PRESIDENCY UNIVERSITY

(Established under the Presidency University Act, 2013 of the Karnataka Act 41 of 2013)

INTEGRATION OF SUSTAINABLE DEVELOPMENT GOALS IN CURRICULA

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Overview

Presidency University offers a dynamic and outcome-based curriculum, modelled on the recommendations of statutory bodies to fulfil the needs at local, regional, national and global level for improving the quality of life, environment and sustainability. The curriculum considers the interdisciplinary learning, which is essential for developmental needs, while framing the Programme Outcomes, Programme Specific Outcomes, and Course Outcomes. The quality framework is based on NBA, NAAC, CRISIL and ISO 9001-2015. The guidelines of regulatory bodies are duly complied with. In order to address the needs at global level, the curriculum design at Presidency University takes into consideration the Sustainable Development Goals formulated by the United Nations, as one of the key parameters. Similarly themes such as Clean Water and Sanitation, Affordable and Clean Energy, Knowledge-based Society, Self-reliance and more, are considered at the national level. The current regional/local priorities like Information technology, Aerospace, Biodiversity and Environment Conservation, Horticulture, Entrepreneurship & Innovation are duly considered. In addition, during implementation/delivery, the curriculum is aligned to national initiatives like "Make in India" "Digital India" "Atmanirbhar" and many more

Implementation in the Curricula:

To state some courses in the Presidency University's curriculum addressing the current needs are – Water management, Urban Transportation, Hybrid Vehicles, Portfolio management, Family business management, Mind Management and Project Centric learning.

Detailing the Needs in the Form of PO/PSO/COs:

It is mandatory to have PEOs, POs, PSOs and COs defined in all programs, as part of Outcome Based Education, commonly driven by a set of Graduate Attributes (GA's). All programs within Presidency University holistically address fundamental knowledge in chosen areas like natural sciences/engineering/ humanities and social science courses (Graduate Attribute-1: Fundamental Knowledge), thus enabling the students to solve complex problems (GA-2). These are addressed through courses to strengthen foundations in economics or mathematics or application-oriented courses like agricultural microbiology or cognitive psychology. Analysis and Design (i.e., GA-3, GA-4) skills are provided through laboratory, mini/Capstone projects. Use of modern tools & techniques (GA-5) is part of both theory and practical courses within the Presidency University curriculum. Use of tools like Network simulator (NS2), MATLAB, SPSS (Statistical software) are some examples. The mini/ Capstone projects/internship which are integral parts of the curriculum address teamwork (GA-6), and Communication (GA7). In addition, these projects also inculcate project management & finance skills (GA-11) and Ethics (GA-10). In addition, emphasis on entrepreneurship and competitive activities (such as hackathon, Idea contest and so-on) and exposure to the Technology Business Incubator (TBI) ensure development of higher order critical thinking and skills. While undergoing internships at premier R&D labs/industry, students learn professional practices (GA-8). Many of the courses have self-learning components that make the students aware of the basic tenets of life-long learning (GA-12). A significant portion of our students also do projects in-house where the faculty members encourage those to take projects that have societal impact (GA-9). Diverse departments strive to develop courses for emerging demands as exemplified in Cyber Security, Translation of literary text, VFX and more which are reflected in the PSOs.

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Eight Schools Under Presidency University

Presidency University has 8 Schools – SOE, SOCSE, SOIS, SOD, SOL, SOM, SOMS, SOL. Each school has multiple programmes under their auspices. The Programs are Integrated/Accredited/Recognized by Global Professional Bodies or Industry led/integrated/recognized or led by Legendary Professionals. The programs cater to the Global, National, Regional and Local developmental needs. During the designing of the programme, these needs are considered and the same is reflected in Programme outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) of the Programmes offered by the Presidency University.

All courses offered by our Presidency University are benchmarked against the curriculum of Global Professional Bodies, led by leading industries, legendary professionals globally well-known, the curriculum design enables a prospective learner to keep pace with emerging trends of business or technology in the ever-dynamic global environment where changes are constant and continuous.

Relevance of Curriculum to Local, Regional, National and Global Developmental Needs

At Presidency University we have identified a set of priorities for the present and in the medium terms which have relevance to global, national, state/regional and local/Bengaluru, development needs. These priorities have been the guiding post Presidency University's curriculum development activities. A detailed list of these priorities is provided below with specific serial numbers.

In the global perspective, the Sustainable Development Goals (SDGs) of the UN that address issues such as poverty, hunger, well-being, clean water, environment, etc., have been identified. Similarly, from the perspective of national priorities we have adopted self-sufficiency, access to affordable health, digitization and more. At a state level the emphasis is on biodiversity, water resource development, etc. and finally at the local level the emphasis is on urban development & utilities, entrepreneurship, creating a talent pool for hi-tech industry and more.

In the following pages we have taken an illustrative set of courses (about 170+) and mapped these local, national, regional, and global developmental needs and also the mapping of the relevant Programme outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) mapping across various programmes offered by the Presidency University. The sustainable Development Goals Include a focus on Global, National, Regional and Local Developmental needs. The following indicate our guiding points for each category.

Global Development Needs

Goal Number	Main Topic	Details
GDG Goal No. 1	No Poverty	End poverty in all its forms everywhere
GDG Goal No. 2	Zero Hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
GDG Goal No. 3	Good Health and wellbeing	Ensure healthy lives and promote wellbeing for all at all ages

GDG Goal No. 4	Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
GDG Goal No. 5	Gender Equality	Achieve gender equality and empower all women and girls
GDG Goal No. 6	Clean water and sanitation	Ensure availability and sustainable management of water and sanitation for all
GDG Goal No. 7	Affordable and Clean Energy	Ensure access to affordable, dependable, sustainable, and modern energy for all
GDG Goal No. 8	Decent Work and Economic Growth	Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all
GDG Goal No. 9	Industry, Innovation, and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
GDG Goal No. 10	Reduced inequality	Reduce inequality within and among countries
GDG Goal No. 11	Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient, and sustainable
GDG Goal No. 12	Responsible Consumption and Production	Ensure sustainable consumption and production patterns
GDG Goal No. 13	Climate Action	Take urgent action to combat climate change and its impacts*
GDG Goal No. 14	Life Below Water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
GDG Goal No. 15	Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
GDG Goal No. 16	Peace and Justice Strong Institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
GDG Goal No. 17	Partnerships to achieve the Goal	Strengthen the means of implementation and revitalize the global partnership for sustainable development

National Development Needs

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Goal Number	Main Topic	Details
NDG Goal No. 1	Infrastructure Development	The infrastructure is important for faster economic growth and alleviation of poverty in the country. The adequate infrastructure in the form of road and railway transport system, ports, power, airports and their efficient working is also needed for integration of the Indian economy with other economies of the world
NDG Goal No. 2	Atma Nirbar Bharath	Atma Nirbhar Bharat Abhiyaan or Self-reliant India campaign is the vision of new India envisaged by the Hon'ble Prime Minister. He further outlined five pillars of Aatma Nirbhar Bharat – Economy, Infrastructure, System, Vibrant Demography and Demand.
NDG Goal No. 3	Digital India	Digital India is a campaign launched by the Government of India to ensure the Government's services are made available to citizens electronically by improved online infrastructure and by increasing Internet connectivity or making the country digitally empowered in the field of technology.
NDG Goal No. 4	Atma Nirbar Swasth Bharath Yojana	The scheme announced during the Budget 2021, is to develop capacities of primary, secondary, and tertiary care health systems, strengthen existing national institutions, and create new institutions, to cater to detection and cure of new and emerging diseases.
NDG Goal No. 5	Innovation & Entrepreneurship	Entrepreneurship is important for a number of reasons, from promoting social change to driving innovation. Entrepreneurs are frequently thought of as national assets to be cultivated, motivated, and remunerated to the greatest possible extent.
NDG Goal No. 6	Industry 4.0	Samarth Udyog Bharat 4.0 (Smart Advanced Manufacturing and Rapid Transformation Hubs) under the Department of Heavy Industries (Ministry of Heavy Industries & Public Enterprises) is the India's initiative to push for Industry 4.0 implementation with an aim to propagate technological solutions to Indian manufacturing units by 2025 through steps like awareness programme, training, demo centres etc.
NDG Goal No. 7	Environment and Sustainability	in a country like India, it does not only require development but also sustainable development. Our Prime Minister, Mr. Modi speaking at last year's United Nations Sustainable Development Summit— welcomed the 15 year blueprint and noted that "much of India's development agenda is mirrored in the Sustainable Development Goals".
NDG Goal No. 8	Energy	Even though India has achieved a fast and remarkable economic growth, energy is still scarce. Strong economic growth in India is escalating the demand for energy, and more energy sources are required to cover this demand

NDG Goal No. 9	Swach Bharath	Swachh Bharat Abhiyan was launched by the Government of India to solve the problems of sanitation and waste management in India by ensuring hygiene across the country. The main aim of the project is to create sanitation facilities for all and provide every rural family with a toilet by 2019. Prime Minister has directly linked clean India with the economic health of the country. There is no doubt that cleanliness is interlinked with the country's tourism and global interests.
NDG Goal No. 10	Water Management	India has only about 4 per cent of the world's renewable water resources but is home to nearly 18 per cent of the world's population Due to increasing demand for domestic, industrial and agriculture uses, most water resources are stressed
NDG Goal No. 11	Urban Renewal	Urban Renewal in India is a comprehensive presentation of the theoretical, strategic and technical aspects of urban renewal. It has been identified across the world as one of the most crucial processes for ensuring optimal development of urban spaces.
NDG Goal No. 12	Trillion Dollar Economy	Prime Minister in 2019 envisioned making India a USD 5 trillion economy and a global economic powerhouse by 2024. With this, India would become the third largest economy in the world.
NDG Goal No. 13	Women Empowerment	Though the principle of gender equality is enshrined in the Indian Constitution, we like other countries have to ensure equal participation in any facets of our economy.
NDG Goal No. 14	Skill Development	The Ministry of Skill Development and Entrepreneurship through National Skill Development Corporation has implemented Pradhan Mantri Kaushal Vikas Yojana (PMKVY) with the objective to enable a large number of Indian youth to take up industry relevant skill training that will help them in securing a better livelihood.
NDG Goal No. 15	Eradication of Poverty and social wellness	Global reduction in extreme poverty was driven by Asia – notably China and India. Between India has reduced the poverty to 27.5% from 54.7% in eh last decade, but still we have a long way to ago in alleviating more than 300+ million people who are under poverty
NDG Goal No. 16	Quality Education	Every girl and boy in India have the fundamental right to quality education, an education one that helps them to acquire basic literacy and numeracy, enjoy learning without fear and feel valued and included irrespective of where they come from.

Regional Developmental Needs:

Goal Number	Main Topic	Details
RDG Goal No. 1	Relevance	All global and national and regional priorities are equally relevant to city/locally (Bangalore - Yelahanka, Rajanukunte, Itgalpura)
RDG Goal No. 2	Environment, Biodiversity and conservation	Karnataka has some unique biodiversity in term its flora and fauna like it supports 10% of total tiger population and 25% of elephant population of the country, the state has around 4500 species of flowering plants, etc., which need to be protected when we move towards sustainable development
RDG Goal No. 3	Horticulture, Floriculture	In Karnataka, there are 18,000 hectares under floriculture cultivation. Karnataka is into floriculture for over 300 years. The Tigala community near Devanahalli and Chickaballapur are extremely good at growing flowers. In the last decade Karnataka has been able to make steady progress in exporting its flowers world-wide, which needs to be nurtured and developed further
RDG Goal No. 4	Water Resources Development	As mentioned earlier, at a national level too water management is a key priority. The state being in the forefront of economic activity sustainable development is a key parameter and more so for irrigation, portability to civilian settlements

Local Developmental Needs

Goal Number	Main Topic	Details
LDG Goal No. 1	Relevance	All global and national and regional priorities are equally relevant to city/locally (Bangalore - Yelahanka, Rajanukunte, Itgalpura)
LDG Goal No. 2	Aerospace, IT, BT	As Bangalore leads the way in IT, fashion, BT, it is also an emerging venue for many aviation, aerospace and defense projects. Bangalore leading its role of the technological capital of India, attracting and nurturing talent for the hitech industry is of critical importance
LDG Goal No. 3	Urban Amenities	As the Bangalore city's population moved towards a million and more, it has put a lot of stress on the existing utilities like electricity, transportation, water. The population growth in Bangalore will increase over the year, putting much strain on the urban utilities, which needs to be managed

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LDG Goal No. 4	Smart City infrastructure	Utilities need to move towards technology adoption i.e. smart infrastructure. Towards this the Govt of India has initiated the Smart City model across various cities with the objective. Bangalore being the tech capital of the country the expectations of its residents it access many of the city's infrastructure through "smart means"
LDG Goal No. 5	Entrepreneurship & Start-ups	Bangalore, often known as India's hottest startup and IT residential neighbourhood. Bengaluru (Bangalore) is an opportunity thriving city with a GDP of $45billion but also with a population of 8.7million. The focus of the economic development in the city has already moved a significant distance in making its marking from MNC companies to local MNC start-ups

SCHOOL OF ENGINEERING
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE NAME : VLSI Design
COURSE CODE : ECE3008
PROGRAM NAME : B.Tech. Electronics and Communication Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9
National	Goal Nos. 3,5,6,8,16
Regional	Goal Nos. 1
Local	Goal Nos. 2,4,5

Program Outcomes (POs):
- **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-12**: Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-3**: An ability to be a successful researcher by identifying, formulating and solving the security, Defence and VLSI Design related problems.

Course Outcomes (COs):
- **CO-1**: Discuss the basic concepts of VLSI design.
- **CO-2**: Interpret the MOS transistor theory.
- **CO-3**: Evaluate the working of various CMOS combinational and sequential circuits.
- **CO-4**: Develop combinational and sequential circuits using Hardware Description Language.
- **CO-5**: Compute various design parameters of digital circuits using cadence tool.

COURSE NAME : **Embedded Systems**

COURSE CODE : **ECE3040**

PROGRAM NAME : **B.Tech. Electronics and Communication Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9
National	Goal Nos. 3,5,6,13,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 2,4,5

Program Outcomes (POs):

➢ **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

➢ **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

➢ **PO-12**:Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**: An ability to be a successful engineer by applying the knowledge of signal processing, embedded systems and antenna design.

Course Outcomes (COs):

➢ **CO-1**: Describe Embedded Systems and their Interfacing to the Analogue world

➢ **CO-2**: Distinguish between various ARM architecture versions

➢ **CO-3**: Program ARM processors using Assembly and C Languages

➢ **CO-4**: Understand the concept of Real Time Operating systems

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COURSE NAME   **: Wearable Devices and its Applications**

COURSE CODE   : ECE3063

PROGRAM NAME   : B.Tech. Electronics and Communication Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9
National	Goal Nos. 3,5,6,13,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 2,4,5

Program Outcomes (POs):
- **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-4**: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6**: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-12**:Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to be a successful engineer by applying the knowledge of signal processing, embedded systems and antenna design.
- **PSO-2**: An ability to be a successful entrepreneur by understanding the impact of wireless communication, networking and provide solutions to real world problems related to global, environmental and socio-economic context.
- **PSO-4**: An ability to identify, formulate and solve the communication engineering problems from knowledge gained during the course to work in a team as well as to lead a team.

Course Outcomes (COs):
- **CO-1**: Understand the Needs Addressed by this Course for development of wearable devices and their influence on varioussectors.
- **CO-2**: Discuss the applications of various wearable inertial sensors for biomedical applications.

➢ **CO-3**: Identify the use of various wearable locomotive tools for safety, security and navigation.
➢ **CO-4**: Design and develop various wearable devices for detection of biochemical and physiological body signals, environmental monitoring, safety and navigational assistive devices.

COURSE NAME   **: Smart Electonics in Agriculture**

COURSE CODE   **: ECE3097**

PROGRAM NAME   **: B.Tech. Electronics and Communication Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9
National	Goal Nos. 14,16
Regional	Goal Nos. 1,3
Local	Goal Nos. 5

Program Outcomes (POs):
- **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO7. Environment and sustainability: Understand the impact of the professional engineering solutionsin societal and environmental contexts, and demonstrate the knowledge of, and Needs Addressed by this Course for sustainabledevelopment.(M)
- **PO-9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-12**:Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to be a successful engineer by applying the knowledge of signal processing, embedded systems and antenna design.
- **PSO-2**: An ability to be a successful entrepreneur by understanding the impact of wireless communication, networking and provide solutions to real world problems related to global, environmental and socio-economic context.

Course Outcomes (COs):
- **CO-1**: Explain the Components and Process of Agriculture.
- **CO-2**: Demonstrate the electronics smart sensors and embedded systems.
- **CO-3**: Employ techniques for cloud based application in agriculture.

COURSE NAME : Industrial IoT

COURSE CODE : ECE3086

PROGRAM NAME : B.Tech. Electronics and Communication Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9
National	Goal Nos. 3,5,6,13,14,16
Regional	Goal Nos. 1,3
Local	Goal Nos. 2,4,5

Program Outcomes (POs):
- ➤ **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ➤ **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- ➤ **PO-9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- ➤ **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- ➤ **PO-12**:Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- ➤ **PSO-1**: An ability to be a successful engineer by applying the knowledge of signal processing, embedded systems and antenna design.
- ➤ **PSO-2**: An ability to be a successful entrepreneur by understanding the impact of wireless communication, networking and provide solutions to real world problems related to global, environmental and socio-economic context.
- ➤ **PSO-4**: An ability to identify, formulate and solve the communication engineering problems from knowledge gained during the course to work in a team as well as to lead a team.

Course Outcomes (COs):
- ➤ **CO-1**: Demonstrate the importance of Industrial IoT and its layers.
- ➤ **CO-2**: Illustrate the role of data analytics and machine learning in IIoT.
- ➤ **CO-3**: Apply the security and fogcomputing features in IIoT.
- ➤ **CO-4**: Make use of the concepts of IIoT in real applications.

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COURSE NAME   : Embedded System Design
COURSE CODE   : ECE6001
PROGRAM NAME   : M.Tech. Embedded System and VLSI

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,9,11
National	Goal Nos. 1,3,5,6,7,14
Regional	Goal Nos. 1,3
Local	Goal Nos. 2,4,5

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired Needs Addressed by this Courses.
- **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to be a successful engineer by applying the knowledge of Embedded System Design, Software for Embedded Systems, CMOS VLSI Design and Advanced Digital System Design.
- **PSO-2**: An ability to be a successful entrepreneur by understanding the impact of Embedded Systems and provide solutions to real world problems related to global, environmental and socio-economic context specially related to IOT.

Course Outcomes (COs):
- **CO-1**: Select Embedded Systems and the components Needs Addressed by this Courseed to develop such systems.
- **CO-2**: Distinguish various ARM architecture versions and processors.
- **CO-3**: Program ARM processors using Assembly Language and C Languages.
- **CO-4**: Interface various on-chip as well as off-chip peripherals to develop embedded applications.
- **CO-5**: Develop Embedded C programs for various real world applications

COURSE NAME : CMOS VLSI Design

COURSE CODE : ECE6002

PROGRAM NAME : M.Tech. Embedded System and VLSI

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9
National	Goal Nos. 3,5,6,8,16
Regional	Goal Nos. 1
Local	Goal Nos. 2,4,5

Program Outcomes (POs):
- ➢ **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- ➢ **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- ➢ **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:An ability to be a successful engineer by applying the knowledge of Embedded System Design, Software for Embedded Systems, CMOS VLSI Design and Advanced Digital System Design.
- ➢ **PSO-3**: An ability to be a successful researcher by identifying, formulating and solving the security, Defence and VLSI Design related problems.

Course Outcomes (COs):
- ➢ **CO-1**: Discuss the basics of VLSI design and understand the basic VLSI design flow, process flow and design methodologies.
- ➢ **CO-2**: Interpret the MOS transistor theory and various ideal and non-ideal characteristics of MOS transistors.
- ➢ **CO-3**: Evaluate the working of various CMOS combinational and sequential circuits.
- ➢ **CO-4**: Develop combinational and sequential circuits using Hardware Description Language.
- ➢ **CO-5**: Compute various design parameters of digital circuits using cadence tool.

COURSE NAME   : IC Fabrication Technology
COURSE CODE   : ECE5016
PROGRAM NAME   : M.Tech. Embedded System and VLSI

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9
National	Goal Nos. 2,3,5,6,7,8,16
Regional	Goal Nos. 1
Local	Goal Nos. 2,4,5

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-2**:An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired Needs Addressed by this Courses.
- **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**:An ability to be a successful engineer by applying the knowledge of Embedded System Design, Software for Embedded Systems, CMOS VLSI Design and Advanced Digital System Design.
- **PSO-3**: An ability to be a successful researcher by identifying, formulating and solving the security, Defence and VLSI Design related problems.

Course Outcomes (COs):
- **CO-1**: Describe the process involved in semiconductor crystal growth and fabrication.
- **CO-2**: Classify various lithography and etching techniques used for pattern transfer
- **CO-3**: Summarize the diffusion and ion implantation mechanisms in IC fabrication.
- **CO-4**: Discuss the process involved in packaging and yield.

COURSE NAME : **Wearable Computing**

COURSE CODE : **ECE5001**

PROGRAM NAME : **M.Tech. Embedded System and VLSI**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9
National	Goal Nos. 3,5,6,8,16
Regional	Goal Nos. 1
Local	Goal Nos. 2,4,5

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired Needs Addressed by this Courses.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-2**: An ability to be a successful entrepreneur by understanding the impact of Embedded Systems and provide solutions to real world problems related to global, environmental and socio-economic context specially related to IOT.
- **PSO-4**: An ability to identify, formulate and solve the communication engineering problems from knowledge gained during the course to work in a team as well as to lead a team.

Course Outcomes (COs):
- **CO-1**: Identify the attributes, components, requirements and challenges of Wearable Computing.
- **CO-2**: Select wearable sensors and signal processing techniques to meet low power design requirements.
- **CO-3**: Employ techniques for modeling context, emotion, activity and data mining for wearable devices.
- **CO-4**: Illustrate various future applications and associated issues.

COURSE NAME   : **MEMS and Nanotechnology**

COURSE CODE   : **ECE5002**

PROGRAM NAME   : **M.Tech. Embedded System and VLSI**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9
National	Goal Nos. 3,5,6,8,16
Regional	Goal Nos. 1
Local	Goal Nos. 2,4,5

Program Outcomes (POs):
- **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-3**: An ability to be a successful researcher by identifying, formulating and solving the security, Defence and VLSI Design related problems.

Course Outcomes (COs):
- **CO-1**: Discuss Methods for Processing MEMS materials
- **CO-2**: Develop Characteristic techniques of micro system fabrication
- **CO-3**: Demonstrate the concepts of Nano technology
- **CO-4**: Illustrate Nano materials and various Nano measurements techniques
- **CO-5**: Implement Nano scale manufacturing

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SCHOOL OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME   : **Power Electronics**
COURSE CODE   : **EEE2019**
PROGRAM NAME   : **B.Tech. Electrical and Eletronics Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 6,8
Regional	Goal Nos. 2
Local	Goal Nos. 2,3

Program Outcomes (POs):

➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Specific Outcomes (PSOs):

➢ **PSO-1**: [Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Power System and Power Electronics & drives and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.

➢ **PSO-2**: [Design/development of Solutions]:Design, develop and solve complex engineering problems related to modern Power System and Power Electronics & drives by designing system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

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➢ **PSO-3**: [Modern Tool usage]:Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities related to modern Power System and Power Electronics & drives to provide a feasible solutions.

Course Outcomes (COs):
➢ **CO-1**: Select the suitable semiconductor switching device in the design of power converters
➢ **CO-2**: Apply the phase-controlled technique in control of AC-DC converters with different loads
➢ **CO-3**: Demonstrate the operation of Choppers and AC Voltage controllers
➢ **CO-4**: Explain the operation and control of Inverters

COURSE NAME : Electrical Machines-II

COURSE CODE : EEE2017

PROGRAM NAME : B.Tech. Electrical and Eletronics Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 6,14
Regional	Goal Nos. 3
Local	Goal Nos. 2,3

Program Outcomes (POs):

- **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-12**: Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

- **PSO-1**: [Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Power System and Power Electronics & drives and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-2**: [Design/development of Solutions]:Design, develop and solve complex engineering problems related to modern Power System and Power Electronics & drives by designing system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):

- **CO-1**: Describe the operation of alternators.
- **CO-2**: Explain the principle of operation of synchronous motors.
- **CO-3**: Analyze the performance of the three phase Induction using the phasor diagrams and equivalent circuits
- **CO-4**: Analyze the performance of the single phase Induction motors.

COURSE NAME   : **Microprocessor and Microcontrollers**
COURSE CODE   : EEE2005
PROGRAM NAME : B.Tech. Electrical and Eletronics Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 1,3,5,10
Regional	Goal Nos. 2
Local	Goal Nos. 2,5

Program Outcomes (POs):
- **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Specific Outcomes (PSOs):
- **PSO-1**: [Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Power System and Power Electronics & drives and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-2**: [Design/development of Solutions]:Design, develop and solve complex engineering problems related to modern Power System and Power Electronics & drives by designing system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.
- **PSO-3**: [Modern Tool usage]:Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities related to modern Power System and Power Electronics & drives to provide a feasible solutions.

Course Outcomes (COs):

- **CO-1**: Describe the architectural features of microprocessors and microcontrollers.
- **CO-2**: Explain the addressing modes, instruction set and I/O port programming of microcontroller.
- **CO-3**: Discuss the various timers/ counter operations
- **CO-4**: Discuss the programming and Interfacing of peripheral devices with microcontroller.
- **CO-5**: Demonstrate various arithmetic operation, the Interrupt system, operation of Timers/Counters and Serial port of 8051
- **CO-6**: Demonstrate the interfacing of the microcontroller experimentally to control some of the electric devices.

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COURSE NAME   : Transmission & Distribution
COURSE CODE   : EEE2021
PROGRAM NAME : B.Tech. Electrical and Eletronics Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 7,11
National	Goal Nos. 1,7,8
Regional	Goal Nos. 3,4
Local	Goal Nos. 3,4

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-7**: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and Needs Addressed by this Course for sustainable development.
- **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Specific Outcomes (PSOs):
- **PSO-1**: [Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Power System and Power Electronics & drives and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-2**: [Design/development of Solutions]:Design, develop and solve complex engineering problems related to modern Power System and Power Electronics & drives by designing system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
- **CO-1**: Explain the basic structure of Transmission and Distribution System.
- **CO-2**: Solve the numerical examples of computation of performance of a transmission line
- **CO-3**: Summarize the several of types Insulators and the concept of Corona
- **CO-4**: Explain the use of Under Ground Cables for Power Transmission.
- **CO-5**: Summaries different distributions systems.

COURSE NAME   : **Power System Analysis**

COURSE CODE   : **EEE3002**

PROGRAM NAME : **B.Tech. Electrical and Eletronics Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 7,10,12
National	Goal Nos. 1,2,8,14
Regional	Goal Nos. 2,4
Local	Goal Nos. 3,4

Program Outcomes (POs):
  ➢ **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
  ➢ **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
  ➢ **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
  ➢ **PO-4**: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
  ➢ **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

Program Specific Outcomes (PSOs):
  ➢ **PSO-1**: [Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Power System and Power Electronics & drives and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.
  ➢ **PSO-2**: [Design/development of Solutions]:Design, develop and solve complex engineering problems related to modern Power System and Power Electronics & drives by designing system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.
  ➢ **PSO-3**: [Modern Tool usage]:Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities related to modern Power System and Power Electronics & drives to provide a feasible solutions.

Course Outcomes (COs):
  ➢ **CO-1**: Model the network of power system components

- ➢ **CO-2**: Apply GS and NR methods to compute the load flow for given power system netbook
- ➢ **CO-3**: Analyze the fault current in power system for different types of faults
- ➢ **CO-4**: Illustrate the concept of stability of power system.
- ➢ **CO-5**: Analyse the concept of contingency of power system.

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SCHOOL OF ENGINEERING
DEPARTMENT OF CIVIL ENGINEERING

COURSE NAME   : Surveying
COURSE CODE   : CIV1005
PROGRAM NAME : B.Tech. Civil Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9,11,17
National	Goal Nos. 1,2,11,14
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,4

Program Outcomes (POs):
- **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Specific Outcomes (PSOs):
- **PSO-1**: Use technical, teamwork and communication skills along with leadership principles, to pursue civil engineering courses in area such as structural, transportation, geotechnical, materials, environment, construction and water resources engineering fields.
- **PSO-2**: Understanding and applying the mathematical and scientific concepts for analytical and design skills concerned with civil engineering practice
- **PSO-4**: Sensitizing towards contemporary issues, societal Needs Addressed by this Courses with professionalism and ethics for sustainable development.

Course Outcomes (COs):
- **CO-1**: Apply the knowledge of fundamental principles of surveying to establish points by predetermined linear and angular measurements.

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- ➢ **CO-2**: Compute the distance and elevation using the concepts of levelling by direct or indirect method.
- ➢ **CO-3**: Interpret the details of field and contours on sheet by site mapping using the concepts of plane table survey and contouring

COURSE NAME   : Environmental Pollution and Control
COURSE CODE   : CIV2027
PROGRAM NAME   : B.Tech. Civil Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,6,9,13,17
National	Goal Nos. 1,2,7,9,10
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,4

Program Outcomes (POs):
  - **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
  - **PO-6**: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
  - **PO-7**: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and Needs Addressed by this Course for sustainable development.
  - **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
  - **PO-12**: Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
  - **PSO-1**: Use technical, teamwork and communication skills along with leadership principles, to pursue civil engineering courses in area such as structural, transportation, geotechnical, materials, environment, construction and water resources engineering fields.
  - **PSO-3**: Engage in life-long learning through independent study and by participating in professional conferences, workshops, seminars, or continuing education by post graduate degree and research.
  - **PSO-4**: Sensitizing towards contemporary issues, societal Needs Addressed by this Courses with professionalism and ethics for sustainable development.

Course Outcomes (COs):
  - **CO-1**: Identify the various sources of water pollution and control methods.
  - **CO-2**: Discuss the behavior of air pollutants in atmosphere and its control strategies.
  - **CO-3**: Infer the impact and control measures of industrial noise Pollution.

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COURSE NAME : **Water Infrastructure Systems**
COURSE CODE : **CIV2047**
PROGRAM NAME : **B.Tech. Civil Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3, 6, 9, 11
National	Goal Nos. 1, 2, 7, 10, 11, 14
Regional	Goal Nos. 1, 2, 4
Local	Goal Nos. 1, 3, 4

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-6**: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-7**: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and Needs Addressed by this Course for sustainable development.
- **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-11**: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO-12**:Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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Program Specific Outcomes (PSOs):

- **PSO-1**: Use technical, teamwork and communication skills along with leadership principles, to pursue civil engineering courses in area such as structural, transportation, geotechnical, materials, environment, construction and water resources engineering fields
- **PSO-2**:Understanding and applying the mathematical and scientific concepts for analytical and design skills concerned with civil engineering practice
- **PSO-3**: Engage in life-long learning through independent study and by participating in professional conferences, workshops, seminars, or continuing education by post graduate degree and research
- **PSO-4**: Sensitizing towards contemporary issues, societal Needs Addressed by this Courses with professionalism and ethics for sustainable development

Course Outcomes (COs):

- **CO-1**: Interpret the relevant treatment units/process for surface and subsurface water
- **CO-2**: Relate the process/principles in sizing and locating the treatment units
- **CO-3**: Analyze the comprehensive water distribution system for a locality

COURSE NAME   : **Design of RC Structural Elements**
COURSE CODE   : **CIV3003**
PROGRAM NAME   : **B.Tech. Civil Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9, 11, 12, 17
National	Goal Nos. 1, 2, 5, 11, 14
Regional	Goal Nos. 1
Local	Goal Nos. 1, 3, 4

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-6**: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO-9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-12**:Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**: Use technical, teamwork and communication skills along with leadership principles, to pursue civil engineering courses in area such as structural, transportation, geotechnical, materials, environment, construction and water resources engineering fields
- **PSO-2**:Understanding and applying the mathematical and scientific concepts for analytical and design skills concerned with civil engineering practice

- ➢ **PSO-3**: Engage in life-long learning through independent study and by participating in professional conferences, workshops, seminars, or continuing education by post graduate degree and research
- ➢ **PSO-4**: Sensitizing towards contemporary issues, societal Needs Addressed by this Courses with professionalism and ethics for sustainable development

Course Outcomes (COs):
- ➢ **CO-1**: Illustrate the principles of the limit state design concepts related to the design of RC structures.
- ➢ **CO-2**: Design the reinforced concrete elements subjected to flexure and shear.
- ➢ **CO-3**: Demonstrate the procedural knowledge in designs of RC structural elements such as slabs and columns

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COURSE NAME   : **Infrastructure Systems for Smart Cities**

COURSE CODE   : **CIV2006**

PROGRAM NAME   : **B.Tech. Civil Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3, 6, 8, 9, 11, 17
National	Goal Nos. 1, 2, 3, 6, 7, 8, 9, 10, 11, 15
Regional	Goal Nos. 1, 2, 4
Local	Goal Nos. 1, 3, 4, 5

Program Outcomes (POs):

- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6**: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-7**: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and Needs Addressed by this Course for sustainable development.
- **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO-9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-11**: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO-12**:Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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Program Specific Outcomes (PSOs):

- **PSO-1**: Use technical, teamwork and communication skills along with leadership principles, to pursue civil engineering courses in area such as structural, transportation, geotechnical, materials, environment, construction and water resources engineering fields
- **PSO-2**:Understanding and applying the mathematical and scientific concepts for analytical and design skills concerned with civil engineering practice
- **PSO-3**: Engage in life-long learning through independent study and by participating in professional conferences, workshops, seminars, or continuing education by post graduate degree and research
- **PSO-4**: Sensitizing towards contemporary issues, societal Needs Addressed by this Courses with professionalism and ethics for sustainable development

Course Outcomes (COs):

- **CO-1**: Identify the latest technology enabled systems for the management of cities.
- **CO-2**: Interpret the dynamic behavior of the urban systems for integrating ICT for effective and efficient urban utilities.
- **CO-3**: Demonstrate the urban infrastructure systems to benefit the citizens, based on smart cities concept as responsive cities.

COURSE NAME   : **Construction Planning, Schedule and Control**

COURSE CODE   : **CIV5006**

PROGRAM NAME   : **M.Tech. Building Construction and Technology**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,11
National	Goal Nos. 1,2,5,11,12,14
Regional	Goal Nos. 1
Local	Goal Nos. 1,3

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired Needs Addressed by this Courses.
- **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**: Able to pursue professional career in the constantly changing field of construction, Engineering, Technology
- **PSO-2**: Able to contribute to knowledge base through teaching and research.
- **PSO-3**: Able to practice and promote sustainable construction technologies for social Needs Addressed by this Courses.

Course Outcomes (COs):
- **CO-1**: Describe the basic concepts of construction project management and Project organization.
- **CO-2**: Prepare project Time plan and network diagram for various construction projects.
- **CO-3**: Prepare project Resource schedule by allocating resources and optimizing resource allocation.
- **CO-4**: Apply different monitoring and control techniques to monitor progress of construction projects.
- **CO-5**: Prepare schedule of projects in MS Project/ Primavera software and perform various operations to optimize the schedule.

COURSE NAME   : **Building Services and Building Information Modelling**
COURSE CODE   : **CIV6002**
PROGRAM NAME   : **M.Tech. Building Construction and Technology**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,6,8,9,11,12,13,17
National	Goal Nos. 1,2,3,5,7,9,10,14
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,2,3,4

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired Needs Addressed by this Courses.
- **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**: Able to pursue professional career in the constantly changing field of construction, Engineering, Technology
- **PSO-2**: Able to contribute to knowledge base through teaching and research.
- **PSO-3**: Able to practice and promote sustainable construction technologies for social Needs Addressed by this Courses.

Course Outcomes (COs):
- **CO-1**: Choose the different types of services required for structure.
- **CO-2**: Create projects using Revit Architectural Template and work with Family tools.
- **CO-3**: Demonstrate competency using REVIT to create and document residential buildings and small commercial buildings.

COURSE NAME : Mechanization in Construction

COURSE CODE : CIV5009

PROGRAM NAME : M.Tech. Building Construction and Technology

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9,11
National	Goal Nos. 1,2,5,6,11,14
Regional	Goal Nos. 1
Local	Goal Nos. 1,3,5

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**: Able to pursue professional career in the constantly changing field of construction, Engineering, Technology
- **PSO-2**: Able to contribute to knowledge base through teaching and research.
- **PSO-3**: Able to practice and promote sustainable construction technologies for social Needs Addressed by this Courses.

Course Outcomes (COs):
- **CO-1**: Identify different Construction methods and its application.
- **CO-2**: Recognize the latest techniques used in surface and subsurface construction.
- **CO-3**: Discuss the methods of drilling and blasting in tunnels and components of a tower crane
- **CO-4**: Relate with different automated and robotic systems used in construction.

COURSE NAME   : **Retrofitting and Repair Techniques**

COURSE CODE   : **CIV6004**

PROGRAM NAME : **M.Tech. Building Construction and Technology**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9,11,17
National	Goal Nos. 1,2,5,6,11,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,3

Program Outcomes (POs):
- ➢ **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- ➢ **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired Needs Addressed by this Courses.
- ➢ **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- ➢ **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- ➢ **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**: Able to pursue professional career in the constantly changing field of construction, Engineering, Technology
- ➢ **PSO-2**: Able to contribute to knowledge base through teaching and research.
- ➢ **PSO-3**: Able to practice and promote sustainable construction technologies for social Needs Addressed by this Courses.

Course Outcomes (COs):
- ➢ **CO-1**: Describe the cause(s) for deterioration of structures.
- ➢ **CO-2**: Explain the Non-Destructive Test (NDT) methods available for conditional field assessment of a structure
- ➢ **CO-3**: Choose repair material(s) to retrofit a deficient member.
- ➢ **CO-4**: Demonstrate appropriate method for retrofitting a distressed structure.

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COURSE NAME   : **Self-Sustainable Buildings**
COURSE CODE   : **CIV5003**
PROGRAM NAME   : **M.Tech. Building Construction and Technology**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,6,7,9,11,12,13,15
National	Goal Nos. 1,2,5,7,8,9,10,11,14
Regional	Goal Nos. 1,2,4
Local	Goal Nos. 1,3,4,5

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired Needs Addressed by this Courses.
- **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**: Able to pursue professional career in the constantly changing field of construction, Engineering, Technology
- **PSO-2**: Able to contribute to knowledge base through teaching and research.
- **PSO-3**: Able to practice and promote sustainable construction technologies for social Needs Addressed by this Courses.

Course Outcomes (COs):
- **CO-1**: Recognize the importance of sustainability and prepare Life Cycle Analysis.
- **CO-2**: Discuss the construction materials of green building and their properties.
- **CO-3**: Infer the performance rating of green building with zero energy to overcome harmful impacts of Indoor air pollution.

SCHOOL OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING

COURSE NAME   : Renewable Energy Systems
COURSE CODE   : MEC2001
PROGRAM NAME : B.Tech. Mechanical Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3, 4, 6, 7, 8, 11, 12, 13
National	Goal Nos. 2, 7, 8, 11
Regional	Goal Nos. 1, 2
Local	Goal Nos. 1, 4, 5

Program Outcomes (POs):
- **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO-9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
- **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO-12**: Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

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- ➢ **PSO-1**: Employbility: Acquire technical and managerial skill that make them an employable graduate.
- ➢ **PSO-2**: Research: Acquire theoretical background of each course that they are capable of applying it for solving real-time (Physical) problems.
- ➢ **PSO-3**: Entrepreneurship: Acquire time management, strategic thinking, team work, and network though out their course study and project work enable them to be an entrepreneurship.

Course Outcomes (COs):
- ➢ **CO-1**: Identify the different types of non-conventional energy sources and compare with various conventional energy systems, their prospects and limitations.
- ➢ **CO-2**: Describe the use of solar energy and the various components used in the energy production with respect to applications.
- ➢ **CO-3**: Appreciate the Needs Addressed by this Course of Wind Energy and the various Biomass Energy sources and know their classifications with applications.
- ➢ **CO-4**: Acquire the knowledge of fuel cells, with emphasis on hydrogen energy.

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COURSE NAME   : Electronics Waste Management
COURSE CODE   : MEC3070
PROGRAM NAME   : B.Tech. Mechanical Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3, 11, 13
National	Goal Nos. 5, 7, 9
Regional	Goal Nos. 1, 2
Local	Goal Nos. 1, 5

Program Outcomes (POs):
- **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-6**: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-7**: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and Needs Addressed by this Course for sustainable development.
- **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-12**: Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**: Employbility: Acquire technical and managerial skill that make them an employable graduate.
- **PSO-2**: Research: Acquire theoretical background of each course that they are capable of applying it for solving real-time (Physical) problems.
- **PSO-3**: Entrepreneurship: Acquire time management, strategic thinking, team work, and network though out their course study and project work enable them to be an entrepreneurship.

Course Outcomes (COs):

- ➢ **CO-1**: Understand the present scenario of E-waste generation in India and the world and the opportunities associated with precious E-Waste elements.
- ➢ **CO-2**: Understand the effect of E-Waste elements on environment and public health.
- ➢ **CO-3**: Classify the different existing recycling technique of E-Waste.
- ➢ **CO-4**: Understand the tool such as Python (Pandas) to draw insight from E-waste data.

REGISTRAR

COURSE NAME   : **Applied Thermodynamics**
COURSE CODE   : **MEC4003**
PROGRAM NAME : **B.Tech. Mechanical Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8, 9, 12
National	Goal Nos. 1, 8, 12
Regional	Goal Nos. 1
Local	Goal Nos. 1, 2, 3

Program Outcomes (POs):
- ➢ **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- ➢ **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- ➢ **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- ➢ **PO-9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
- ➢ **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**: Employbility: Acquire technical and managerial skill that make them an employable graduate.
- ➢ **PSO-2**: Research: Acquire theoretical background of each course that they are capable of applying it for solving real-time (Physical) problems.

Course Outcomes (COs):
- ➢ **CO-1**: Apply the first law and second law of thermodynamics to analyses the reciprocating internal combustion engine.
- ➢ **CO-2**: Apply the first law and second law of thermodynamics to analyses the gas turbine.
- ➢ **CO-3**: Apply the first law and second law of thermodynamics to analyses the vapor power cycle.
- ➢ **CO-4**: Apply the first law and second law of thermodynamics to analyses the refrigeration cycle.

COURSE NAME : **Introduction to Additive Manufacturing and Its Applications**
COURSE CODE : **MEC3002**
PROGRAM NAME : **B.Tech. Mechanical Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4, 8 , 9 ,12
National	Goal Nos. 2, 5, 6
Regional	Goal Nos. 1
Local	Goal Nos. 1, 2, 4

Program Outcomes (POs):
  - **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
  - **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
  - **PO-6**: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
  - **PO-7**: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and Needs Addressed by this Course for sustainable development.
  - **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
  - **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
  - **PO-12**: Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
  - **PSO-1**: Employbility: Acquire technical and managerial skill that make them an employable graduate.
  - **PSO-3**: Entrepreneurship: Acquire time management, strategic thinking, team work, and network though out their course study and project work enable them to be an entrepreneurship.

Course Outcomes (COs):
  - **CO-1**: Identify the different AM techniques.
  - **CO-2**: Explain the Design considerations in AM.
  - **CO-3**: Illustrate the post processing.
  - **CO-4**: Summarize the AM process selection and its applications.

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COURSE NAME : Design of Machine Elements I

COURSE CODE : MEC3004

PROGRAM NAME : B.Tech. Mechanical Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4, 8, 9
National	Goal Nos. 1, 2, 12
Regional	Goal Nos. 1
Local	Goal Nos. 1, 2, 5

Program Outcomes (POs):

➢ **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-6**: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

➢ **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

➢ **PO-9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

➢ **PO-10**: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Specific Outcomes (PSOs):

➢ **PSO-1**: Employbility: Acquire technical and managerial skill that make them an employable graduate.

➢ **PSO-2**: Research: Acquire theoretical background of each course that they are capable of applying it for solving real-time (Physical) problems.

➢ **PSO-3**: Entrepreneurship: Acquire time management, strategic thinking, team work, and network though out their course study and project work enable them to be an entrepreneurship.

Course Outcomes (COs):

- **CO-1**: Analyze machine components against static and dynamic loads using theories of failure.
- **CO-2**: Design springs for withstanding static and fatigue loads
- **CO-3**: Design welded, riveted and bolted joints for general applications
- **CO-4**: Design keys, cotter and knuckle joints for motion transmission.
- **CO-5**: Design shafts, design engine components like gear.

COURSE NAME : Industry 4.0

COURSE CODE : MEC5002

PROGRAM NAME : M.Tech. Product Design and Development

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8, 9, 11
National	Goal Nos. 2, 6, 12
Regional	Goal Nos. 1
Local	Goal Nos. 1, 2

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired Needs Addressed by this Courses.
- **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**: Employbility: Acquire technical and managerial skill that make them an employable graduate.
- **PSO-2**: Research: Acquire theoretical background of each course that they are capable of applying it for solving real-time (Physical) problems.
- **PSO-3**: Entrepreneurship: Acquire time management, strategic thinking, team work, and network though out their course study and project work enable them to be an entrepreneur.

Course Outcomes (COs):
- **CO-1**: Describe Industry 4.0 and scope for Indian Industry.
- **CO-2**: Demonstrate conceptual framework and road map of Industry 4.0.
- **CO-3**: Describe Robotic technology and Augmented reality for Industry 4.0.
- **CO-4**: Demonstrate obstacle and framework conditions for Industry 4.0.

COURSE NAME : Design for Manufacture, Assembly and Environments

COURSE CODE : MEC5011

PROGRAM NAME : M.Tech. Product Design and Development

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8, 11, 13
National	Goal Nos. 6, 14
Regional	Goal Nos. 1, 2
Local	Goal Nos. 1, 2

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**: Employbility: Acquire technical and managerial skill that make them an employable graduate.
- **PSO-2**: Research: Acquire theoretical background of each course that they are capable of applying it for solving real-time (Physical) problems.
- **PSO-3**: Entrepreneurship: Acquire time management, strategic thinking, team work, and network though out their course study and project work enable them to be an entrepreneur.

Course Outcomes (COs):
- **CO-1**: Design product for ease of manual, automatic and robot assembly.
- **CO-2**: Design a product for ease of manufacturing.
- **CO-3**: Apply principles of design for environment in the product design.
- **CO-4**: Develop a preliminary implementation plan, update standard work procedures and write an action plan.

COURSE NAME : Global Product Design and Supply Chain

COURSE CODE : MEC5018

PROGRAM NAME : M.Tech. Product Design and Development

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8, 9, 11, 12
National	Goal Nos. 2, 5, 7, 9, 10
Regional	Goal Nos. 1, 2
Local	Goal Nos. 1, 2, 3, 5

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**: Employbility: Acquire technical and managerial skill that make them an employable graduate.
- **PSO-2**: Research: Acquire theoretical background of each course that they are capable of applying it for solving real-time (Physical) problems.
- **PSO-3**: Entrepreneurship: Acquire time management, strategic thinking, team work, and network though out their course study and project work enable them to be an entrepreneur.

Course Outcomes (COs):
- **CO-1**: Summarize the impact of product design on supply chain.
- **CO-2**: Devise a global product with minimized Supply Chain risk.
- **CO-3**: Build agility in product design using modern approaches.
- **CO-4**: Interpret the impact of product design on sustainability.

COURSE NAME   **: Additive Manufacturing**

COURSE CODE   **: MEC5006**

PROGRAM NAME   **: M.Tech. Product Design and Development**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4, 8 , 9 ,12
National	Goal Nos. 2, 5, 6
Regional	Goal Nos. 1
Local	Goal Nos. 1, 2, 4

Program Outcomes (POs):
- ➢ **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- ➢ **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired Needs Addressed by this Courses.
- ➢ **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- ➢ **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**: Employbility: Acquire technical and managerial skill that make them an employable graduate.
- ➢ **PSO-2**: Research: Acquire theoretical background of each course that they are capable of applying it for solving real-time (Physical) problems.
- ➢ **PSO-3**: Entrepreneurship: Acquire time management, strategic thinking, team work, and network though out their course study and project work enable them to be an entrepreneur.

Course Outcomes (COs):
- ➢ **CO-1**: Identify the stages of development related to AM system and classification based of material.
- ➢ **CO-2**: Prepare the model from modelling software to 3D printer version.
- ➢ **CO-3**: Compare different AM process based on process paramete.
- ➢ **CO-4**: Analyze suitable orientation workflow for better part fabrication process & reduced part build errors.
- ➢ **CO-5**: Demonstrate models with 3D machine for different applications.

COURSE NAME   : Finite Element Methods in Mechanical Design
COURSE CODE   : MEC5007
PROGRAM NAME   : M.Tech. Product Design and Development

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4, 8, 9
National	Goal Nos. 1, 2, 12
Regional	Goal Nos. 1
Local	Goal Nos. 1, 2, 5

Program Outcomes (POs):
- ➢ **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- ➢ **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired Needs Addressed by this Courses.
- ➢ **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- ➢ **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- ➢ **PSO-2**: Research: Acquire theoretical background of each course that they are capable of applying it for solving real-time (Physical) problems.
- ➢ **PSO-3**: Entrepreneurship: Acquire time management, strategic thinking, team work, and network though out their course study and project work enable them to be an entrepreneur.

Course Outcomes (COs):
- ➢ **CO-1**: Understand the importance of ergonomics in the design of new products.
- ➢ **CO-2**: Learn the effect of biomechanics, bio thermodynamics, bioenergetics on the design and development of new products.
- ➢ **CO-3**: Understand the effects of other human factors.

SCHOOL OF ENGINEERING
DEPARTMENT OF PETROLEUM ENGINEERING

COURSE NAME   : Data Analytics for Oil and Gas Exploration
COURSE CODE   : PET1003
PROGRAM NAME : B.Tech. Petroleum Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4, 7, 8, 9,17
National	Goal Nos. 5,7,8,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 5

Program Outcomes (POs):

➢ **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

➢ **PO-12**: Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**: Identify, formulate, research literature, and analyze complex engineering problems related to Drilling Engineering, Reservoir Engineering, Production Engineering, and Petrophysics.

➢ **PSO-2**: Design solutions for complex engineering problems related to Drilling Engineering, Drilling Fluids, Reservoir Engineering, and Production Engineering processes.

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- ➢ **PSO-3**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Drilling Engineering, Reservoir Engineering, Production Engineering, and Petrophysics with an understanding of the limitations.

Course Outcomes (COs):
- ➢ **CO-1**: Explain the basics of data analytics in the oil and gas industries.
- ➢ **CO-2**: Identify the importance of data management in oil and gas industry.
- ➢ **CO-3**: Describe different attributes in reservoir characterization.
- ➢ **CO-4**: Discuss various factors to optimize drilling.

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COURSE NAME   : Fundamentals of Oil and Gas Well Drilling Technology

COURSE CODE   : PET2003

PROGRAM NAME   : B.Tech. Petroleum Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4, 7, 8, 9,17
National	Goal Nos. 5,7,8,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 5

Program Outcomes (POs):
- **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6**: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-7**: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and Needs Addressed by this Course for sustainable development.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-12**: Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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Program Specific Outcomes (PSOs):

- **PSO-1**: Identify, formulate, research literature, and analyze complex engineering problems related to Drilling Engineering, Reservoir Engineering, Production Engineering, and Petrophysics.
- **PSO-2**: Design solutions for complex engineering problems related to Drilling Engineering, Drilling Fluids, Reservoir Engineering, and Production Engineering processes.
- **PSO-3**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Drilling Engineering, Reservoir Engineering, Production Engineering, and Petrophysics with an understanding of the limitations.

Course Outcomes (COs):

- **CO-1**: Compute the load capacity and power requirement of various rig components.
- **CO-2**: Choose appropriate drill string components according to pressure requirements.
- **CO-3**: Select appropriate casing string according to pressure requirements.
- **CO-4**: Classify drilling bits based on the drilling mechanism.

COURSE NAME   : **Fundamentals of Petroleum Reservoir Engineering**

COURSE CODE   : **PET2004**

PROGRAM NAME   : **B.Tech. Petroleum Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4, 7, 8, 9,17
National	Goal Nos. 5,7,8,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 5

Program Outcomes (POs):

- ➤ **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ➤ **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- ➤ **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- ➤ **PO-4**: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- ➤ **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- ➤ **PO-6**: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- ➤ **PO-7**: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and Needs Addressed by this Course for sustainable development.
- ➤ **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- ➤ **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- ➤ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- ➤ **PO-12**: Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

- **PSO-1**: Identify, formulate, research literature, and analyze complex engineering problems related to Drilling Engineering, Reservoir Engineering, Production Engineering, and Petrophysics.
- **PSO-2**: Design solutions for complex engineering problems related to Drilling Engineering, Drilling Fluids, Reservoir Engineering, and Production Engineering processes.
- **PSO-3**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Drilling Engineering, Reservoir Engineering, Production Engineering, and Petrophysics with an understanding of the limitations.

Course Outcomes (COs):

- **CO-1**: Explain the reservoir rock and fluid properties of a hydrocarbon reservoir.
- **CO-2**: Compare the flow behavior of reservoir fluid through porous media.
- **CO-3**: Differentiate various drive mechanisms.
- **CO-4**: Apply the concept of different reserve estimation methods.

COURSE NAME : **Fundamentals of Oil and Gas Production Technology**
COURSE CODE : **PET2006**
PROGRAM NAME : **B.Tech. Petroleum Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4, 7, 8, 9,17
National	Goal Nos. 5,7,8,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 5

Program Outcomes (POs):
- **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-7**: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and Needs Addressed by this Course for sustainable development.
- **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-11**: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO-12**: Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

- **PSO-1**: Identify, formulate, research literature, and analyze complex engineering problems related to Drilling Engineering, Reservoir Engineering, Production Engineering, and Petrophysics.
- **PSO-2**: Design solutions for complex engineering problems related to Drilling Engineering, Drilling Fluids, Reservoir Engineering, and Production Engineering processes.
- **PSO-3**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Drilling Engineering, Reservoir Engineering, Production Engineering, and Petrophysics with an understanding of the limitations.

Course Outcomes (COs):

- **CO-1**: Apply the knowledge of IPR, TPR and nodal analysis for determining various well performance parameters.
- **CO-2**: Illustrate different pumps for artificial lift techniques.
- **CO-3**: Compute various operating parameters of gas lift technique.
- **CO-4**: Discuss ESP and other pumps along with their components and working principle.

COURSE NAME   : Occupational Health and Safety
COURSE CODE   : PET2030
PROGRAM NAME : B.Tech. Petroleum Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4, 7, 8, 9,17
National	Goal Nos. 5,7,8,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 5

Program Outcomes (POs):
- **PO-1**: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified Needs Addressed by this Courses with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-5**: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-7**: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and Needs Addressed by this Course for sustainable development.
- **PO-8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO-9**: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-12**: Life-long learning: Recognize the Needs Addressed by this Course for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

- **PSO-1**: Identify, formulate, research literature, and analyze complex engineering problems related to Drilling Engineering, Reservoir Engineering, Production Engineering, and Petrophysics.
- **PSO-2**: Design solutions for complex engineering problems related to Drilling Engineering, Drilling Fluids, Reservoir Engineering, and Production Engineering processes.
- **PSO-3**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Drilling Engineering, Reservoir Engineering, Production Engineering, and Petrophysics with an understanding of the limitations.

Course Outcomes (COs):
- **CO-1**: Recognize importance of reliability and safety at workplace.
- **CO-2**: Apply the risk assessment techniques.
- **CO-3**: Describe the safety practices applicable in drill site.
- **CO-4**: Classify methods to control oil spill and treat waste water.

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME : Fundamentals of Natural Language Processing

COURSE CODE : CSE3014

PROGRAM NAME : B.Tech. Computer Science and Engineering (Artificial Intelligence and Machine Learning)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9
National	Goal Nos. 3,6,14,16
Regional	Goal Nos. -
Local	Goal Nos. 2

Program Outcomes (POs):
 - **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
 - **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
 - **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
 - **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
 - **PO-8**:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Program Specific Outcomes (PSOs):
 - **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.
 - **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to AI & ML principles and practices, Programming AI & ML Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):
 - **CO-1**:Understand the fundamental concepts of Natural Language Processing
 - **CO-2**:Read corpora and train models for different NLP tasks.

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- CO-3:Create word embeddings
- CO-4:Understand sequence to sequence modeling as used in machine translation.

COURSE NAME : 5G Networking

COURSE CODE : CSE3090

PROGRAM NAME : B.Tech. Computer and Communication Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,17
National	Goal Nos. 1,3,5,6,14,16
Regional	Goal Nos. -
Local	Goal Nos. 4,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

Program Specific Outcomes (PSOs):
- **PSO-1**:Apply the knowledge gained during the course of the program from Mathematics, Basic Sciences in general and all Computer Science and networking courses in particular to identify, formulate and solve real life complex engineering problems faced in industries.
- **PSO-2**:Provide socially acceptable technical solutions to complex engineering problems of computer science and communication networks with the application of modern and appropriate techniques for sustainable development relevant to professional engineering practice.

Course Outcomes (COs):
- **CO-1**:Explain the channel models of 5G and the use cases for 5G.
- **CO-2**:Analyze use of MIMO in 5G and its techniques.
- **CO-3**:Understand device to device (D2D) communication and standardization.

➢ **CO-4**:Illustrate the in-depth functioning of 5G radio access technologies and security issues in 5G.

COURSE NAME   : **Intelligent Signal Processing**

COURSE CODE   : **CSA3016**

PROGRAM NAME : **B.Tech. Computer and Communication Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,17
National	Goal Nos. 1,3,5,6,14,16
Regional	Goal Nos. -
Local	Goal Nos. 4,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

Program Specific Outcomes (PSOs):
- **PSO-1**:Apply the knowledge gained during the course of the program from Mathematics, Basic Sciences in general and all Computer Science and networking courses in particular to identify, formulate and solve real life complex engineering problems faced in industries.
- **PSO-2**:Provide socially acceptable technical solutions to complex engineering problems of computer science and communication networks with the application of modern and appropriate techniques for sustainable development relevant to professional engineering practice.

Course Outcomes (COs):
- **CO-1**:Understand basic concepts of signal processing and how to apply these concepts for Compression and Networking.
- **CO-2**:Employ Model Based Signal Processing for audio, image and video processing.
- **CO-3**:Implement different signal processing techniques for audio and video compression.
- **CO-4**:Implement simple movement and face detection systems that work with live camera input

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COURSE NAME   : Advanced Natural Language Processing

COURSE CODE   : CSE3015

PROGRAM NAME   : B.Tech. Computer and Communication Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,17
National	Goal Nos. 1,3,5,6,14,16
Regional	Goal Nos. -
Local	Goal Nos. 4,5

Program Outcomes (POs):

➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:Apply the knowledge gained during the course of the program from Mathematics, Basic Sciences in general and all Computer Science and networking courses in particular to identify, formulate and solve real life complex engineering problems faced in industries.

➢ **PSO-2**:Provide socially acceptable technical solutions to complex engineering problems of computer science and communication networks with the application of modern and appropriate techniques for sustainable development relevant to professional engineering practice.

Course Outcomes (COs):

➢ **CO-1**:Understand how to solve different problems in natural language processing.

➢ **CO-2**:Solve natural language generation problems such as machine translation and text summarization.

➢ **CO-3**:Perform sentiment analysis on reviews to discern the stance of the writer

➢ **CO-4**:Use public gaze behaviour data to improve the performance of different NLP systems.

COURSE NAME : **Introduction to Artificial Intelligence and Machine Learning**
COURSE CODE : **CSE3001**
PROGRAM NAME : **B.Tech. Computer and Communication Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,17
National	Goal Nos. 1,3,5,6,14,16
Regional	Goal Nos. -
Local	Goal Nos. 4,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

Program Specific Outcomes (PSOs):
- **PSO-1**:Apply the knowledge gained during the course of the program from Mathematics, Basic Sciences in general and all Computer Science and networking courses in particular to identify, formulate and solve real life complex engineering problems faced in industries.
- **PSO-2**:Provide socially acceptable technical solutions to complex engineering problems of computer science and communication networks with the application of modern and appropriate techniques for sustainable development relevant to professional engineering practice.

Course Outcomes (COs):
- **CO-1**:To develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents.
- **CO-2**:Produce machine learning models for predictive analytics.
- **CO-3**:Apply ensemble learning, optimization and hyper parameter tuning techniques for machine learning algorithms
- **CO-4**:Demonstrate different types of clustering techniques.
- **CO-5**:Employ time series forecasting techniques/models for real world problems.

COURSE NAME   **: Neural Networks and Fuzzy Logic**

COURSE CODE   **: CSE3016**

PROGRAM NAME   **: B.Tech. Computer and Communication Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,17
National	Goal Nos. 1,3,5,6,14,16
Regional	Goal Nos. -
Local	Goal Nos. 4,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

Program Specific Outcomes (PSOs):
- **PSO-1**:Apply the knowledge gained during the course of the program from Mathematics, Basic Sciences in general and all Computer Science and networking courses in particular to identify, formulate and solve real life complex engineering problems faced in industries.
- **PSO-2**:Provide socially acceptable technical solutions to complex engineering problems of computer science and communication networks with the application of modern and appropriate techniques for sustainable development relevant to professional engineering practice.

Course Outcomes (COs):
- **CO-1**:Define the concept of Neural Networks.
- **CO-2**:Define the ideas behind most common learning algorithms in Neural Network
- **CO-3**:Discuss the concepts of Fuzzy Sets and Relations
- **CO-4**:Demonstrate the Fuzzy logic concepts and its applications

COURSE NAME   **: Operating Systems**

COURSE CODE   : **CSE2010**

PROGRAM NAME   : **B.Tech. Electronics and Computer Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,17
National	Goal Nos. 1,3,5,6,14,16
Regional	Goal Nos. -
Local	Goal Nos. 4,5

Program Outcomes (POs):

➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

➢ **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, IT infrastructure and Communication Technologies reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, IT infrastructure and Communication Technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles and

practices, IT infrastructure and Communication Technologies with an understanding of the limitations.

Course Outcomes (COs):
- **CO-1**:Describe the fundamental concepts of operating Systems
- **CO-2**:Demonstrate various CPU scheduling algorithms
- **CO-3**:Apply synchronization tools to a given problem
- **CO-4**:Discuss various memory management techniques

COURSE NAME   : **Database Management Systems**

COURSE CODE   : **CSE2012**

PROGRAM NAME   : **B.Tech. Electronics and Computer Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,17
National	Goal Nos. 1,3,5,6,14,16
Regional	Goal Nos. -
Local	Goal Nos. 4,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, IT infrastructure and Communication Technologies reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, IT infrastructure and Communication Technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles and

practices, IT infrastructure and Communication Technologies with an understanding of the limitations.

Course Outcomes (COs):
- ➢ **CO-1**:Understand core concepts of database.
- ➢ **CO-2**:Apply normalization techniques to refine database schema.
- ➢ **CO-3**:Develop database with concurrent transactions execution feature.

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COURSE NAME : Data Structures

COURSE CODE : CSE201

PROGRAM NAME : B.Tech. Electronics and Computer Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,17
National	Goal Nos. 1,3,5,6,14,16
Regional	Goal Nos. -
Local	Goal Nos. 4,5

Program Outcomes (POs):

➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):

➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, IT infrastructure and Communication Technologies reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, IT infrastructure and Communication Technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles and practices, IT infrastructure and Communication Technologies with an understanding of the limitations.

Course Outcomes (COs):

- ➢ **CO-1**:Describe the need for data representation, data structure and algorithms for a specific problem.
- ➢ **CO-2**:Choose an appropriate linear data structure for a given computation.
- ➢ **CO-3**:Choose an appropriate non-linear data structure for a given computation.
- ➢ **CO-4**:Identify the need for heap and hash functions for given computational scenario.

COURSE NAME : Cloud Computing and Services
COURSE CODE : CSE233
PROGRAM NAME : B.Tech. Electronics and Computer Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,17
National	Goal Nos. 1,3,5,6,14,16
Regional	Goal Nos. -
Local	Goal Nos. 4,5

Program Outcomes (POs):
➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
➢ **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
➢ **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,
➢ **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, IT infrastructure and Communication Technologies reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, IT infrastructure and Communication Technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles and

practices, IT infrastructure and Communication Technologies with an understanding of the limitations.

Course Outcomes (COs):
- ➢ **CO-1**:Describe fundamentals of cloud computing, virtualization and cloud computing services.
- ➢ **CO-2**: Explain security and standards in cloud computing.
- ➢ **CO-3**: Discuss Cloud mechanisms to optimize the QoS parameters.
- ➢ **CO-4**: Develop applications using Cloud services and VM instances.

COURSE NAME : System Administration and IT Infrastructure
COURSE CODE : CSE250
PROGRAM NAME : B.Tech. Electronics and Computer Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,17
National	Goal Nos. 1,3,5,6,14,16
Regional	Goal Nos. -
Local	Goal Nos. 4,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,
- **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, IT infrastructure and Communication Technologies reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, IT infrastructure and Communication Technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

- ➤ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles and practices, IT infrastructure and Communication Technologies with an understanding of the limitations.

Course Outcomes (COs):
- ➤ **CO-1**: Demonstrate the knowledge of different directory services and how a centralized system admin can support different parts of IT Infrastructure.
- ➤ **CO-2**: Apply the concepts of system administration to real life scenarios.
- ➤ **CO-3**: Understand the working of user Management and Directory management commands.
- ➤ **CO-4**: Demonstrate the knowledge of cloud infrastructure services.
- ➤ **CO-5**: Identify appropriate methods of system recovery and back-up.

COURSE NAME   : Enterprise Network Design

COURSE CODE   : CSE2053

PROGRAM NAME   : B.Tech. Information Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 1,2,3,6,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4

Program Outcomes (POs):

➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an

➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

➢ **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):

➢ **PSO-2**:[Design/development of Solutions]: An ability to gain knowledge on design and control strategy; techniques to secure information, to design and develop software projects as well as Analyze and test user requirements.

Course Outcomes (COs):

➢ **CO-1**:Understand the customer requirements, Structure and Modularize the Network.

➢ **CO-2**:Compare Open flow controllers and switches with other enterprise networks.

➢ **CO-3**:Design Basic Campus and Data Center Network, Remote Connectivity, IP Addressing and Select suitable Routing Protocols for the Network.

➢ **CO-4**:Apply a Methodology to Network Design.

COURSE NAME   : Information Retrieval

COURSE CODE   : CSE2051

PROGRAM NAME : B.Tech. Information Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 1,2,3,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,3

Program Outcomes (POs):

- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,
- **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

- **PSO-1**:[Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Information System and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.

Course Outcomes (COs):

- **CO-1**:Define basic concepts of Information Retrieval.
- **CO-2**:Evaluate the effectiveness and efficiency of different information retrieval methods.
- **CO-3**:Explain different indexing methodology requirements and the concept of web retrieval and crawling.
- **CO-4**:Classify different recommender systems its aspect.

COURSE NAME : Pattern Recognition

COURSE CODE : CSE3122

PROGRAM NAME : B.Tech. Information Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9,11
National	Goal Nos. 1,2,3,4,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,3,4

Program Outcomes (POs):
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):
- **PSO-2**:[Design/development of Solutions]: An ability to gain knowledge on design and control strategy; techniques to secure information, to design and develop software projects as well as Analyze and test user requirements.

Course Outcomes (COs):
- **CO-1**:Identify areas where Pattern Recognition and Machine Learning can offer a solution.
- **CO-2**:Describe the strength and limitations of some techniques used in computational Machine Learning for classification, regression and density estimation problems.
- **CO-3**:Describe genetic algorithms, validation methods and sampling techniques.
- **CO-4**:Describe and model data to solve problems in regression and classification.

COURSE NAME : Search Engine Optimization
COURSE CODE : CSE3123
PROGRAM NAME : B.Tech. Information Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9,11
National	Goal Nos. 1,2,3,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,
- **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Information System and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.

Course Outcomes (COs):

- ➢ **CO-1**:Explain the significance of search engine and its working
- ➢ **CO-2**:Building an SEO-Friendly Site
- ➢ **CO-3**:Optimize the SEO Foundation
- ➢ **CO-4**:Differentiate On-page SEO vs Off-page SEO
- ➢ **CO-5**:Explain how Word tracker can help to choose keywords for a project title.

COURSE NAME   **: Service Oriented Architecture**

COURSE CODE   **: CSE3125**

PROGRAM NAME   **: B.Tech. Information Science and Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9,11
National	Goal Nos. 1,2,3,6,7
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4

Program Outcomes (POs):
  - ➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
  - ➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
  - ➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
  - ➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
  - ➢ **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
  - ➢ **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
  - ➢ **PSO-3**:[Modern Tool usage]: An Ability to gain working Knowledge on emerging software tools and technologies and apply the knowledge of computing tools and techniques in the field of Information science for solving real world problems encountered in the Software Industries.

Course Outcomes (COs):
  - ➢ **CO-1**:Discuss the XML Fundamentals and to manipulate the data using XML
  - ➢ **CO-2**:Define the key principles of SOA
  - ➢ **CO-3**:Discuss the web services technology elements for realizing SO
  - ➢ **CO-4**:Illustrate the various Web Service Standard

REGISTRAR

COURSE NAME : Artificial Intelligence for Robotics

COURSE CODE : CSE3076

PROGRAM NAME : B.Tech. Information Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 5,6,8,10,11
National	Goal Nos. 1,4,5,7,9
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,2,4

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Information System and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-2**:[Design/development of Solutions]: An ability to gain knowledge on design and control strategy; techniques to secure information, to design and develop software projects as well as Analyze and test user requirements.
- **PSO-3**:[Modern Tool usage]: An Ability to gain working Knowledge on emerging software tools and technologies and apply the knowledge of computing tools and techniques in the field of Information science for solving real world problems encountered in the Software Industries.

Course Outcomes (COs):
- **CO-1**:Define the basic of local search algorithms, various optimization techniques for a given AI algorithm.
- **CO-2**:Identify the smart intelligent way to represent the knowledge Engineering
- **CO-3**:Describe RPA, where it can be applied and how it's implemented.
- **CO-4**:Use different types of variables, Control Flow and data manipulation techniques.**COURSE NAME : Robotic Vision**

COURSE CODE : CSE2048

PROGRAM NAME : B.Tech. Information Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 2,3,5,8,9,11
National	Goal Nos. 8,9,10,11,12
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,2,4

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Information System and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-2**:[Design/development of Solutions]: An ability to gain knowledge on design and control strategy; techniques to secure information, to design and develop software projects as well as Analyze and test user requirements.
- **PSO-3**:[Modern Tool usage]: An Ability to gain working Knowledge on emerging software tools and technologies and apply the knowledge of computing tools and techniques in the field of Information science for solving real world problems encountered in the Software Industries.

Course Outcomes (COs):
- **CO-1**:Explain the fundamentals of Robotic vision and its processing.
- **CO-2**:Perform image enhancement techniques in spatial and frequency domain
- **CO-3**:Elucidate the mathematical modeling of image degradation and restoration.
- **CO-4**:Apply the concept of image segmentation.**COURSE NAME : Machine Vision**

COURSE CODE   **: CSE3013**

PROGRAM NAME   **: B.Tech. Information Science and Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,5,8,9,11
National	Goal Nos. 5,8,9,11
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,2,3,5

Program Outcomes (POs):
  ➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
  ➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
  ➢ **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Program Specific Outcomes (PSOs):
  ➢ **PSO-1**:[Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Information System and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.
  ➢ **PSO-2**:[Design/development of Solutions]: An ability to gain knowledge on design and control strategy; techniques to secure information, to design and develop software projects as well as Analyze and test user requirements.
  ➢ **PSO-3**:[Modern Tool usage]: An Ability to gain working Knowledge on emerging software tools and technologies and apply the knowledge of computing tools and techniques in the field of Information science for solving real world problems encountered in the Software Industries.

Course Outcomes (COs):
  ➢ **CO-1**:Understanding of Machine Vision Principles: Gain a solid understanding of the fundamental principles and concepts underlying machine vision systems, including image processing, computer vision algorithms, and pattern recognition techniques.
  ➢ **CO-2**:Knowledge of Machine Vision Algorithms: Acquire knowledge of various machine vision algorithms and techniques used for tasks such as image acquisition, preprocessing, segmentation, feature extraction, object detection, tracking.
  ➢ **CO-3**:Ability to Implement Machine Vision Systems: Develop the skills to design, implement, and evaluate machine vision systems using programming languages and libraries commonly used in the field, such as MATLAB, OpenCV, Python, TensorFlow, or PyTorch

- ➢ **CO-4**:Practical Experience: Gain hands-on experience through lab exercises, projects, and assignments that involve implementing and experimenting with machine vision algorithms and systems
- ➢ **CO-5**:Collaboration and Communication: Develop teamwork and communication skills by working on group projects and effectively presenting findings and results related to machine vision tasks

COURSE NAME : Robotic Process Automation Systems

COURSE CODE : CSE3106

PROGRAM NAME : B.Tech. Information Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 6,8,9,11
National	Goal Nos. 3,5,6
Regional	Goal Nos. 1,2
Local	Goal Nos. 2,4

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Information System and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-2**:[Design/development of Solutions]: An ability to gain knowledge on design and control strategy; techniques to secure information, to design and develop software projects as well as Analyze and test user requirements.
- **PSO-3**:[Modern Tool usage]: An Ability to gain working Knowledge on emerging software tools and technologies and apply the knowledge of computing tools and techniques in the field of Information science for solving real world problems encountered in the Software Industries.

Course Outcomes (COs):
- **CO-1**:Illustrate the intuition about Robotic Process Automation Technology and the underlying logic/structure related to RPA
- **CO-2**:Demonstrate the RPA Methodologies for Control Flow and data manipulation techniques
- **CO-3**:Apply appropriate RPA Tools for the automation Process
- **CO-4**:Utilize of various automated tools and its modern workflow automations

COURSE NAME : Robot Operating System

COURSE CODE : CSE2045

PROGRAM NAME : B.Tech. Information Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 2,3,5,8,9,11
National	Goal Nos. 8,9,10,11,12
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,2,4

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, review research articles, formulate and analyze complex engineering problems related to modern Information System and to arrive substantiated inferences using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-2**:[Design/development of Solutions]: An ability to gain knowledge on design and control strategy; techniques to secure information, to design and develop software projects as well as Analyze and test user requirements.
- **PSO-3**:[Modern Tool usage]: An Ability to gain working Knowledge on emerging software tools and technologies and apply the knowledge of computing tools and techniques in the field of Information science for solving real world problems encountered in the Software Industries.

Course Outcomes (COs):
- **CO-1**:Describe the need for ROS and its significance
- **CO-2**:Summarize the Linux commands used in robotics
- **CO-3**:Discuss about the concepts behind navigation through file system
- **CO-4**:Discuss about the applications of ROS

COURSE NAME   **: Storage Area Networks**

COURSE CODE   **: CSE2054**

PROGRAM NAME   **: B.Tech. Information Science and Technology**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 1,3,6,14
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):

- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-8**:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,
- **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

- **PSO-1**:An ability to use and develop cloud software, administrative features. Infrastructure services and architectural patterns; ethical hacking and forensic security technologies.
- **PSO-2**:An ability to gain knowledge on design and control strategy; techniques to secure information and adapt to the fast changing world of information technology needs.
- **PSO-3**:An ability to gain working Knowledge on emerging software tools and technologies and apply the knowledge of secure computing tools and techniques in the field of Information science and technology for solving real world problems.

Course Outcomes (COs):

- **CO-1**:Identify key challenges in managing information and analyze different storage networking technologies.
- **CO-2**:Explain physical and logical components of a storage infrastructure of RAID, and intelligent storage systems.
- **CO-3**:Describe Object and Content addressed storage and storage virtualization.
- **CO-4**:Articulate business continuity solutions—backup and archive for managing fixed content.

COURSE NAME   **: Firewall and Internet Security**

COURSE CODE   **: CSE2058**

PROGRAM NAME   **: B.Tech. Information Science and Technology**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 1,3,6,14
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):
- **PSO-1**:An ability to use and develop cloud software, administrative features. Infrastructure services and architectural patterns; ethical hacking and forensic security technologies.
- **PSO-2**:An ability to gain knowledge on design and control strategy; techniques to secure information and adapt to the fast changing world of information technology needs.
- **PSO-3**:An ability to gain working Knowledge on emerging software tools and technologies and apply the knowledge of secure computing tools and techniques in the field of Information science and technology for solving real world problems.

Course Outcomes (COs):
- **CO-1**:Identify areas where firewall and network security can offer a solution
- **CO-2**:Describe the strength and limitations of some techniques used in network attacks
- **CO-3**:Show that DES decryption is, in fact, the inverse of DES encryption.
- **CO-4**:How to obtain a digital certificate of any document
- **CO-5:** Demonstrate the network security system using open source tools

COURSE NAME : Mobile Networking

COURSE CODE : CSE2059

PROGRAM NAME : B.Tech. Information Science and Technology

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 1,3,6,14
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):

➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:An ability to use and develop cloud software, administrative features. Infrastructure services and architectural patterns; ethical hacking and forensic security technologies.

➢ **PSO-2**:An ability to gain knowledge on design and control strategy; techniques to secure information and adapt to the fast changing world of information technology needs.

Course Outcomes (COs):

➢ **CO-1**:Discuss various protocols in Ad-hoc and Sensor Networks

➢ **CO-2**:Express the Wireless Broadband Networks Technology Overview, Platforms and Standards

➢ **CO-3**:Apply the management, testing and troubleshooting in Wireless Broadband Networks working principles of wireless LAN, its standard

➢ **CO-4**:Demonstrate various wireless networks using latest tool

COURSE NAME : Information Security and Management

COURSE CODE : CSE2060

PROGRAM NAME : B.Tech. Information Science and Technology

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 1,3,6,14
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-8**:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Program Specific Outcomes (PSOs):
- **PSO-1**:An ability to use and develop cloud software, administrative features. Infrastructure services and architectural patterns; ethical hacking and forensic security technologies.
- **PSO-2**:An ability to gain knowledge on design and control strategy; techniques to secure information and adapt to the fast changing world of information technology needs.

Course Outcomes (COs):
- **CO-1**:Understand the foundations of Information Security.
- **CO-2**:Understand the various threats facing organizations
- **CO-3**:Examine the Risk and treat the Risk
- **CO-4**:Implement Security Technologies in Information Security.

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COURSE NAME : Information Sytem Audit

COURSE CODE : CSE2055

PROGRAM NAME : B.Tech. Information Science and Technology

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 1,3,6,14
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-8**:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Program Specific Outcomes (PSOs):
- **PSO-1**:An ability to use and develop cloud software, administrative features. Infrastructure services and architectural patterns; ethical hacking and forensic security technologies.
- **PSO-2**:An ability to gain knowledge on design and control strategy; techniques to secure information and adapt to the fast changing world of information technology needs.
- **PSO-3**:An ability to gain working Knowledge on emerging software tools and technologies and apply the knowledge of secure computing tools and techniques in the field of Information science and technology for solving real world problems.

Course Outcomes (COs):
- **CO-1**:Identify the procedures involved in auditing process.
- **CO-2**:Understanding of policies, procedures and standards in Information Syste
- **CO-3**:Describe the disaster recovery plan and Business Continuity Plan
- **CO-4**:Identify the maintenance and support activities
- **CO-5**:Understand the IS network Infrastructure and assets protection

COURSE NAME : Reinforcement Learning

COURSE CODE : CSE3011

PROGRAM NAME : B.Tech. Computer Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 1
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):

➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an

➢ **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

➢ **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):

➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principle

➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs.

➢ **PSO-3**:[Modern Tool usage]: create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Software Engineering principles and practices, Programme.

Course Outcomes (COs):

- ➤ **CO-1**:Apply dynamic programming concepts to find an optimal policy in a gaming environment
- ➤ **CO-2**:Implement on-policy and off-policy Monte Carlo methods for finding an optimal policy in a reinforcement learning environment
- ➤ **CO-3**:Apply Temporal Difference learning techniques to the Frozen Lake RL environment
- ➤ **CO-4**:Apply various exploration-exploitation strategies of the Multi-Armed Bandit (MAB) problem.

COURSE NAME   : **Applied AI**
COURSE CODE   : **CSE3005**
PROGRAM NAME   : **B.Tech. Computer Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 12
National	Goal Nos. 6
Regional	Goal Nos. 1
Local	Goal Nos. 4

Program Outcomes (POs):
- ➤ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ➤ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- ➤ **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- ➤ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- ➤ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):
- ➤ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principle
- ➤ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs.
- ➤ **PSO-3**:[Modern Tool usage]: create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Software Engineering principles and practices, Programme.

Course Outcomes (COs):

- **CO-1**:Gain comprehensive knowledge of AI techniques and algorithms applicable to engineering domains
- **CO-2**:Understand the role of knowledge-based agents and Apply logic in practical problem-solving
- **CO-3**:Develop critical thinking and problem-solving skills to tackle complex engineering challenges using advanced AI approaches
- **CO-4**:Evaluate the ethical and societal implications of AI applications and develop strategies for responsible AI deployment

COURSE NAME　　　: **Expert Systems**

COURSE CODE　　　: **CSE3108**

PROGRAM NAME　: **B.Tech. Computer Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 5
Regional	Goal Nos. 1
Local	Goal Nos. 4

Program Outcomes (POs):
- ➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- ➢ **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- ➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- ➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principle
- ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs.
- ➢ **PSO-3**:[Modern Tool usage]: create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Software Engineering principles and practices, Programme.

Course Outcomes (COs):
- ➢ **CO-1**:Understand the various AI programming knowledges
- ➢ **CO-2**:Apply the expert system techniques for specific task completion
- ➢ **CO-3**:Design and Develop expert systems using appropriate knowledge based tools

COURSE NAME   : **Autonomous Navigation and Vehicles**

COURSE CODE   : **CSE3017**

PROGRAM NAME   : **B.Tech. Computer Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 5
Regional	Goal Nos. 1
Local	Goal Nos. 2

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principle
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs.
- **PSO-3**:[Modern Tool usage]: create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Software Engineering principles and practices, Programme.

Course Outcomes (COs):
- **CO-1**:Understand the Autonomous system's and its requirements. Explain algorithm, sensing, object recognition and tracking of an Autonomous system.

- ➤ **CO-2**:Do the error analysis of Localization systems and use the tools and techniques.
- ➤ **CO-3**:Explain, plan and control the traffic behavior, and shall be able to do lane level routing and create simple algorithms.
- ➤ **CO-4**:Explain Plan and control motion, choose proper client systems for automotive vehicles and understand the cloud platform.

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COURSE NAME : Time Series Analysis
COURSE CODE : CSE3012
PROGRAM NAME : B.Tech. Computer Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8
National	Goal Nos. 7
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
  ➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
  ➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
  ➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
  ➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
  ➢ **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
  ➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principle
  ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs.
  ➢ **PSO-3**:[Modern Tool usage]: create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Software Engineering principles and practices, Programme.

Course Outcomes (COs):
  ➢ **CO-1**:Knowledge of basic concepts in time series analysis and forecasting

- ➢ **CO-2**:Understanding the use of time series models for forecasting and the limitations of the methods
- ➢ **CO-3**:Develop time series regression models
- ➢ **CO-4**:Compare with multivariate times series and other applications

REGISTRAR

COURSE NAME : **Text mining and Text Analytics**
COURSE CODE : CSE3134
PROGRAM NAME : **B.Tech. Computer Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- ➢ **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- ➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- ➢ **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principle
- ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs.
- ➢ **PSO-3**:[Modern Tool usage]: create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Software Engineering principles and practices, Programme.

Course Outcomes (COs):
- ➢ **CO-1**:Gain comprehensive knowledge of Text mining and Analytics.

- ➢ **CO-2**:Understand the concepts of Syntagmatic Relation Discovery, Topic Mining and Analysis,and Probabilistic Topic Models.
- ➢ **CO-3**:Evaluate the text clustering and categorization models.

COURSE NAME : Predictive Analytics for Big Data
COURSE CODE : CSE3133
PROGRAM NAME : B.Tech. Computer Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 5
Regional	Goal Nos. 1
Local	Goal Nos. 4

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principle
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs.
- **PSO-3**:[Modern Tool usage]: create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Software Engineering principles and practices, Programme.

Course Outcomes (COs):
- **CO-1**:Assess potentially enormous amounts of data
- **CO-2**:Generate and back-test a predictive model

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- ➢ **CO-3**:Evaluate different types of predictive models
- ➢ **CO-4**:Process data using a Map-Reduce strategy
- ➢ **CO-5**:Compile a report on the data analysis that was done

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COURSE NAME : Information Security in Business

COURSE CODE : CSE3135

PROGRAM NAME : B.Tech. Computer Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4
National	Goal Nos. 1
Regional	Goal Nos. 1
Local	Goal Nos. 2

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principle
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs.
- **PSO-3**:[Modern Tool usage]: create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Software Engineering principles and practices, Programme.

Course Outcomes (COs):
- **CO-1**:Understand and explain the risks faced by computer systems and networks.
- **CO-2**:Identify and analyze security problems in computer systems and networks.
- **CO-3**:Develop standard security mechanisms to protect systems and networks
- **CO-4**:Use cryptography algorithms and protocols to achieve computer security.

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COURSE NAME   : Data Visualization and decision-making systems
COURSE CODE   : CSE3138
PROGRAM NAME   : B.Tech. Computer Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 6
Regional	Goal Nos. 1
Local	Goal Nos. 2

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principle
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs.
- **PSO-3**:[Modern Tool usage]: create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Software Engineering principles and practices, Programme.

Course Outcomes (COs):
- **CO-1**:Understand the principles and importance of data visualization in decision-making processes

- ➤ **CO-2**:Apply visual perception and cognition principles to design clear and impactful data visualizations
- ➤ **CO-3**:Create static and interactive visualizations using a variety of techniques, such as bar charts, scatter plots, and network visualizations
- ➤ **CO-4**:Apply geographic data visualization techniques to analyze spatial patterns and communicate geographic information effectively

COURSE NAME : Scientific Computation

COURSE CODE : CSE3139

PROGRAM NAME : B.Tech. Computer Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9
National	Goal Nos. 5
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principle
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs.
- **PSO-3**:[Modern Tool usage]: create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Software Engineering principles and practices, Programme.

Course Outcomes (COs):
- **CO-1**:Solve systems of linear equations using Matlab.
- **CO-2**:Numerically solve simple differential equations
- **CO-3**:Use Monte-Carlo techniques to obtain approximate solutions

COURSE NAME   : Fundamentals of Data Analytics
COURSE CODE   : CSE2027
PROGRAM NAME   : B.Tech. Computer Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,5,8,9,12,17
National	Goal Nos. 1,2,3,4,5,6,14,16
Regional	Goal Nos. 1,4
Local	Goal Nos. 2,4,5

Program Outcomes (POs):

 ➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
 ➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
 ➢ **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
 ➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
 ➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):

 ➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
 ➢ **PSO-2**: [Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
 ➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles and practices, Programming and Computing technologies with an understanding of the limitations.

Course Outcomes (COs):

- **CO-1**:Explain concepts associated to basics of data analytics
- **CO-2**:Solve problems related to random process and standard distributions.
- **CO-3**:Experiment and visualize defined data sets and their different graphical illustrations.
- **CO-4**:Interpret details of supervised and unsupervised learning mechanisms.

COURSE NAME   **: Artificial Intelligence and Machine Learning**

COURSE CODE   **: CSE3157**

PROGRAM NAME   **: B.Tech. Computer Science and Engineering**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,12
National	Goal Nos. 2,3,4,5,6,7,8,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,5

Program Outcomes (POs):

- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

- ➤ **PSO-2**: [Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- ➤ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles and practices, Programming and Computing technologies with an understanding of the limitations.

Course Outcomes (COs):
- ➤ **CO-1**:Describe the basic understanding of the AI and concepts of searching for AI problems.
- ➤ **CO-2**:Develop knowledge base for representing the given real world data using logic and reasoning methods.
- ➤ **CO-3**:Apply concept learning and Artificial Neural Network techniques for the given problems.
- ➤ **CO-4**:Articulate Machine Learning model using Supervised and Unsupervised learning algorithms.
- ➤ **CO-5**:Develop solutions / mini project on real world problems using AIML domain, either individually or as a part of the team and report the results.

COURSE NAME : Cryptography and Network Security

COURSE CODE : CSE3078

PROGRAM NAME : B.Tech. Computer Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,10,11,12,16
National	Goal Nos. 1,2,3,5,6,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,4,5

Program Outcomes (POs):

➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

➢ **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

➢ **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and

practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

- ➢ **PSO-2**: [Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

- ➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles and practices, Programming and Computing technologies with an understanding of the limitations.

Course Outcomes (COs):

- ➢ **CO-1**:Understand different classical encryption techniques
- ➢ **CO-2**:Apply different symmetric encryption techniques on given problems
- ➢ **CO-3**: Identify and analyze the mathematical concepts for different cryptographic algorithms.
- ➢ **CO-4**:Demonstrate public key cryptographic algorithms for encryption, key exchange, message authentication and digital signature
- ➢ **CO-5**:Interpret security issues in network, transport , application layers and   security protocols

COURSE NAME : Mobile Application Development
COURSE CODE : CSE3075
PROGRAM NAME : B.Tech. Computer Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,12,17
National	Goal Nos. 1,2,3,4,5,6,7,8,9,14,15,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
 ➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
 ➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
 ➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
 ➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
 ➢ **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
 ➢ **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
 ➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
 ➢ **PSO-2**: [Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
 ➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles and

practices, Programming and Computing technologies with an understanding of the limitations.

Course Outcomes (COs):

➢ **CO-1**: Discuss the fundamentals of mobile application development and its architecture.
➢ **CO-2**: Illustrate mobile applications with appropriate android view.
➢ **CO-3**:Demonstrate the use of services, broadcast receiver, Notifications and content provider
➢ **CO-4**:Apply data persistence techniques, to perform CRUD operations
➢ **CO-5**:Use multimedia and internet services for mobile applications.

REGISTRAR
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COURSE NAME : Cloud Computing

COURSE CODE : CSE2069

PROGRAM NAME : B.Tech. Computer Science and Engineering

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,7,12
National	Goal Nos. 1,2,3,4,5,6,9,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,4,5

Program Outcomes (POs):

➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-8**:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

➢ **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

➢ **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

➢ **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies reaching substantiated

conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PSO-2**: [Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles and practices, Programming and Computing technologies with an understanding of the limitations.

Course Outcomes (COs):

➢ **CO-1**: Comprehend the significance of Cloud computing technologies
➢ **CO-2**: Describe appropriate Virtualization techniques to virtualize infrastructures
➢ **CO-3**: Apply Cloud mechanisms to optimize the QoS parameters
➢ **CO-4**:Interpret recent technologies on Cloud

COURSE NAME   **: Wireless Communication in IOT**

COURSE CODE   **: CSE3055**

PROGRAM NAME   **: B.Tech. Computer Science and Engineering (IoT)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9,11
National	Goal Nos. 1,2,3,4,5,6,7,8,11,12,14,16
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):

➢ **PO-1:** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2:** Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-3:** Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PO-5:** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-6:** The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

➢ **PO-9:** Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

➢ **PO-12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Internet of Things principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Internet of Things principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Internet of Things principles and practices,

Programming in Internet of Things Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):
- **CO-1**:To understand the fundamentals of wireless networks
- **CO-2**:Analyze the standards of IoT which employed for wireless networks
- **CO-3**:Explain the use of various wireless technologies in IoT
- **CO-4**:Design and develop various applications of IoT

REGISTRAR

COURSE NAME : **Privacy and Security in IoT**

COURSE CODE : **CSE3063**

PROGRAM NAME : **B.Tech. Computer Science and Engineering (IoT)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9,11
National	Goal Nos. 1,2,3,4,5,6,7,8,11,12,14,16
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Internet of Things principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Internet of Things principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.
- **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Internet of Things principles and practices, Programming in Internet of Things Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):

- **CO-1**:Explain benefits of modern cryptographic algorithms
- **CO-2**:Apply the Elliptic curve Diffie Hellman and digital signature algorithms to encrypt-decrypt , generate and verify the signatures
- **CO-3**: Estimate the performance of ECC with other traditional cryptography algorithms.

COURSE NAME   : Introduction to Fog Computing
COURSE CODE   : CSE2032
PROGRAM NAME   : B.Tech. Computer Science and Engineering (IoT)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,11
National	Goal Nos. 1,2,3,4,5,6,7,8,11,,14
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,2,3

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-7**:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering   problems related to Internet of Things principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Internet of Things principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and   safety, cultural, societal and environmental considerations.
- **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Internet of Things principles and practices, Programming in Internet of Things Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):

- **CO-1**:Understand the basic principles and concepts of Fog Computing.
- **CO-2**:Identify the middleware and orchestration techniques of Fog Computing.
- **CO-3**:Discuss the requirements, implementation and integration of Fog Computing solutions.
- **CO-4**:Apply fog computing solutions to real world problems.

COURSE NAME : Big Data Analytics for IoT

COURSE CODE : CSE3053

PROGRAM NAME : B.Tech. Computer Science and Engineering (IoT)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9,11
National	Goal Nos. 1,2,3,4,5,6,7,8,11,12,14
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):

➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

➢ **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Internet of Things principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Internet of Things principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Internet of Things principles and practices, Programming in Internet of Things Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):
➢ **CO-1**:Demonstrate IOT Data Analytics and machine learning application in IOT
➢ **CO-2**:Apply appropriate Hadoop Ecosystem tools to perform data analytics for a given problem
➢ **CO-3**:Examine concepts of cloud based IOT, Big data and IOT
➢ **CO-4**:Illustrate techniques and strategies for data collection and Geospatial Analytics to IOT Data

COURSE NAME   : **Mobile Application for IOT**
COURSE CODE   : **CSE3066**
PROGRAM NAME   : **B.Tech. Computer Science and Engineering (IoT)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,8,9,11
National	Goal Nos. 1,2,3,4,5,6,7,8,11,12,14,16
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
- ➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- ➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- ➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- ➢ **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- ➢ **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering   problems related to Internet of Things principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Internet of Things principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.
- ➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Internet of Things principles and practices, Programming in Internet of Things Computing & analytics with an understanding of the limitations.

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Course Outcomes (COs):

- ➢ **CO-1**:Describe the fundamental concepts of Mobile Operating Systems
- ➢ **CO-2**:Design and develop various mobile applications
- ➢ **CO-3**:Demonstrate uses of IoT devices for application
- ➢ **CO-4**:Illustrate various applications of IoT that integrates with Mobile OS

COURSE NAME : Foundations of Blockchain Technology

COURSE CODE : CSE2019

PROGRAM NAME : B.Tech. Computer Science and Engineering (Block Chain)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,6,8
National	Goal Nos. 3,6,12,16
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO-11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
 ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Block Chain principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and   safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
 ➢ **CO-1**:Understand the concepts of an emerging blockchain technology
 ➢ **CO-2**:Infer the knowledge about consensus protocols
 ➢ **CO-3**:Explore Bitcoin payment methods
 ➢ **CO-4**:Develop simple smart contract

COURSE NAME : Smart Contract and Solidity

COURSE CODE : CSE3020

PROGRAM NAME : B.Tech. Computer Science and Engineering (Block Chain)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,4,9,11
National	Goal Nos. 1,5,7,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,4

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO-11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Program Specific Outcomes (PSOs):

➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Block Chain principles and practices, Programming Block chain Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):

- ➤ **CO-1**:Understand the fundamentals of computational Element of the Blockchain Technology
- ➤ **CO-2**:Implement user-defined operations of arbitrary complexity that are not possible through plain cryptocurrency protocols
- ➤ **CO-3**:Exhibit best practices for designing solutions with smart contracts using Solidity and Remix IDE

COURSE NAME   : **Blockchain Security and performances**

COURSE CODE   : **CSE3028**

PROGRAM NAME   : **B.Tech. Computer Science and Engineering (Block Chain)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9,11,16
National	Goal Nos. 3,5,7,11
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,4

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Block Chain principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Block Chain principles and practices, Programming Block chain Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):

- **CO-1**:Comprehend security and performance perspective of blockchain technology.
- **CO-2**:Apply cryptographic techniques to enhance security in blockchain based systems
- **CO-3**:Implement secure transaction models.
- **CO-4**:Apply security techniques to blockchain systems that provide solutions to some real world problems

COURSE NAME   : Blockchain Technology

COURSE CODE   : CSE2020

PROGRAM NAME   : B.Tech. Computer Science and Engineering (Block Chain)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9,11,16
National	Goal Nos. 3,5,7,16
Regional	Goal Nos. 1,2
Local	Goal Nos. 1,2,5

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

- ➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Block Chain principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences

- ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Block Chain principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

- ➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Block Chain principles and practices,

Programming Block chain Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):

- ➢ **CO-1**:Understand the concepts of Blockchain
- ➢ **CO-2**:Explain the methods for verification and validation of Bitcoin transactions
- ➢ **CO-3**:Explore the use of Ethereum
- ➢ **CO-4**:Illustrate the role of blockchain in various domain

COURSE NAME : Distributed Ledger Technology

COURSE CODE : CSE3023

PROGRAM NAME : B.Tech. Computer Science and Engineering (Block Chain)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9,11,15
National	Goal Nos. 3,14,,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2.5

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO-11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Block Chain principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences

➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Block Chain principles and practices,

Programming Block chain Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):

- ➢ **CO-1**:Understand and explore the working of distributed ledger technology
- ➢ **CO-2**:Understand the working of Smart Contracts
- ➢ **CO-3**:Apply the learning of solidity and de-centralized apps on Ethereum

COURSE NAME   **: Agile Structures and Frameworks**
COURSE CODE   **: CSE3040**
PROGRAM NAME   **: B.Tech. Computer Science and Technology (Devops)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,4,8,9
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to software development & project management methodologies, Computing, DevOps tools and practices and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Course Outcomes (COs):
- **CO-1**:Understand the basic concepts of Agile Software Process.
- **CO-2**:Describe Agile Software Process
- **CO-3**:Comprehend the various Agile Methodologies.
- **CO-4**:Apply appropriate Agile Technology tools.

COURSE NAME   : **System Provisioning and Configuration Management**
COURSE CODE   : **CSE3052**
PROGRAM NAME   : **B.Tech. Computer Science and Technology (Devops)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,4,8,9,12,
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,5

Program Outcomes (POs):
 ➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
 ➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
 ➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
 ➢ **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
 ➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
 ➢ **PO-6**:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
 ➢ **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
 ➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):
 ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to software development & project management methodologies, Computing, DevOps tools and practices and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Course Outcomes (COs):

- ➢ **CO-1**:Understand the service provisioning on Cloud.
- ➢ **CO-2**:Learn automation, preventing errors, tracking of changes.
- ➢ **CO-3**:Understand configuration management.
- ➢ **CO-4**:Implement the Configuration and Management on Cloud Service Platform.

COURSE NAME : **Automated Test Management**

COURSE CODE : **CSE3043**

PROGRAM NAME : **B.Tech. Computer Science and Technology (Devops)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,4,8,9
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to software development & project management methodologies, Computing, DevOps tools and practices and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Course Outcomes (COs):
- **CO-1**:Revise the topics on Java and HTML for application in automated Testing.
- **CO-2**:Understand the basics of automated testing and the requirement for automated testing.
- **CO-3**:Learn to implement automated testing using tools like Selenium.
- **CO-4**:Learn to execute simple testing problems using TestNG and JUnit testing.

COURSE NAME   **: Development Automation**

COURSE CODE   **: CSE3045**

PROGRAM NAME **: B.Tech. Computer Science and Technology (Devops)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,4,8,9
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,5

Program Outcomes (POs):
- ➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- ➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- ➢ **PO-8**:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- ➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,
- ➢ **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- ➢ **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to software development & project management methodologies, Computing, DevOps tools and practices and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Course Outcomes (COs):
- ➢ **CO-1**:Understand the automated software delivery and deployment process
- ➢ **CO-2**:Analyze the various automation scenarios
- ➢ **CO-3**:Demonstrate the interaction with linux environment
- ➢ **CO-4**:Implement scripts
- ➢ **CO-5**:Implement makefiles to automate tasks

COURSE NAME : DevOps Tools Internals

COURSE CODE : CSE3046

PROGRAM NAME : B.Tech. Computer Science and Technology (Devops)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,4,8,9
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to software development & project management methodologies, Computing, DevOps tools and practices and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Course Outcomes (COs):
- **CO-1**:Apply the features and common Git workflow
- **CO-2**:Practice the Docker container and Saving Changes To A Docker Container
- **CO-3**:Practice the filters and plugins to populate, manipulate, and manage data used by Ansible Playbooks
- **CO-4**:Interpret the installation and features of Jenkins and build jobs

COURSE NAME : Web Intelligence and Analytics.

COURSE CODE : CSE3031

PROGRAM NAME : B.Tech. Computer Science and Technology (Big Data)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,4,9
National	Goal Nos. 3.5.6.7
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyse complex engineering problems related to Software Engineering principles & practice, Programming, Big Data computing & analytics Substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles & practice, Programming, Big Data Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):
- **CO-1**: A grounded understanding of web intelligence and business analytics terminology related to the above.
- **CO-2**: How to deploy web intelligence to improve the outcomes of your marketing or business plan.
- **CO-3**: How Analysts impact the bottom line (their role) within various businesses and lines of business
- **CO-4**:Growth potentials for Web Analysts and Big Data professionals

COURSE NAME   **: NoSQL Database**

COURSE CODE   **: CSE2024**

PROGRAM NAME   **: B.Tech. Computer Science and Technology (Big Data)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,4,9,11
National	Goal Nos. 1,3,5
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Specific Outcomes (PSOs):
  ➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyse complex engineering problems related to Software Engineering principles & practice, Programming, Big Data computing & analytics Substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
  ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Software Engineering principles & practice, Programming, Big Data Computing & analytics and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Course Outcomes (COs):
  ➢ **CO-1**:Understand history, fundamentals, characteristics, and main benefits of NoSQL databases.
  ➢ **CO-2**:Comprehend different types of NoSQL databases through case studies.
  ➢ **CO-3**:Design different types of NoSQL databases, add content, and try queries on them

COURSE NAME : Big Data Technologies

COURSE CODE : CSE3002

PROGRAM NAME : B.Tech. Computer Science and Technology (Big Data)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,4,9,11
National	Goal Nos. 1,3,5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO-11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyse complex engineering problems related to Software Engineering principles & practice, Programming, Big Data computing & analytics Substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles & practice, Programming, Big Data Computing & analytics with an understanding of the limitations.

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Course Outcomes (COs):

- ➤ **CO-1**:Apply Map-Reduce programming on the given datasets to extract required insights.
- ➤ **CO-2**:Employ appropriate Hadoop Ecosystem tools such as scoop, Hbase, Hive, to perform data analytics for a given problem.
- ➤ **CO-3**:Use Spark tool to analyze the given dataset for a given problem.

COURSE NAME   : **Streaming Data Analytics**

COURSE CODE   : **CSE3032**

PROGRAM NAME   : **B.Tech. Computer Science and Technology (Big Data)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,4,9
National	Goal Nos. 1,3,5,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyse complex engineering problems related to Software Engineering principles & practice, Programming, Big Data computing & analytics Substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- ➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Software Engineering principles & practice, Programming, Big Data Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):
- ➢ **CO-1**:Recognize the characteristics of data streams that make it useful to solve real-world problems.
- ➢ **CO-2**:Apply appropriate algorithms for analyzing the data streams for a variety of problems.
- ➢ **CO-3**:Implement different algorithms for analyzing the data streams.

COURSE NAME : **Cyber Forensics**

COURSE CODE : **CSE2037**

PROGRAM NAME : **B.Tech. Computer Science and Engineering (Cyber Security)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9
National	Goal Nos. 1,2,3,4,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,5

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

> **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Cyber Security principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

> **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Cyber Security principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

REGISTRAR

Course Outcomes (COs):
- ➢ **CO-1**:Understand various digital investigation terminologies and methods [Knowledge]
- ➢ **CO-2**:Understand various file formats
- ➢ **CO-3**:Recognize the importance of digital forensic duplication and various tools for analysis to achieve adequate perspectives of digital forensic investigation in various applications
- ➢ **CO-4**:Apply techniques for forensic investigation

REGISTRAR

COURSE NAME : Ethical Hacking

COURSE CODE : CSE2039

PROGRAM NAME : B.Tech. Computer Science and Engineering (Cyber Security)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 1,2,3,4,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,5

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):
- **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Cyber Security principles and practices, Programming in Cyber Security Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):
- **CO-1**:Understand about the intruders.

REGISTRAR

- ➢ **CO-2**:Discuss intrusion detection and prevention policies
- ➢ **CO-3**:Explain the fundamental concepts of Network Protocol Analysis and demonstrate the skill to capture and analyze network packets.
- ➢ **CO-4**:Apply various protocol analyzers and Network Intrusion Detection Systems as security tools to detect network attacks and troubleshoot network problems.

COURSE NAME : Intrusion Detection and Prevention System

COURSE CODE : CSE3145

PROGRAM NAME : B.Tech. Computer Science and Engineering (Cyber Security)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 1,2,3,4,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,5

Program Outcomes (POs):

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO-7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Specific Outcomes (PSOs):
  ➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Cyber Security principles and practices, Programming in Cyber Security Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):
  ➢ **CO-1**:Understand about the intruders.
  ➢ **CO-2**:Discuss intrusion detection and prevention policies
  ➢ **CO-3**:Explain the fundamental concepts of Network Protocol Analysis and demonstrate the skill to capture and analyze network packets.
  ➢ **CO-4**:Apply various protocol analyzers and Network Intrusion Detection Systems as security tools to detect network attacks and troubleshoot network problems.

REGISTRAR

COURSE NAME : **Web Security**

COURSE CODE : **CSE3097**

PROGRAM NAME : **B.Tech. Computer Science and Engineering (Cyber Security)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 1,2,3,4,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,5

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Cyber Security principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Cyber Security principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):

- ➢ **CO-1**:Define the fundamentals of web applications and validation
- ➢ **CO-2**:Recognize the significance of password and authentication in web applications
- ➢ **CO-3**:Explain the importance of session management in web
- ➢ **CO-4**:Apply web attack techniques to find vulnerabilities in web applications

COURSE NAME : Cyber threats for IOT and Cloud

COURSE CODE : CSE2040

PROGRAM NAME : B.Tech. Computer Science and Engineering (Cyber Security)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 1,2,3,4,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,5

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Specific Outcomes (PSOs):
➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Cyber Security principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Cyber Security principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
➢ **CO-1**:Describe the different types of cyber threats for IOT and cloud
➢ **CO-2**:Develop a deeper understanding and familiarity with various types of cyber-attacks, cybercrimes, vulnerabilities and remedies thereto
➢ **CO-3**:Analyze different types of cyber threats using tools
➢ **CO-4**:Plan, implement, and monitor cyber security mechanisms to ensure the protection of information technology assets.

REGISTRAR

COURSE NAME : Machine Learning Techniques

COURSE CODE : CSE3008

PROGRAM NAME : B.Tech. Computer Science and Technology

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9,17
National	Goal Nos. 3,6,12,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 4,5

Program Outcomes (POs):

- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,
- **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Program Specific Outcomes (PSOs):

- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

> **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to AI & ML principles and practices, Programming AI & ML Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):
> **CO-1**:Apply advanced supervised machine learning methods for predictive modeling
> **CO-2**:Produce machine learning models with better predictive performance using meta learning algorithms
> **CO-3**:Create predictive models using Perceptron learning algorithms
> **CO-4**:Employ advanced unsupervised learning algorithms for clustering, competitive learning and outlier detection
> **CO-5**:Implement machine learning based intelligent models using Python libraries.

COURSE NAME   **: Deep Learning Techniques**
COURSE CODE   **: CSE3010**
PROGRAM NAME   **: B.Tech. Computer Science and Technology**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9,17
National	Goal Nos. 1,3,6,12,14
Regional	Goal Nos. 1
Local	Goal Nos. 4,5

Program Outcomes (POs):

➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, an

➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

➢ **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

➢ **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to AI & ML principles and practices, Programming AI & ML Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):

- **CO-1**:Comprehend basic concepts of Deep Learning Frameworks
- **CO-2**:Comprehend basic concepts of Deep Learning Frameworks
- **CO-3**:Apply various supervised deep learning techniques
- **CO-4**:Illustrate various unsupervised deep learning techniques.

REGISTRAR

COURSE NAME : Operating system with Linux Internals
COURSE CODE : CSE3120
PROGRAM NAME : B.Tech. Computer Science and Technology

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9,17
National	Goal Nos. 1,3,6,12,14
Regional	Goal Nos. 1
Local	Goal Nos. 4,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,
- **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.
- **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to AI & ML principles and practices,

Programming AI & ML Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):
- **CO-1**:Explain the structure and functions of OS
- **CO-2**:Solve problems on various CPU Scheduling Algorithms
- **CO-3**:Apply different techniques to various synchronization problems
- **CO-4**:Apply appropriate Linux commands APIs for memory management, directory management, IPC, and signal Handling in Linux

COURSE NAME : Data Analysis and Visualization

COURSE CODE : CSE2015

PROGRAM NAME : B.Tech. Computer Science and Engineering (Data Science)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,5,6,14
Regional	Goal Nos. 1
Local	Goal Nos. 2,4,5

Program Outcomes (POs):

- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,
- **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Program Specific Outcomes (PSOs):

- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Data science principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

Course Outcomes (COs):

- **CO-1**: Interpret various types of data and the principles of data visualization.
- **CO-2**:Apply visualization techniques to a problem and its associated dataset.
- **CO-3**:Create interactive visualization for better insight using various visualization tools.
- **CO-4**:Manipulate streaming data using various techniques

COURSE NAME : R Programming for Data Science
COURSE CODE : CSE3035
PROGRAM NAME : B.Tech. Computer Science and Engineering (Data Science)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,5,6,14
Regional	Goal Nos. 1
Local	Goal Nos. 2,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Data science principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

Course Outcomes (COs):
- **CO-1**:Describe the R programming for Data Analytics.
- **CO-2**:Generalize the appropriate visualization methods.
- **CO-3**:Demonstrate the various statistical testing methods.
- **CO-4**:Apply the probability and complex distribution functions for the analysis of data.

COURSE NAME : Predictive Analytics

COURSE CODE : CSE3036

PROGRAM NAME : B.Tech. Computer Science and Engineering (Data Science)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,5,6,14
Regional	Goal Nos. 1
Local	Goal Nos. 2,4,5

Program Outcomes (POs):
- **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,
- **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Data science principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Data science principles and practices, Programming Data science Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):
- **CO-1**:Define the nature of analytics and its applications.
- **CO-2**:Discuss the concepts of predictive analytics and data mining.

- ➢ **CO-3**:Compute the analytical tools in business scenarios to achieve competitive advantage.
- ➢ **CO-4**:Relate the real-world insights in decision trees and time series analysis methods in dynamic business environment
- ➢ **CO**-5: Outline the importance of big data in predictive analytics

REGISTRAR

COURSE NAME : Optimization for Data Science
COURSE CODE : CSE3037
PROGRAM NAME : B.Tech. Computer Science and Engineering (Data Science)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,5,6,14
Regional	Goal Nos. 1
Local	Goal Nos. 2,4,5

Program Outcomes (POs):
- **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-4**:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Program Specific Outcomes (PSOs):
- **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Data science principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- **PSO-3**:[Modern Tool usage]: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities related to Data science principles and practices, Programming Data science Computing & analytics with an understanding of the limitations.

Course Outcomes (COs):
- **CO-1**: Apply data processing and data visualization techniques
- **CO-2**:Perform descriptive and inferential statistical analysis
- **CO-3**:Utilize appropriate distance metrics and optimization techniques
- **CO-4**:Implement supervised algorithms for classification and prediction
- **CO-5**:Implement unsupervised classification algorithms
- **CO-6**:Evaluate the performance metrics of supervised and unsupervised algorithms

COURSE NAME : Social Media Analytics

COURSE CODE : CSE3039

PROGRAM NAME : B.Tech. Computer Science and Engineering (Data Science)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,5,6,14
Regional	Goal Nos. 1
Local	Goal Nos. 2,4,5

Program Outcomes (POs):

- ➢ **PO-1**:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ➢ **PO-2**:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- ➢ **PO-3**:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- ➢ **PO-5**:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- ➢ **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- ➢ **PO-10**:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations,
- ➢ **PO-11**:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Program Specific Outcomes (PSOs):

- ➢ **PSO-1**:[Problem Analysis]: Identify, formulate, research literature, and analyze complex engineering problems related to Data science principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

Course Outcomes (COs):

- ➢ **CO-1**:Define the role of social media data and analytics in helping organizations achieve their goals.

- ➢ **CO-2**:Identify the key performance indicators to accurately measure the success of social media efforts
- ➢ **CO-3**:Analyze social media data using native analytics (e.g., Facebook, Twitter) and social media measurement tools
- ➢ **CO-4**:Demonstrate meaningful insights with actionable and strategic recommendations based on thorough social media data analysis

REGISTRAR

COURSE NAME   : Deep Learning
COURSE CODE   : CSE6001
PROGRAM NAME   : M.Tech. Data Science

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,3,4,5,8,9,11,12,13,16,17
National	Goal Nos. 1,2,3,4,5,6,8,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
- ➢ **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- ➢ **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired needs.
- ➢ **PO-3**:An ability to carry out research in the respective discipline and publish the findings.
- ➢ **PO-4**:An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- ➢ **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Data science principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
- ➢ **CO-1**:Apply basic concepts of Deep Learning to develop feed forward models.
- ➢ **CO-2**:Apply Supervised and Unsupervised Deep Learning techniques to build effective models for prediction or classification tasks.
- ➢ **CO-3**:Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains of Machine Learning and Machine vision.
- ➢ **CO-4**:Analyze performance of implemented Deep Neural models.

COURSE NAME   **: Programming Essentials in Python**

COURSE CODE   **: CSE5004**

PROGRAM NAME   **: M.Tech. Data Science**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,5,8,9,10,13,17
National	Goal Nos. 1,2,3,5,6,8,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
- ➢ **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- ➢ **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired needs.
- ➢ **PO-3**:An ability to carry out research in the respective discipline and publish the findings.
- ➢ **PO-4**:An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- ➢ **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Data science principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
- ➢ **CO-1**:Define the Python programming constructs.
- ➢ **CO-2**:Manipulate data using NumPy and Pandas.
- ➢ **CO-3**: Illustrate visualization of data using Matplotlib.
- ➢ **CO-4**:Discover the insights of data using scikit.

COURSE NAME : Data Science with Cloud Computing

COURSE CODE : CSE5011

PROGRAM NAME : M.Tech. Data Science

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,5,8,9,10,11,12,13,17
National	Goal Nos. 1,2,3,4,5,6,8,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired needs.
- **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Data science principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
- **CO-1**:Define data science and its fundamentals and the process in Data Science.
- **CO-2**:Explain the process of ingesting data into the cloud platform.
- **CO-3**:Analyze real-world problems with accuracy.
- **CO-4**:Demonstrate the overall organization of data and storage.

COURSE NAME : **Big Data Analytics Tools and Techniques**
COURSE CODE : **CSE6003**
PROGRAM NAME : **M.Tech. Data Science**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,,3,4,5,8,9,11,12,13,17
National	Goal Nos. 1,2,3,4,5,6,8,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
- ➢ **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- ➢ **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired needs.
- ➢ **PO-3**:An ability to carry out research in the respective discipline and publish the findings.
- ➢ **PO-4**:An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- ➢ **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- ➢ **PSO-2**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Data science principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
- ➢ **CO-1**:Understand managing big data using Hadoop analytical tools and technologies
- ➢ **CO-2**:Understand map-reduce analytics using Hadoop and related tools
- ➢ **CO-3**:Preparing for data summarization, query, and analysis.
- ➢ **CO-4**:Applying data modeling techniques to large data sets
- ➢ **CO-5**:Building a complete business data analytic solution

COURSE NAME : Artificial Neural Network

COURSE CODE : CSE6009

PROGRAM NAME : M.Tech. Data Science

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,3,4,5,8,9,10,11,12,13,17
National	Goal Nos. 1,2,3,4,5,6,8,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired needs.
- **PO-3**:An ability to carry out research in the respective discipline and publish the findings.
- **PO-4**:An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-3**:[Design/development of Solutions]: Design solutions for complex engineering problems related to Data science principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
- **CO-1**:Understand the mathematical foundations of neural network models.
- **CO-2**:Solve real world problems using neural network systems.
- **CO-3**:Explain feed forward network for Single layer and multiple layers.
- **CO-4**:Describe the Knowledge of Associative memories and Self organizing maps.

COURSE NAME : **Artificial Intelligence in Cloud Computing**

COURSE CODE : **CSE5012**

PROGRAM NAME : **M.Tech. Artificial Intelligence**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,3,4,5,8,9,10,11,12,13,17
National	Goal Nos. 1,2,3,4,5,6,8,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
➢ **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
➢ **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired needs.
➢ **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
➢ **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
➢ **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
➢ **PSO-2**[Design/development of Solutions]: Design solutions for complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
➢ **CO-1**:Gain the knowledge on AI Cloud services
➢ **CO-2**:Understand the various applications of AI
➢ **CO-3**:Design a chatbot
➢ **CO-4**:Develop cloud AI application

COURSE NAME : **Natural Language Processing Techniques**
COURSE CODE : **CSE6002**
PROGRAM NAME : **M.Tech. Artificial Intelligence**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,5,8,9,10,11,12,13,16,17
National	Goal Nos. 1,2,3,4,5,6,8,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
- **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired needs.
- **PO-3**:An ability to carry out research in the respective discipline and publish the findings.
- **PO-4**:An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- **PSO-2**[Design/development of Solutions]: Design solutions for complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
- **CO-1**:Define different problems related to natural language processing.
- **CO-2**:Discuss using NLP techniques for different applications.
- **CO-3**:Propose solutions for a particular NLP problem using different machine learning and deep learning techniques.
- **CO-4**:Learn to use different NLP tools and packages.

COURSE NAME   : **AI in Internet of Things**

COURSE CODE   : **CSE6006**

PROGRAM NAME   : **M.Tech. Artificial Intelligence**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,5,6,7,8,9,10,11,12,13,15,16,17
National	Goal Nos. 1,2,3,4,5,6,8,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
  - ➢ **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
  - ➢ **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired needs.
  - ➢ **PO-3**:An ability to carry out research in the respective discipline and publish the findings.
  - ➢ **PO-4**:An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
  - ➢ **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
  - ➢ **PSO-2**[Design/development of Solutions]: Design solutions for complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
  - ➢ **CO-1**:Understand building blocks of Internet of Things and characteristics.
  - ➢ **CO-2**:Describe IoT Protocols
  - ➢ **CO-3**:Compare and contrast from a range of AI techniques when implementing smart systems
  - ➢ **CO-4**:Identify and Apply techniques in areas of AIIoT.

COURSE NAME : **Knowledge Engineering and Expert Systems**
COURSE CODE : **CSE5006**
PROGRAM NAME : **M.Tech. Artificial Intelligence**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,5,8,9,11,12,17
National	Goal Nos. 1,2,3,4,5,6,8,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
  - **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
  - **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired needs.
  - **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
  - **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
  - **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
  - **PSO-2**[Design/development of Solutions]: Design solutions for complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
  - **CO-1**:Explain the basic concepts in Knowledge Engineering and types of Knowledge based systems.
  - **CO-2**:Discuss the process of acquiring knowledge from the human expert
  - **CO-3**:Apply logical rules, semantic networks and frames for representing the knowledge
  - **CO-4**:Life cycle and methodologies applied to support the development of knowledge-based systems
  - **CO-5**:Explain how expert systems deal with uncertainty and describe architecture and tools used.

COURSE NAME : **Essentials of Machine Learning**

COURSE CODE : **CSE5016**

PROGRAM NAME : **M.Tech. Artificial Intelligence**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,5,8,9,11,12,13,17
National	Goal Nos. 1,2,3,4,5,6,8,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
- ➢ **PO-1**: An ability to analyze, manage and supervise engineering systems and processes with the aid of appropriate advanced tools.
- ➢ **PO-2**: An ability to design a system and process within constraints of health, safety, security, economics, manufacturability to meet desired needs.
- ➢ **PO-3**: An ability to carry out research in the respective discipline and publish the findings.
- ➢ **PO-4**: An ability to effectively communicate and transfer the knowledge/ skill to stakeholders.
- ➢ **PO-5**: An ability to realize the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

Program Specific Outcomes (PSOs):
- ➢ **PSO-2**[Design/development of Solutions]: Design solutions for complex engineering problems related to AI & ML principles and practices, Programming and Computing technologies and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

Course Outcomes (COs):
- ➢ **CO-1**: Understand the basic concepts of Probability and Statistics.
- ➢ **CO-2**: Understand the basic concepts of Linear Algebra.
- ➢ **CO-3**: Peruse courses on Machine learning/Deep learning in future.

SCHOOL OF MANAGEMENT - PG

COURSE NAME   : Macro Economics for Managers
COURSE CODE   : MGT224
PROGRAM NAME   : MBA

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1, 12
National	Goal Nos. 12,13,15
Regional	Goal Nos. 1
Local	Goal Nos. 1, 5

Program Outcomes (POs):
- **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.
- **PO-4**: An ability to identify and evaluate business ideas and opportunities.
- **PO-6**: An ability to evaluate and integrate ethical and societal considerations when making business decisions.

Program Specific Outcomes (PSOs):
- **PSO-2**: An ability to analyze the business problems from different functional perspectives.
- **PSO-3** An ability to make data driven decisions and effectively communicate to different stakeholders.

Course Outcomes (COs):
- **CO-1**: Explain key concepts of macroeconomics in business decision making
- **CO-2**: Apply concepts of consumption, investment and savings, Aggregate supply and Aggregate demand in business.
- **CO-3**: Explain how unemployment and inflation influence business decision in the short run and in the long run
- **CO-4**: Analyze the effect of fiscal instruments and monetary instruments with respect to India's business environment

COURSE NAME : Business Ethics, Corporate Governance and Social Responsibility
COURSE CODE : MGT302
PROGRAM NAME : MBA

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,3,11,12
National	Goal Nos. 1,4,5,6,7,15
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-1**: An ability to lead themselves and others to achieve organizational goals contributing effectively to a team environment.
- **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders
- **PO-6**: An ability to evaluate and integrate ethical and societal considerations when making business decisions.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply a significant amount of business administration knowledge in the following domains viz. HR management, Finance, Marketing, Operations & Supply chain management and Business Analytics.
- **PSO-2**: An ability to analyze the business problems from different functional perspectives.

Course Outcomes (COs):
- **CO-1**: State various theories of ethical decision making.
- **CO-2**: Discuss the concept of Corporate Social Responsibility with respect to provisions in Companies Act 2013
- **CO-3**: Discuss the concept of Corporate Social Responsibility with respect to provisions in Companies Act 2013
- **CO-4**: Illustrate the regulatory framework of corporate governance in India in wake of various corporate frauds

COURSE NAME   **: International Human Resource Management**

COURSE CODE   : HRM402

PROGRAM NAME   : MBA

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,5,10
National	Goal Nos. 2,4,6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.
- **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply a significant amount of business administration knowledge in the following domains viz. HR management, Finance, Marketing, Operations & Supply chain management and Business Analytics.
- PS0-3 An ability to make data driven decisions and effectively communicate to different stakeholders.

Course Outcomes (COs):
- **CO-1**: Define key concepts in International Human Resource Management (Knowledge)
- **CO-2**: Outline international dimensions of Human Resource Management (Knowledge)
- **CO-3**: Classify the factors associated with expatriate recruitment, selection, training and performance. (Analysis)

COURSE NAME : **Green Supply Chain Management**
COURSE CODE : **LSM241**
PROGRAM NAME : **MBA**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,11
National	Goal Nos. 1,5,6,11
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➤ **PO-1**: An ability to lead themselves and others to achieve organizational goals contributing effectively to a team environment.
- ➤ **PO-4**: An ability to make data driven decisions and effectively communicate to different stakeholders
- ➤ **PO-7**: An ability to demonstrate commitment to continuous learning

Program Specific Outcomes (PSOs):
- ➤ **PSO-2**: An ability to analyze the business problems from different functional perspectives.
- ➤ PS0-3 An ability to make data driven decisions and effectively communicate to different stakeholders.

Course Outcomes (COs):
- ➤ **CO-1**: Outline the role of green supply chain management
- ➤ **CO-2**: Explain the various green supply chain design aspects
- ➤ **CO-3**: Interpret the various challenges in reverse logistics & recycling
- ➤ **CO-4**: Illustrate various strategies employed in waste reduction processes

REGISTRAR

COURSE NAME   : Green Marketing
COURSE CODE   : MBA4025
PROGRAM NAME : MBA

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 6,8,9,11
National	Goal Nos. 1,4,6,11
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-3**: An ability to identify real life problems in different management functions and solve them through strategic planning, critical thinking and innovation.
- ➢ **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**: An ability to apply a significant amount of business administration knowledge in the following domains viz. HR management, Finance, Marketing, Operations & Supply chain management and Business Analytics.
- ➢ PS0-3 An ability to make data driven decisions and effectively communicate to different stakeholders.

Course Outcomes (COs):
- ➢ **CO-1**: Discuss the concept and landscape of Green Marketing
- ➢ **CO-2**: Modify Marketing Mix for greening the business
- ➢ **CO-3**: Develop effective Green Marketing Strategies

REGISTRAR

COURSE NAME : Business Laws

COURSE CODE : MGT108

PROGRAM NAME : MBA (Business Analytics)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,14,16
National	Goal Nos. 7,9,11,13,14
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.
- **PO-4**: An ability to identify and evaluate business ideas and opportunities.
- **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders

Program Specific Outcomes (PSOs):
- **PSO-2**: An ability to apply relevant analytical techniques to gain business insights and develop business strategies for making better decisions.
- **PSO-3**: An ability to communicate technical and non-technical information to different stake holders for the effective implementation of business decisions.

Course Outcomes (COs):
- **CO-1**: State the legal formation of contractual relationships in business
- **CO-2**: Infer the concept of contract of sale and about conditions and warranties given by the companies
- **CO-3**: Interpret the procedure for the formation of company, it's functioning, managing and winding up
- **CO-4**: Explain consumer rights and the procedure for settlement of a dispute in a consumer forum

REGISTRAR

COURSE NAME   : **Contemporary Issues in Society**

COURSE CODE   : MBA3035

PROGRAM NAME   : **MBA (Business Analytics)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,5,14,16
National	Goal Nos. 7,9,10,11,13,14
Regional	Goal Nos. 1,4
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**: An ability to lead themselves and others to achieve organizational goals contributing effectively to a team environment.
- **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.
- **PO-6**: An ability to evaluate and integrate ethical and societal considerations when making business decisions.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to understand and solve business problems using analytical models.
- **PSO-2**: An ability to apply relevant analytical techniques to gain business insights and develop business strategies for making better decisions.

Course Outcomes (COs):
- **CO-1**: Explain contemporary practices in day to day businesses in India
- **CO-2**: Distinguish between traditional and contemporary business practices

COURSE NAME : Business Ethics & Corporate governance

COURSE CODE : MBA3003

PROGRAM NAME : MBA (Business Analytics)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,3,11
National	Goal Nos. 1,4,5,6,7,15
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-1**: An ability to lead themselves and others to achieve organizational goals contributing effectively to a team environment.
- ➢ **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.
- ➢ **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**: An ability to understand and solve business problems using analytical models.
- ➢ **PSO-3**: An ability to communicate technical and non-technical information to different stake holders for the effective implementation of business decisions.

Course Outcomes (COs):
- ➢ **CO-1**: State various theories of ethical decision making
- ➢ **CO-2**: Discuss the concept of Corporate Social Responsibility with respect to provisions in Companies Act 2013
- ➢ **CO-3**: Explain the concept of corporate governance along with corporate governance systems in practice at domestic and international level
- ➢ **CO-4**: Illustrate the regulatory framework of corporate governance in India in wake of various corporate frauds

COURSE NAME   : Corporate Strategy

COURSE CODE   : MGT233

PROGRAM NAME   : MBA (Business Analytics)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 3,5,6
Regional	Goal Nos. 1,2
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-4**: An ability to identify and evaluate business ideas and opportunities.
- **PO-7**: An ability to demonstrate commitment to continuous learning

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to understand and solve business problems using analytical models.
- **PSO-3**: An ability to communicate technical and non-technical information to different stake holders for the effective implementation of business decisions.

Course Outcomes (COs):
- **CO-1**: Understand the implications of Organisational and environmental contexts for successful implementation of Corporate strategies
- **CO-2**: Critically examine the effects of complexity and uncertainty on strategy formation / implementation
- **CO-3**: Be able to use an extended range of tools and frameworks to conduct a full strategic analysis of an organisation/business, thereby linking theory to practice

REGISTRAR

COURSE NAME : Business Strategy in Digital Age

COURSE CODE : MBA4040

PROGRAM NAME : MBA (Business Analytics)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,15,17
National	Goal Nos. 3,6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-3**: An ability to identify real life problems in different management functions and solve them through strategic planning, critical thinking and innovation.
- **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders
- **PO-6**: An ability to evaluate and integrate ethical and societal considerations when making business decisions.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to understand and solve business problems using analytical models.
- **PSO-2**: An ability to apply relevant analytical techniques to gain business insights and develop business strategies for making better decisions.

Course Outcomes (COs):
- **CO-1**: Discuss key trends in digital business strategy [Comprehension]
- **CO-2**: Illustrate real-time business situations while using disruptive technology [Application]
- **CO-3**: Apply Business Model strategy challenges and opportunities with new resources and capabilities [Application]

COURSE NAME : Data Analytics using Cloud Technology

COURSE CODE : MBA4039

PROGRAM NAME : MBA (E-Business Management)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 6,9,12
National	Goal Nos. 1,8,11
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-1**: An ability to lead themselves and others to achieve organizational goals contributing effectively to a team environment.
- **PO-4**: An ability to identify and evaluate business ideas and opportunities.
- **PO-6**: An ability to evaluate and integrate ethical and societal considerations when making business decisions.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to identify real life problems in digital enterprises and solve them through strategic planning, critical thinking and innovation.
- **PSO-2**: An ability to analyze the impact of digitalization, innovation and technology on business.

Course Outcomes (COs):
- **CO-1**: Demonstrate the concepts of Azure analytics. (Apply)
- **CO-2**: Prepare the given data for machine learning processes. (Apply).
- **CO-3**: Demonstrate AWS techniques for machine learning based business analytics. (Apply)

REGISTRAR

COURSE NAME : **Organizational Behaviour**
COURSE CODE : **MGT218**
PROGRAM NAME : **MBA (E-Business Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 5,10,16
National	Goal Nos. 2,4,15
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.
- **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders
- **PO-6**: An ability to evaluate and integrate ethical and societal considerations when making business decisions.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to identify real life problems in digital enterprises and solve them through strategic planning, critical thinking and innovation.
- **PSO-3**: An ability to identify opportunities, acquire resources and develop capabilities to run a digital business.

Course Outcomes (COs):
- **CO-1**: Describe the concepts of human behaviour in the organizations. [Knowledge]
- **CO-2**: Explain the significance of attitudes and emotions at work. [Comprehension]
- **CO-3**: Distinguish perception, individual personality and behavior in organizational environment. [Comprehension]
- **CO-4**: Analyse motivational and leadership theories used in organizations for decision making. [Analysis]
- **CO-5**: Demonstrate the perspectives of group dynamics, organizational change and conflict management leading to efficient work culture. [Application]

COURSE NAME : **E-Commerce Supply Chain and Logistics Management**

COURSE CODE : **ECM206**

PROGRAM NAME : **MBA (E-Business Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,11,12
National	Goal Nos. 1,5,8,11
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.
- **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to identify real life problems in digital enterprises and solve them through strategic planning, critical thinking and innovation.
- **PSO-3**: An ability to identify opportunities, acquire resources and develop capabilities to run a digital business.

Course Outcomes (COs):
- **CO-1**: Describe the significance of Ecommerce, need for Logistics and Supply Chain, the Networked economy and different business models
- **CO-2**: Explain the security, legal aspects, electronic payments, innovations and integration with logistics & supply chain
- **CO-3**: Apply the metrics related to logistics and supply chain performance
- **CO-4**: Identify various processes of lean management and various career opportunities

COURSE NAME　　: **Technology Foundations for Business**
COURSE CODE　　: **MBA1018**
PROGRAM NAME　: **MBA (E-Business Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9,11
National	Goal Nos. 1,3,5,16
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-1**: An ability to lead themselves and others to achieve organizational goals contributing effectively to a team environment.
- ➢ **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.

Program Specific Outcomes (PSOs):
- ➢ **PSO-2**: An ability to analyze the impact of digitalization, innovation and technology on business.
- ➢ **PSO-3**: An ability to identify opportunities, acquire resources and develop capabilities to run a digital business.

Course Outcomes (COs):
- ➢ **CO-1**: Understand Information Technology concepts [Knowledge]
- ➢ **CO-2**: Discuss key IT systems and their role in Organizations [Comprehension]
- ➢ **CO-3**: Describe how IT Systems can be used for competitive advantage [Comprehension]

COURSE NAME : E Commerce Strategy

COURSE CODE : MBA4072

PROGRAM NAME : MBA (E-Business Management)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 3,5,6
Regional	Goal Nos. 1,2
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.
- **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to identify real life problems in digital enterprises and solve them through strategic planning, critical thinking and innovation.
- **PSO-2**: An ability to analyze the impact of digitalization, innovation and technology on business.

Course Outcomes (COs):
- **CO-1**: Discuss the concepts such as e business strategy, e business success factors and payment types
- **CO-2**: Prepare appropriate strategic frameworks for an e-commerce startup, business unit or pre-existing enterprise
- **CO-3**: Analyze the Supply chain and Procurement network of e Business entity

COURSE NAME   : **Economics for Managers**
COURSE CODE   : **MBA1015**
PROGRAM NAME : **MBA (Logistics & Supply Chain Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1, 12
National	Goal Nos. 12,13,15
Regional	Goal Nos. 1
Local	Goal Nos. 1, 5

Program Outcomes (POs):
  - ➢ **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.
  - ➢ **PO-4**: An ability to identify and evaluate business ideas and opportunities.
  - ➢ **PO-6**: An ability to evaluate and integrate ethical and societal considerations when making business decisions.

Program Specific Outcomes (PSOs):
  - ➢ **PSO-1**: An ability to solve real-life business cases related to logistics network design, warehousing and transportation.
  - ➢ **PSO-3**: An ability to understand the best Sourcing Practices, Strategic Sourcing and apply techniques to find the right vendors and maintain relationship with vendors.

Course Outcomes (COs):
  - ➢ **CO-1**: Explain equations and graphs and Illustrate economic behavior at the individual, firm and policy levels.
  - ➢ **CO-2**: Relate the characteristics of different market structures and their implications for the firm's entry, sustainability and exit
  - ➢ **CO-3**: Apply concepts of consumption, investment and savings, Aggregate supply, and Aggregate demand in business
  - ➢ **CO-4**: Interpret the effect of fiscal instruments and monetary instruments with respect to fiscal policies in India economy on business
  - ➢ **CO-5**: Employ the 'economic way of thinking' for managerial decision making

COURSE NAME   : **Total Quality Management**
COURSE CODE   : **MBA2031**
PROGRAM NAME   : **MBA (Logistics & Supply Chain Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,3,10
National	Goal Nos. 1,4,7,15
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- PO1: An ability to lead themselves and others to achieve organizational goals contributing effectively to a team environment.
- **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders
- **PO-6**: An ability to evaluate and integrate ethical and societal considerations when making business decisions.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to solve real-life business cases related to logistics network design, warehousing and transportation.
- **PSO-3**: An ability to understand the best Sourcing Practices, Strategic Sourcing and apply techniques to find the right vendors and maintain relationship with vendors.

Course Outcomes (COs):
- **CO-1**: Have Knowledge of the various quality terminologies and methods of generating ideas for quality improvement
- **CO-2**: Understand the essence of tools and techniques of quality management
- **CO-3**: Analyze the techniques of statistical process control and seven tools of quality control
- **CO-4**: Apply the principles and philosophies of quality management.

COURSE NAME   **: Entreprenuership and New Business Models**
COURSE CODE   **: MBA3002**
PROGRAM NAME   **: MBA (Logistics & Supply Chain Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9,17
National	Goal Nos. 2,3,4
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.
- **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders

Program Specific Outcomes (PSOs):
- **PSO-2**: An ability to understand how the global economy is linked together by the flow of products, information and finances through the supply chain network.
- **PSO-3**: An ability to understand the best Sourcing Practices, Strategic Sourcing and apply techniques to find the right vendors and maintain relationship with vendors.

Course Outcomes (COs):
- **CO-1**: Identify the entrepreneurial journey. [Knowledge]
- **CO-2**: Develop business plan using business model canvas. [Application]
- **CO-3**: Examine the role of technology in business. [Comprehension]
- **CO-4**: Understand the challenges faced by entrepreneurs in the entrepreneurial journey. [Knowledge]

COURSE NAME   : Personal Wealth Management

COURSE CODE   : MBA3037

PROGRAM NAME   : MBA (Logistics & Supply Chain Management)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,5,10
National	Goal Nos. 2,4,6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- PO1: An ability to lead themselves and others to achieve organizational goals contributing effectively to a team environment.
- **PO-4**: An ability to identify and evaluate business ideas and opportunities.
- **PO-7**: An ability to demonstrate commitment to continuous learning

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to solve real-life business cases related to logistics network design, warehousing and transportation.
- **PSO-2**: An ability to understand how the global economy is linked together by the flow of products, information and finances through the supply chain network.

Course Outcomes (COs):
- **CO-1**: Explain the process of Personal Financial planning
- **CO-2**: Determine the need for insurance and investment planning to overcome various risks faced by individuals
- **CO-3**: Identify various Tax planning strategies to reduce the burden of tax
- **CO-4**: Evaluate the various Corpus for Retirement Planning

COURSE NAME   **: International Supply Chain Management**

COURSE CODE   **: MBA4065**

PROGRAM NAME   **: MBA (Logistics & Supply Chain Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,11,13
National	Goal Nos. 1,5,7,11
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment.
- **PO-3**: An ability to identify real life problems in different management functions and solve them through strategic planning, critical thinking and innovation.
- **PO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to solve real-life business cases related to logistics network design, warehousing and transportation.
- **PSO-3**: An ability to understand the best Sourcing Practices, Strategic Sourcing and apply techniques to find the right vendors and maintain relationship with vendors.

Course Outcomes (COs):
- **CO-1**: the student will be able to: Apply the Selection of supplier and Procurement Management
- **CO-2**: Apply Strategic cost management, Conflict Managements, Legal and Contractual Issues in International SCM.
- **CO-3**: Analyze the demand management, supply chain sustainability and its performance

COURSE NAME   **: Econometrics for Managers**
COURSE CODE   **: MGO202**
PROGRAM NAME   **: MBA (Digital Marketing)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1, 12
National	Goal Nos. 12,13,15
Regional	Goal Nos. 1
Local	Goal Nos. 1, 5

Program Outcomes (POs):
- **PO-2**:An ability to integrate functional knowledge and apply managerial skills in changing business environment.
- **PO-4**:An ability to identify and evaluate business ideas and opportunities.
- **PO-6**:An ability to evaluate and integrate ethical and societal considerations when making business decisions.

Program Specific Outcomes (PSOs):
- **PSO-2**:An ability to unleash the potential of SMAC (Social, Mobile, Analytics and Cloud) in marketing efforts of an organization.
- **PSO-3**: An ability to attract, engage and retain customers of an enterprise with the power of digital technologies
-

Course Outcomes (COs):
- **CO-1**: Explain key concepts of macroeconomics in business decision making.
- **CO-2**: Apply concepts of consumption, investment and savings, Aggregate supply and Aggregate demand in business
- **CO-3**: Explain how unemployment and inflation influence business decision in the short run and in the long run
- **CO-4**: Analyze the effect of fiscal instruments and monetary instruments with respect to India's business environment.

COURSE NAME : **Entrepreneurship and New Venture Creation**

COURSE CODE : MGT232

PROGRAM NAME : MBA (Digital Marketing)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9,17
National	Goal Nos. 2,3,4
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-5**:An ability to make data driven decisions and effectively communicate to different stakeholders
- ➢ **PO-6**:An ability to evaluate and integrate ethical and societal considerations when making business decisions.

Program Specific Outcomes (PSOs):
- ➢ **PSO-2**:An ability to unleash the potential of SMAC (Social, Mobile, Analytics and Cloud) in marketing efforts of an organization.
- ➢ **PSO-3**: An ability to attract, engage and retain customers of an enterprise with the power of digital technologies
- ➢

Course Outcomes (COs):
- ➢ **CO-1**: Identify the entrepreneurial journey. [Knowledge]
- ➢ **CO-2**: Develop business plan using business model canvas. [Application]
- ➢ **CO-3**: Examine the role of technology in business. [Comprehension]
- ➢ **CO-4**: Understand the social responsibility of corporate towards society. [Comprehension]

COURSE NAME   : **Business Ethics and Corporate Governance**

COURSE CODE   : MGT241

PROGRAM NAME   : **MBA (Digital Marketing)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,3,11
National	Goal Nos. 1,4,5,6,7,15
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-1**:An ability to lead themselves and others to achieve organizational goals contributing effectively to a team environment.
- ➢ **PO-2**:An ability to integrate functional knowledge and apply managerial skills in changing business environment.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:An ability to devise strategies to enhance the visibility of an organization using different digital media and technologies.
- ➢ **PSO-2**:An ability to unleash the potential of SMAC (Social, Mobile, Analytics and Cloud) in marketing efforts of an organization.

Course Outcomes (COs):
- ➢ **CO-1**: State various theories of ethical decision making
- ➢ **CO-2**: Discuss the concept of Corporate Social Responsibility with respect to provisions in Companies Act 2013
- ➢ **CO-3**: Explain the concept of corporate governance along with corporate governance systems in practice at domestic and international level
- ➢ **CO-4**: Illustrate the regulatory framework of corporate governance in India in wake of various corporate frauds

COURSE NAME   : **Contemporary Issues in Business & Society I**
COURSE CODE   : **MGT235**
PROGRAM NAME   : **MBA (Digital Marketing)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,4,5,14,16
National	Goal Nos. 7,9,10,11,13,14
Regional	Goal Nos. 1,4
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**:An ability to lead themselves and others to achieve organizational goals contributing effectively to a team environment.
- **PO-3**:An ability to identify real life problems in different management functions and solve them through strategic planning, critical thinking and innovation.
- **PO-4**:An ability to identify and evaluate business ideas and opportunities.
- **PO-7**:An ability to demonstrate commitment to continuous learning

Program Specific Outcomes (PSOs):
- **PSO-1**:An ability to devise strategies to enhance the visibility of an organization using different digital media and technologies.
- **PSO-3**: An ability to attract, engage and retain customers of an enterprise with the power of digital technologies
-

Course Outcomes (COs):
- **CO-1**: An ability to lead themselves and others to achieve organizational goals contributing effectively to a team environment
- **CO-2**: An ability to integrate functional knowledge and apply managerial skills in changing business environment
- **CO-3**: An ability to identify real life problems in different management functions and solve them through strategic planning, critical thinking and innovation
- **CO-4**: An ability to identify and evaluate business ideas and opportunities
- **CO-5**: An ability to make data driven decisions and effectively communicate to different stakeholders
- **CO-6**: An ability to evaluate and integrate ethical and societal considerations when making business decisions

COURSE NAME   : **Management Consulting**

COURSE CODE   : **MGO203**

PROGRAM NAME   : **MBA (Digital Marketing)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,3,11,12
National	Goal Nos. 1,4,5,6,7,15
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-3**:An ability to identify real life problems in different management functions and solve them through strategic planning, critical thinking and innovation.
- **PO-7**:An ability to demonstrate commitment to continuous learning

Program Specific Outcomes (PSOs):
- **PSO-2**:An ability to unleash the potential of SMAC (Social, Mobile, Analytics and Cloud) in marketing efforts of an organization.
- **PSO-3**: An ability to attract, engage and retain customers of an enterprise with the power of digital technologies
-

Course Outcomes (COs):
- **CO-1**: Make aware of the practices of management consulting
- **CO-2**: Understanding ABC of Management Consulting project.
- **CO-3**: Identify opportunities, key factors and issues relevant for consulting engagement and their relationships
- **CO-4**: Prepare consulting proposals, develop frameworks to assess. Suggest remedial action plan(s).

COURSE NAME   : Introduction to Human Rights and Gender Issues
COURSE CODE   : BAJ1003
PROGRAM NAME : BA Journalism and Mass Communication

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 5,8,10,16
National	Goal Nos. 13,16
Regional	Goal Nos. 1,3
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-3**:Influential and effective communication: Ability to share thoughts, ideas and applied skills of communication in its various perspectives like written communication, speech communication & language efficiency.
- **PO-4**: Critical/ Reflective thinking: Employ critical and reflective thinking along with the ability to create a sense of awareness of self and society.
- **PO-5**: Ethical Awareness: As a communication learner, one understands the importance of ethical values and their application in professional life.
- **PO-9**: Cooperation/ Team work: Building a team, motivating and inspiring the team members to work with cooperation to their utmost efficiency.
- **PO-10**: Leadership readiness/ Qualities: To make learners fluent in multiple facets of leadership. Creating the ability to take ownership in crucial situations. Enhancing the qualities to be an efficient leader. Cultivating key characteristics in learners is to be visionary leaders who can inspire the team to greatness.

Program Specific Outcomes (PSOs):
- PS0-1: Exhibit a sound understanding and knowledge of Journalism and Mass Communication.
- PS0-2: Display the competence to explore career opportunities as per the demands and requirements of the Media Industry.
- PS0-3: Think critically, and creatively, and demonstrate curiosity to discover new horizons in Journalism and Mass Communication.

Course Outcomes (COs):
- **CO-1**: Explain the various topics associated with human rights and gender studies
- **CO-2**: Elaborate the status of human rights, environment & gender studies
- **CO-3**: Influence of Media in public opinion.
- **CO-4**: Develop empathy to human rights and gender equality in personal and professional life

SCHOOL OF LAW

COURSE NAME : Constitutional Law – II
COURSE CODE : LAW 3003
PROGRAM NAME : BBA LLB(Hons.)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 5,8,10,16,17
National	Goal Nos. 2,3,7,13,15
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-2**:Ability to develop critical thinking skill
- **PO-3**:Ability to identify, analyze and solve legal problem with professional ethics and integrity
- **PO-5**: Ability to draft professional legal writing along with effective oral communication
- **PO-6**:Ability to apply legal theory to factual settings
- **PO-7**:Ability to apply legal theory to engage in legal argumentation
- **PO-8**:Ability to conduct independent legal research specific to the case
- **PO-10**:Recognition of the need for engaging in lifelong learning
- **PO-12**:Ability to adapt knowledge of contemporary issues

Program Specific Outcomes (PSOs):
- **PSO-2**:To develop in-depth knowledge and understanding of management, beheverial science and economic dimensions of law and its interface with Indian Legal systems
- **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
- **CO-1**:Explain the nature of the federal polity and the various powers and limitations imposed on the Executive wing of the union and state.
- **CO-2**:Express the various essential qualifications and limitations of the power of the Legislative wing of Union and State
- **CO-3**:Identify the various powers and jurisdictions of the Union and State Judicial system.
- **CO-4**:Recognize the various issues that may arise in the Centre-State relations through the established norms and precedents.
- **CO-5**:Analyse the powers of the government in declaring an emergency and amending the Constitution

COURSE NAME : Intellectual Property Rights II

COURSE CODE : LAW408

PROGRAM NAME : BBA LLB(Hons.)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,12,16,17
National	Goal Nos. 1,5,7,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**:Ability to apply the fundamental concept of Humanities, Commerce and Management to legal problems
- **PO-2**:Ability to develop critical thinking skill
- **PO-3**:Ability to identify, analyze and solve legal problem with professional ethics and integrity
- **PO-4**:Ability to conduct dispute resolution with professional ethics and integrity
- **PO-5**: Ability to draft professional legal writing along with effective oral communication
- **PO-6**:Ability to apply legal theory to factual settings
- **PO-7**:Ability to apply legal theory to engage in legal argumentation
- **PO-8**:Ability to conduct independent legal research specific to the case
- **PO-9**:Ability to conduct client services with necessary usage of technological tools

Program Specific Outcomes (PSOs):
- **PSO-2**:To develop in-depth knowledge and understanding of management, beheverial science and economic dimensions of law and its interface with Indian Legal systems
- **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
- **CO-1**:Apply the Patent Laws in National & International perspective for the protection of inventions.
- **CO-2**:Analyse the problems related to protection of Bio Diversity under IPR.
- **CO-3**:Comprehend the issues related to the Design under IPR.
- **CO-4**:Understand the contemporary domains and changing dimensions of IPR in National and International Level.

COURSE NAME : Company law

COURSE CODE : LAW132

PROGRAM NAME : BBA LLB(Hons.)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,10,12,16
National	Goal Nos. 2,3,5,6,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-2**:Ability to develop critical thinking skill
- **PO-4**:Ability to conduct dispute resolution with professional ethics and integrity
- **PO-7**:Ability to apply legal theory to engage in legal argumentation
- **PO-12**:Ability to adapt knowledge of contemporary issues

Program Specific Outcomes (PSOs):
- **PSO-2**:To develop in-depth knowledge and understanding of management, beheverial science and economic dimensions of law and its interface with Indian Legal systems
- **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
- **CO-1**:Apply the sections of Company Act, 2013 in Corporate Litigation
- **CO-2**:Analyze the foundational principles of Indian corporate law, undertake legal research with primary and secondary materials, and evaluate legal information.
- **CO-3**:Acquire problem recognition and problem identification skills necessary in the modern business environment as well as for the more advanced commercial law papers.
- **CO-4**:Understand the significant trends and recurring issues in company law.

COURSE NAME   : Public International Law
COURSE CODE   : LAW120
PROGRAM NAME   : BBA LLB(Hons.)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,12,16,17
National	Goal Nos. 1,5,7,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
  - **PO-1**:Ability to apply the fundamental concept of Humanities, Commerce and Management to legal problems
  - **PO-2**:Ability to develop critical thinking skill
  - **PO-3**:Ability to identify, analyze and solve legal problem with professional ethics and integrity
  - **PO-6**:Ability to apply legal theory to factual settings
  - **PO-7**:Ability to apply legal theory to engage in legal argumentation
  - **PO-8**:Ability to conduct independent legal research specific to the case
  - **PO-10**:Recognition of the need for engaging in lifelong learning
  - **PO-12**:Ability to adapt knowledge of contemporary issues

Program Specific Outcomes (PSOs):
  - **PSO-2**:To develop in-depth knowledge and understanding of management, beheverial science and economic dimensions of law and its interface with Indian Legal systems
  - **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
  - **CO-1**:Outline the basic concepts and legal foundations of Public International law.
  - **CO-2**:Apply sources of International Law to contemporary scenarios.
  - **CO-3**:Explain relationship between International Law and Municipal Law.
  - **CO-4**:Identify the criteria for State Recognition and State Succession
  - **CO-5**:Discuss different organs of UN and the role of UN in settlement of international disputes.

REGISTRAR

COURSE NAME : Law Relating to Women & Children
COURSE CODE : LAW 407
PROGRAM NAME : BBA LLB(Hons.)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 5,8,10,16,17
National	Goal Nos. 2,3,7,13,15
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
➢ **PO-2**:Ability to develop critical thinking skill
➢ **PO-3**:Ability to identify, analyze and solve legal problem with professional ethics and integrity
➢ **PO-4**:Ability to conduct dispute resolution with professional ethics and integrity
➢ **PO-12**:Ability to adapt knowledge of contemporary issues

Program Specific Outcomes (PSOs):
➢ **PSO-2**:To develop in-depth knowledge and understanding of management, beheverial science and economic dimensions of law and its interface with Indian Legal systems
➢ **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
➢ **CO-1**:Understand the relevance of Gender Study and rights of Children
➢ **CO-2**:Understand the intersection between Gender & National Law
➢ **CO-3**:Analyze the various laws pertaining to women in the International Legal Framework.
➢ **CO-4**:Apply various concepts and the important aspects of national legislationsrelated to child rights in practical field.

COURSE NAME   : **Environmental Law**

COURSE CODE   : **LAW122**

PROGRAM NAME   : **BA LLB (Hons.)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,6,9,11,13
National	Goal Nos. 1,2,7,9
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,4

Program Outcomes (POs):
- **PO-2**:Ability to develop critical thinking skill
- **PO-6**:Ability to apply legal theory to factual settings
- **PO-7**:Ability to apply legal theory to engage in legal argumentation
- **PO-11**: Exhibit social responsibility adhering to ethical and moral values
- **PO-12**:Ability to adapt knowledge of contemporary issues

Program Specific Outcomes (PSOs):
- **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
- **CO-1**:Analyse the concept of environment, pollution and the nature and scope of environmental law.
- **CO-2**:Analyse the core elements of international legal framework pertaining to environment.
- **CO-3**:Demonstrate an ability to engage in debates about the ways in which environment is protected under Indian legal regime.
- **CO-4**:Critically articulate the interface between domestic and international legal framework on environment.
- **CO-5**:Examine the importance of forest and need for its conservation under the legal framework.

COURSE NAME   : **Public Administration: Core Concepts**
COURSE CODE   : **BAL 2004**
PROGRAM NAME   : **BA LLB (Hons.)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,12,16
National	Goal Nos. 2,15
Regional	Goal Nos. 1
Local	Goal Nos. 1,3,4

Program Outcomes (POs):
- **PO-1**:Ability to apply the fundamental concept of Humanities, Commerce and Management to legal problems
- **PO-2**:Ability to develop critical thinking skill
- **PO-11**: Exhibit social responsibility adhering to ethical and moral values
- **PO-12**:Ability to adapt knowledge of contemporary issues
- **PO-13**:Ability to function in multidisciplinary team

Program Specific Outcomes (PSOs):
- **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
- **CO-1**:Explain the nature and scope of Public Administration
- **CO-2**:Identify basic concepts and principles of public administration
- **CO-3**:Analyze the theories of public administration
- **CO-4**:Examine the emerging trends in public administration

COURSE NAME   : **Law of Contract**

COURSE CODE   : **LAW2022**

PROGRAM NAME   : **BA LLB (Hons.)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,10,12,16
National	Goal Nos. 2,3,5,6,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-2**:Ability to develop critical thinking skill
- **PO-4**:Ability to conduct dispute resolution with professional ethics and integrity
- **PO-7**:Ability to apply legal theory to engage in legal argumentation
- **PO-12**:Ability to adapt knowledge of contemporary issues

Program Specific Outcomes (PSOs):
- **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
- **CO-1**:Explain the basic principles of law of contract.
- **CO-2**:Infer the legal aspects of a valid consideration and capacity to contract.
- **CO-3**:Illustrate importance of free consent as an essential to a valid contract.
- **CO-4**:Identify various types of Contract under Indian Contract Act, 1872.
- **CO-5**:Categorize the various modes of Discharge of Contract and remedies for breach of contract.
- **CO-6**:Illustrate the remedies for breach of contract and specific

COURSE NAME   : International Politics
COURSE CODE   : BAL-105
PROGRAM NAME   : BA LLB (Hons.)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,10,12,16
National	Goal Nos. 2,3,5,6,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**:Ability to apply the fundamental concept of Humanities, Commerce and Management to legal problems
- **PO-2**:Ability to develop critical thinking skill
- **PO-10**:Recognition of the need for engaging in lifelong learning
- **PO-11**: Exhibit social responsibility adhering to ethical and moral values
- **PO-12**:Ability to adapt knowledge of contemporary issues

Program Specific Outcomes (PSOs):
- **PSO-2**:To develop in-depth knowledge and understanding of comparative political thoughts, social and economic dimensions of law and its interface with Indian Legal systems
- **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
- **CO-1**:Understand the theories of international politics
- **CO-2**:Describe world system using concept of balance of power and hegemony
- **CO-3**:Evaluate the impact of Cold War and post-Cold War developments on international relations
- **CO-4**:Examine the concepts of national power, national interest and collective security

COURSE NAME : Law of Contract II

COURSE CODE : LAW 2025

PROGRAM NAME : BA LLB (Hons.)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,10,12,16
National	Goal Nos. 2,3,5,6,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-2**:Ability to develop critical thinking skill
- **PO-3**:Ability to identify, analyze and solve legal problem with professional ethics and integrity
- **PO-4**:Ability to conduct dispute resolution with professional ethics and integrity
- **PO-6**:Ability to apply legal theory to factual settings
- **PO-7**:Ability to apply legal theory to engage in legal argumentation

Program Specific Outcomes (PSOs):
- **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
- **CO-1**: Define the context and rational of specific contracts of Indemnity & Guarantee.
- **CO-2**: Determine the usage of principles and the rights of the parties under Bailment & Pledge
- **CO-3**: Identify the relation of contract of agency with our day to day commercial activities and their impact on social & economic front.
- **CO-4**:Identify the relevant legal issues involved in Sale of Goods Act and its applicability.
- **CO-5**: Apply the relevant principles, legal provisions and the case laws in Partnership Act to the legal issues in contractual dealings and construct a coherent and effective argument for dispute resolution.

COURSE NAME : Banking Law

COURSE CODE : LAW 311

PROGRAM NAME : B.Com LLB (Hons.)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,10,12,16
National	Goal Nos. 2,3,5,6,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**:Ability to apply the fundamental concept of Humanities, Commerce and Management to legal problems
- **PO-2**:Ability to develop critical thinking skill
- **PO-3**:Ability to identify, analyze and solve legal problem with professional ethics and integrity
- **PO-6**:Ability to apply legal theory to factual settings
- **PO-7**:Ability to apply legal theory to engage in legal argumentation
- **PO-10**:Recognition of the need for engaging in lifelong learning
- **PO-12**:Ability to adapt knowledge of contemporary issues

Program Specific Outcomes (PSOs):
- **PSO-2**:To develop in-depth knowledge and understanding of commerce and its economic dimensions of law and its interface with Indian Legal systems
- **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
- **CO-1**:Understand the banking structure in India.
- **CO-2**:Analyse the relationship between the Banker and Customer.
- **CO-3**:Identify the recent trends of Banking system in India.
- **CO-4**:Solve the problems related to the Negotiable Instruments Act, 1881.

COURSE NAME : Advance Public International Law

COURSE CODE : LAW 401

PROGRAM NAME : B.Com LLB (Hons.)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,12,16,17
National	Goal Nos. 1,5,7,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- ➢ **PO-1**:Ability to apply the fundamental concept of Humanities, Commerce and Management to legal problems
- ➢ **PO-2**:Ability to develop critical thinking skill
- ➢ **PO-3**:Ability to identify, analyze and solve legal problem with professional ethics and integrity
- ➢ **PO-6**:Ability to apply legal theory to factual settings
- ➢ **PO-7**:Ability to apply legal theory to engage in legal argumentation
- ➢ **PO-8**:Ability to conduct independent legal research specific to the case
- ➢ **PO-12**:Ability to adapt knowledge of contemporary issues

Program Specific Outcomes (PSOs):
- ➢ **PSO-2**:To develop in-depth knowledge and understanding of commerce and its economic dimensions of law and its interface with Indian Legal systems
- ➢ **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
- ➢ **CO-1**:Analyze the concept of State Responsibility in the wake of contemporary world issues.
- ➢ **CO-2**:Examine the complexity of international legal regime and disputes on law of the sea.
- ➢ **CO-3**:Critique the concept of jurisdiction vis-à-vis States.
- ➢ **CO-4**:Analyze the position of Diplomatic Agents and their immunities.
- ➢ **CO-5**:Analyze the issues and challenges being faced by contemporary international legal regime.

COURSE NAME : Law of Torts, Consumer Protection Act and Motor vehicle Act
COURSE CODE : LAW2021
PROGRAM NAME : B.Com LLB (Hons.)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,10,12,16
National	Goal Nos. 2,3,5,6,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
  - **PO-2**:Ability to develop critical thinking skill
  - **PO-3**:Ability to identify, analyze and solve legal problem with professional ethics and integrity
  - **PO-4**:Ability to conduct dispute resolution with professional ethics and integrity
  - **PO-6**:Ability to apply legal theory to factual settings
  - **PO-7**:Ability to apply legal theory to engage in legal argumentation
  - **PO-11**: Exhibit social responsibility adhering to ethical and moral values
  - **PO-12**:Ability to adapt knowledge of contemporary issues

Program Specific Outcomes (PSOs):
  - **PSO-2**:To develop in-depth knowledge and understanding of commerce and its economic dimensions of law and its interface with Indian Legal systems
  - **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
  - **CO-1**:Describe the foundational principles of Law of Torts.
  - **CO-2**:Recognize the concept and kinds of liabilities in Torts
  - **CO-3**:Identify the nature of Negligence, Nuisance and nervous Shock
  - **CO-4**:Discuss the various kinds of Torts against the person and property
  - **CO-5**:Explain the working of COPRA and MVA.

COURSE NAME : International Trade Law

COURSE CODE : LAW 322

PROGRAM NAME : B.Com LLB (Hons.)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,10,12,16
National	Goal Nos. 2,3,5,6,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):

➢ **PO-1**:Ability to apply the fundamental concept of Humanities, Commerce and Management to legal problems
➢ **PO-2**:Ability to develop critical thinking skill
➢ **PO-3**:Ability to identify, analyze and solve legal problem with professional ethics and integrity
➢ **PO-4**:Ability to conduct dispute resolution with professional ethics and integrity
➢ **PO-6**:Ability to apply legal theory to factual settings

Program Specific Outcomes (PSOs):

➢ **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):

➢ **CO-1**:Analyze the concept of International Trade Policies and their impact on domestic policies.
➢ **CO-2**:Examine the inflows and outflows of foreign exchange and its role in Indian economy.
➢ **CO-3**:Interpret various nuances of the process of export-import of goods and services.
➢ **CO-4**:Examine the provisions enacted in laws related to foreign-trade with reference to India.
➢ **CO-5**:Analyze the functions of international organizations in specialized sectors and dispute resolution.

COURSE NAME   : **Competition Law**

COURSE CODE   : **LAW308**

PROGRAM NAME   : **B.Com LLB (Hons.)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,10,12,16
National	Goal Nos. 2,3,5,6,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- ➤ **PO-1**:Ability to apply the fundamental concept of Humanities, Commerce and Management to legal problems
- ➤ **PO-2**:Ability to develop critical thinking skill
- ➤ **PO-3**:Ability to identify, analyze and solve legal problem with professional ethics and integrity
- ➤ **PO-6**:Ability to apply legal theory to factual settings
- ➤ **PO-7**:Ability to apply legal theory to engage in legal argumentation
- ➤ **PO-8**:Ability to conduct independent legal research specific to the case

Program Specific Outcomes (PSOs):
- ➤ **PSO-2**:To develop in-depth knowledge and understanding of commerce and its economic dimensions of law and its interface with Indian Legal systems
- ➤ **PSO-3**:To develop intellectual rigor as well as more general transferable intellectual skills which are of value in the practice of Law and a wide range of careers.

Course Outcomes (COs):
- ➤ **CO-1**:Demonstrate Understanding of foundations of Competition Law and Policy.
- ➤ **CO-2**:Apply the principles of competition law in order to identify anti-competitive agreements and practices.
- ➤ **CO-3**:Propose solutions under the Competition Act 2002 to eliminate practices abusing the dominance practices in a market situation.
- ➤ **CO-4**:Analyze the various Combinations under Competition Law.

COURSE NAME   **: Research Methodology**

COURSE CODE   **: PGL1001**

PROGRAM NAME   **: L.M. (Intellectual Property Rights)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,12,16,17
National	Goal Nos. 1,5,7,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**:Impart detailed knowledge in some specific area or areas of the discipline law.
- **PO-3**:Ability to inculcate research skills to enable them to do research in the area of specialization
- **PO-5**:Demonstrate quality research skills thereby making original contributions to the discipline of Law.

Program Specific Outcomes (PSOs):
- **PSO-1**:IPR is at the center of economic and social development therefore ordinary lawyers will find it difficult to deal with disputes relating to infringement of IPR, therefore the primary objective is to impart them the knowledge necessary to deal with t
- **PSO-2**:To impart interdisciplinary knowledge that is required for the above purpose.
- **PSO-3**:To train the students in an acquiring special skills that are necessary to deal with IPR.

Course Outcomes (COs):
- **CO-1**: Compare and contrast diverse theories and conduct theoretical analysis in social research.
- **CO-2**:Formulate appropriate research designs based on the specific requirements of a research problem.
- **CO-3**: Interpret and analyze data using correlation, regression, and hypothesis testing methods.
- **CO-4**:Differentiate qualitative research methods, assess reliability, validity, and triangulation in qualitative data.
- **CO-5**:Understand the purpose, objectives, and methods of teaching, and the learning cycle.

COURSE NAME : Law and Justice in a Globalizing World
COURSE CODE : PGL 1003
PROGRAM NAME : L.M. (Intellectual Property Rights)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,12,16,17
National	Goal Nos. 1,5,7,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-2**:Ability to inculcate in them highly specialized knowledge and skills relating to those areas to enable them to evaluate and improve the existing knowledge.
- **PO-4**:Enhance their teaching skills in the area of the discipline law.

Program Specific Outcomes (PSOs):
- **PSO-1**:IPR is at the center of economic and social development therefore ordinary lawyers will find it difficult to deal with disputes relating to infringement of IPR, therefore the primary objective is to impart them the knowledge necessary to deal with t
- **PSO-2**:To impart interdisciplinary knowledge that is required for the above purpose.
- **PSO-3**:To train the students in an acquiring special skills that are necessary to deal with IPR.

Course Outcomes (COs):
- **CO-1**:Differentiate various types of justice, including compensatory, distributive, socio-economic, and social justice, and their implications.
- **CO-2**:Analyze the role of globalization in shaping social justice and global distributive justice
- **CO-3**:Assess the impact of globalization on the judicial process and the administration of justice.
- **CO-4**:Evaluate environmental jurisprudence and the shift from Millennium Development Goals (MDGs) to Sustainable Development Goals (SDGs).

REGISTRAR

COURSE NAME : Intellectual Property Regimes - I

COURSE CODE : PGL2002

PROGRAM NAME : L.M. (Intellectual Property Rights)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,12,16,17
National	Goal Nos. 1,5,7,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**:Impart detailed knowledge in some specific area or areas of the discipline law.
- **PO-4**:Enhance their teaching skills in the area of the discipline law.
- **PO-5**:Demonstrate quality research skills thereby making original contributions to the discipline of Law.

Program Specific Outcomes (PSOs):
- **PSO-1**:IPR is at the center of economic and social development therefore ordinary lawyers will find it difficult to deal with disputes relating to infringement of IPR, therefore the primary objective is to impart them the knowledge necessary to deal with t
- **PSO-2**:To impart interdisciplinary knowledge that is required for the above purpose.
- **PSO-3**:To train the students in an acquiring special skills that are necessary to deal with IPR.

Course Outcomes (COs):
- **CO-1**:Analyze the international dimensions of Intellectual Property protection
- **CO-2**:Evaluate the implications of international treaties on Intellectual Property protection
- **CO-3**:Analyze the criteria for patentability and non-patentable inventions
- **CO-4**:Analyze the concept of trademark subject matter and its essential elements

COURSE NAME   : Comparative Public Law

COURSE CODE   : PGL 1002

PROGRAM NAME   : LL.M. (Technology Law)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,10,12,16
National	Goal Nos. 2,3,5,6,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**:Impart detailed knowledge in some specific area or areas of the discipline law.
- **PO-5**:Demonstrate quality research skills thereby making original contributions to the discipline of Law.

Program Specific Outcomes (PSOs):
- **PSO-1**:Technology is at the center of economic and social development therefore ordinary lawyers will find it difficult to deal with disputes relating to infringement of Technology Law, therefore the primary objective is to impart them the knowledge necess
- **PSO-2**:To impart interdisciplinary knowledge that is required for the above purpose.
- **PSO-3**:To train the students in an acquiring special skills that are necessary to deal with Technology Law.

Course Outcomes (COs):
- **CO-1**:Analyze the challenges and problems associated with the application of Comparative Law in legal contexts.
- **CO-2**:Evaluate the principles of Constitutionalism in the USA, UK, and India, emphasizing Right to Information and Open Government.
- **CO-3**:Examine Unitary Forms of Government and analyze its implications on governance.
- **CO-4**:Analyze the principles of Judicial Independence and Accountability in India, UK, and U.S.A.

COURSE NAME   : **Law, Science, and Technology Intersection**

COURSE CODE   : **PGL 2011**

PROGRAM NAME   : **LL.M. (Technology Law)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,12,16,17
National	Goal Nos. 1,5,7,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- ➢ **PO-2**:Ability to inculcate in them highly specialized knowledge and skills relating to those areas to enable them to evaluate and improve the existing knowledge.
- ➢ **PO-4**:Enhance their teaching skills in the area of the discipline law.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:Technology is at the center of economic and social development therefore ordinary lawyers will find it difficult to deal with disputes relating to infringement of Technology Law, therefore the primary objective is to impart them the knowledge necess
- ➢ **PSO-2**:To impart interdisciplinary knowledge that is required for the above purpose.
- ➢ **PSO-3**:To train the students in an acquiring special skills that are necessary to deal with Technology Law.

Course Outcomes (COs):
- ➢ **CO-1**:Assess the effectiveness of existing legal frameworks in managing the interface between science, technology, and law.
- ➢ **CO-2**:Apply legal principles to address the challenges and risks associated with these technologies.
- ➢ **CO-3**:Analyze the role of science and technology in the judicial process and its impact on criminal matters.
- ➢ **CO-4**:Analyze the legal implications of Big Data and data protection regulations, especially in the context of science and technology

COURSE NAME : Data Protection and Privacy Laws

COURSE CODE : PGL 2004

PROGRAM NAME : LL.M. (Technology Law)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,12,16,17
National	Goal Nos. 1,5,7,12
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-2**:Ability to inculcate in them highly specialized knowledge and skills relating to those areas to enable them to evaluate and improve the existing knowledge.
- **PO-4**:Enhance their teaching skills in the area of the discipline law.

Program Specific Outcomes (PSOs):
- **PSO-1**:Technology is at the center of economic and social development therefore ordinary lawyers will find it difficult to deal with disputes relating to infringement of Technology Law, therefore the primary objective is to impart them the knowledge necess
- **PSO-2**:To impart interdisciplinary knowledge that is required for the above purpose.
- **PSO-3**:To train the students in an acquiring special skills that are necessary to deal with Technology Law.

Course Outcomes (COs):
- **CO-1**:Identify the components of cyber space and cyber law.
- **CO-2**:Evaluate the Information Technology (Reasonable Security Practices And Procedures And Sensitive Personal Data Or Information) Rules, 2011.
- **CO-3**: Recognize the concept and types of intellectual property rights (IPR).
- **CO-4**: Examine the intersection of AI, copyright law, and patent law.

SCHOOL OF DESIGN

COURSE NAME   : **Entrepreneurship Development for Designers**
COURSE CODE   : **BCD 405**
PROGRAM NAME : **B.Des**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8
National	Goal Nos. 3,5
Regional	Goal Nos. 1
Local	Goal Nos. 5

Program Outcomes (POs):
- **PO-6**:Demonstrate professional and ethical responsibility
- **PO-11**:Apply the techniques, skills, and modern design tools necessary for design practice
- **PO-12**:Apply the design principles and management principles to manage the project of multidisciplinary nature.

Program Specific Outcomes (PSOs):
- **PSO-1**:Identify and examine raw materials and constituents required for design innovation and development.
- **PSO-2**:Demonstrate skills in ideation, conceptualization and production of design solutions for manufacturing organizations and design houses
- **PSO-3**:Apply creative skills for the production of sustainable, social, and environmental-friendly products and processes

Course Outcomes (COs):
- **CO-1**: Understand different types of enterprise.
- **CO-2**: Understand filtering feasible business ideas.
- **CO-3**: Develop a sustainable Business Model.

COURSE NAME   : **Visual Merchandising**

COURSE CODE   : **BDF 309**

PROGRAM NAME : **B.Des**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 5,9,12,17
National	Goal Nos. 3,5,6,7,12,14
Regional	Goal Nos. 1
Local	Goal Nos. 1,3,5

Program Outcomes (POs):
- **PO-1**:Apply knowledge of fundamental principles of design.
- **PO-4**:Operate on multidisciplinary teams
- **PO-7**:Interpret effectively
- **PO-8**:Evaluate the impact of design solutions in a global, economic, environmental and societal context.
- **PO-12**:Apply the design principles and management principles to manage the project of multidisciplinary nature.

Program Specific Outcomes (PSOs):
- **PSO-1**:Identify and examine raw materials and constituents required for design innovation and development.
- **PSO-2**:Demonstrate skills in ideation, conceptualization and production of design solutions for manufacturing organizations and design houses
- **PSO-3**:Apply creative skills for the production of sustainable, social, and environmental-friendly products and processes

Course Outcomes (COs):
- **CO-1**: Identify and define the design concepts applied to visual merchandising
- **CO-2**: Discuss the processes involved in creating effective theme-based displays
- **CO-3**: Review the meaning-making process to display themes through visual mediums
- **CO-4**: Apply effective planning strategies to maximize consumer interest and sales

COURSE NAME   : Advanced Level Design

COURSE CODE   : BDG 309

PROGRAM NAME   : B.Des

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8
National	Goal Nos. 3,5
Regional	Goal Nos. -
Local	Goal Nos. 5

Program Outcomes (POs):
- **PO-4**:Operate on multidisciplinary teams
- **PO-5**:Identify, formulate and solve design problems
- **PO-7**:Interpret effectively
- **PO-10**:Identify contemporary design issues
- **PO-11**:Apply the techniques, skills, and modern design tools necessary for design practice

Program Specific Outcomes (PSOs):
- **PSO-1**:Identify and examine raw materials and constituents required for design innovation and development.
- **PSO-2**:Demonstrate skills in ideation, conceptualization and production of design solutions for manufacturing organizations and design houses
- **PSO-3**:Apply creative skills for the production of sustainable, social, and environmental-friendly products and processes

Course Outcomes (COs):
- **CO-1**: Identify the process of game-level creation.
- **CO-2**: Understand level design principles for puzzle design and environment design.
- **CO-3**: Apply level design techniques and create levels for a hyper casual game.
- **CO-4**: Identify the critical path in a 3D level and construct the game level using the principles taught.

COURSE NAME : System Design
COURSE CODE : BPD 402
PROGRAM NAME : B.Des

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 9,11
National	Goal Nos. 1,7
Regional	Goal Nos. 2
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-3**:Design a system, program, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- **PO-4**:Operate on multidisciplinary teams
- **PO-5**:Identify, formulate and solve design problems
- **PO-8**:Evaluate the impact of design solutions in a global, economic, environmental and societal context.

Program Specific Outcomes (PSOs):
- **PSO-1**:Identify and examine raw materials and constituents required for design innovation and development.
- **PSO-2**:Demonstrate skills in ideation, conceptualization and production of design solutions for manufacturing organizations and design houses
- **PSO-3**:Apply creative skills for the production of sustainable, social, and environmental-friendly products and processes

Course Outcomes (COs):
- **CO-1**: Understand systems and their existence through cases study.
- **CO-2**: Identify gap areas to improve the systems through design thinking.
- **CO-3**: Apply design methods and processes to develop better systems to achieve sustainable goal.

COURSE NAME   **: Design Studio III**
COURSE CODE   **: BDS306**
PROGRAM NAME   **: B.Des**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 3,6,7,9,11
National	Goal Nos. 2, 4, 5, 7, 9, 13, 14, 15, 16
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
  - **PO-2**:Design and conduct experiments, as well as analyse and interpret design data.
  - **PO-3**:Design a system, program, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
  - **PO-5**:Identify, formulate and solve design problems
  - **PO-6**:Demonstrate professional and ethical responsibility
  - **PO-11**:Apply the techniques, skills, and modern design tools necessary for design practice

Program Specific Outcomes (PSOs):
  - **PSO-1**:Identify and examine raw materials and constituents required for design innovation and development.
  - **PSO-2**:Demonstrate skills in ideation, conceptualization and production of design solutions for manufacturing organizations and design houses
  - **PSO-3**:Apply creative skills for the production of sustainable, social, and environmental-friendly products and processes

Course Outcomes (COs):
  - **CO-1**: Illustrate the knowledge of health interior design fundamentals.
  - **CO-2**: Identify the spatial environment and requirements of health facilities.
  - **CO-3**: Categorize of materials in surface finish required for health care setting.
  - **CO-4**: Apply and development of the design process; demonstrating through relevant communication skills.
  - **CO-5**: Produce a variety of concept and finished physical models.

COURSE NAME : Design Thinking and Communication
COURSE CODE : BSM1009
PROGRAM NAME : B.Sc. (Multimedia)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,5,9
National	Goal Nos. 5,3,13,14,16
Regional	Goal Nos. 2
Local	Goal Nos. 5

Program Outcomes (POs):
  ➢ **PO-1**:Apply fundamental knowledge of elements and principles of design.
  ➢ **PO-2**:Practice multidisciplinary design approach working in teams/groups.
  ➢ **PO-4**:Identify and solve design-related problems/challenges

Program Specific Outcomes (PSOs):
  ➢ **PSO-1**:Identify, evaluate and apply techniques and tools of multimedia
  ➢ **PSO-2**:Demonstrate ideation, conceptualization and production skills in multimedia design solutions
  ➢ **PSO-3**:Apply creative skills to develop concepts, interfaces and interactive platforms and design programs in multimedia

Course Outcomes (COs):
  ➢ **CO-1**: Understand the concepts of design thinking approaches.
  ➢ **CO-2**: Develop the students as a good designer by imparting creativity and problem - solving ability.
  ➢ **CO-3**: Practice design thinking skills in the development of innovative prototypes.

COURSE NAME : Photography
COURSE CODE : BSM2003
PROGRAM NAME : B.Sc. (Multimedia)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9,17
National	Goal Nos. 1,3,14,16
Regional	Goal Nos. 1,2
Local	Goal Nos. 5

Program Outcomes (POs):
- **PO-4**:Identify and solve design-related problems/challenges
- **PO-6**:Design a system, program, component, or process to meet desired needs within realistic constraint
- **PO-10**:Apply the techniques, skills and modern design tools necessary for multimedia design practice.

Program Specific Outcomes (PSOs):
- **PSO-1**:Identify, evaluate and apply techniques and tools of multimedia
- **PSO-2**:Demonstrate ideation, conceptualization and production skills in multimedia design solutions
- **PSO-3**:Apply creative skills to develop concepts, interfaces and interactive platforms and design programs in multimedia

Course Outcomes (COs):
- **CO-1**: Understand the practical exposure to handle camera functions and lighting techniques,
- **CO-2**: Study the image making skills in indoor and outdoor conditions
- **CO-3**: Explore the techniques and aesthetics in photography.

REGISTRAR

COURSE NAME : Advertising and Public Relation

COURSE CODE : BSM2016

PROGRAM NAME : B.Sc. (Multimedia)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,3,4,5,17
National	Goal Nos. 2,3,4,7,9,15, 16
Regional	Goal Nos. 2,4
Local	Goal Nos. 3

Program Outcomes (POs):
 - ➢ **PO-1**:Apply fundamental knowledge of elements and principles of design.
 - ➢ **PO-2**:Practice multidisciplinary design approach working in teams/groups.
 - ➢ **PO-4**:Identify and solve design-related problems/challenges
 - ➢ **PO-6**:Design a system, program, component, or process to meet desired needs within realistic constraint

Program Specific Outcomes (PSOs):
 - ➢ **PSO-1**:Identify, evaluate and apply techniques and tools of multimedia
 - ➢ **PSO-2**:Demonstrate ideation, conceptualization and production skills in multimedia design solutions
 - ➢ **PSO-3**:Apply creative skills to develop concepts, interfaces and interactive platforms and design programs in multimedia

Course Outcomes (COs):
 - ➢ **CO-1**: Identify the meaning, concept and tools of Advertising and Public Relations.
 - ➢ **CO-2**: Discuss the role and importance of advertising in society.
 - ➢ **CO-3**: Interpret organizational workflow of Advertising Agency.

COURSE NAME : Audio Technology and Production
COURSE CODE : BSM2009
PROGRAM NAME : B.Sc. (Multimedia)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,5,6
National	Goal Nos. 2,3,4,14
Regional	Goal Nos. -
Local	Goal Nos. 5

Program Outcomes (POs):
- **PO-2**:Practice multidisciplinary design approach working in teams/groups.
- **PO-6**:Design a system, program, component, or process to meet desired needs within realistic constraint
- **PO-10**:Apply the techniques, skills and modern design tools necessary for multimedia design practice.

Program Specific Outcomes (PSOs):
- **PSO-1**:Identify, evaluate and apply techniques and tools of multimedia
- **PSO-2**:Demonstrate ideation, conceptualization and production skills in multimedia design solutions
- **PSO-3**:Apply creative skills to develop concepts, interfaces and interactive platforms and design programs in multimedia

Course Outcomes (COs):
- **CO-1**: Understand the concepts of Audio Editing and different types of Mixing and Mastering Techniques.
- **CO-2**: Develop Critical Listening Skills as well as students will gain knowledge of signal flow and basic audio technology including Mixers, Recorders, Microphones. The learner develops interviewing and field recording skills with practice of the art of st
- **CO-3**: Practice Audio Production skills in the development of innovative Short Films as well as Documentary Film Production.

COURSE NAME   : **Video Technology and Production**
COURSE CODE   : BSM2010
PROGRAM NAME   : **B.Sc. (Multimedia)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9,13
National	Goal Nos. 3,5,9
Regional	Goal Nos. -
Local	Goal Nos. 2

Program Outcomes (POs):
  - ➢ **PO-1**:Apply fundamental knowledge of elements and principles of design.
  - ➢ **PO-2**:Practice multidisciplinary design approach working in teams/groups.
  - ➢ **PO-6**:Design a system, program, component, or process to meet desired needs within realistic constraint
  - ➢ **PO-10**:Apply the techniques, skills and modern design tools necessary for multimedia design practice.

Program Specific Outcomes (PSOs):
  - ➢ **PSO-1**:Identify, evaluate and apply techniques and tools of multimedia
  - ➢ **PSO-2**:Demonstrate ideation, conceptualization and production skills in multimedia design solutions
  - ➢ **PSO-3**:Apply creative skills to develop concepts, interfaces and interactive platforms and design programs in multimedia

Course Outcomes (COs):
  - ➢ **CO-1**: Plan and create video projects incorporating audio elements.
  - ➢ **CO-2**: Apply the techniques learnt in capturing and transferring of audio-visual outputs on external devices.
  - ➢ **CO-3**: Interpret the process of studio production in Television.

SCHOOL OF MEDIA STUDIES

COURSE NAME : Ethics in Media and the legal framework
COURSE CODE : BAJ3001
PROGRAM NAME : BA Journalism and Mass Communication

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,16,17
National	Goal Nos. 15,16
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-1**: Disciplinary Knowledge: Acquiring knowledge of different dimensions of communication, and historical perspectives and presenting the events or news within the ethical framework to the masses.
- ➢ **PO-2**: Understanding the Role of the Press: The press in a democratic society, the importance of freedom of the press and its limitations.
- ➢ **PO-4**: Critical/ Reflective thinking: Employ critical and reflective thinking along with the ability to create a sense of awareness of self and society.
- ➢ **PO-8**: Research-related Skills: A sense of inquiry and investigation for raising relevant and contemporary questions, synthesizing and articulating
- ➢ **PO-11**:Lifelong Learning: Every learner consistently updates oneself with current knowledge, skills and technologies. Acquiring Knowledge and creating the understanding in learners that learning will continue throughout life.

Program Specific Outcomes (PSOs):
- ➢ PS0-1: Exhibit a sound understanding and knowledge of Journalism and Mass Communication.
- ➢ PS0-2: Display the competence to explore career opportunities as per the demands and requirements of the Media Industry.
- ➢ PS0-3: Think critically, and creatively, and demonstrate curiosity to discover new horizons in Journalism and Mass Communication.

Course Outcomes (COs):
- ➢ **CO-1**: Understand the importance of judicial system as related to media
- ➢ **CO-2**: Interpret various Laws/ Bills/ Acts related to media.
- ➢ **CO-3**: Distinguish between codes, laws and ethics as applicable to media professionals
- ➢ **CO-4**: Analyse the emerging ethical issues such as diversity, advocacy, digital media and political correctness.

COURSE NAME : Developmental Journalism
COURSE CODE : BAJ2006
PROGRAM NAME : BA Journalism and Mass Communication

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,3,4,5,6,7,8,9,10,11,12,13,16,17
National	Goal Nos. 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):
- **PO-1**: Disciplinary Knowledge: Acquiring knowledge of different dimensions of communication, and historical perspectives and presenting the events or news within the ethical framework to the masses.
- **PO-2**: Understanding the Role of the Press: The press in a democratic society, the importance of freedom of the press and its limitations.
- **PO-3**: Influential and effective communication: Ability to share thoughts, ideas and applied skills of communication in its various perspectives like written communication, speech communication & language efficiency.
- **PO-4**: Critical/ Reflective thinking: Employ critical and reflective thinking along with the ability to create a sense of awareness of self and society.
- **PO-11**:Lifelong Learning: Every learner consistently updates oneself with current knowledge, skills and technologies. Acquiring Knowledge and creating the understanding in learners that learning will continue throughout life.

Program Specific Outcomes (PSOs):
- PS0-1: Exhibit a sound understanding and knowledge of Journalism and Mass Communication.
- PS0-2: Display the competence to explore career opportunities as per the demands and requirements of the Media Industry.
- PS0-3: Think critically, and creatively, and demonstrate curiosity to discover new horizons in Journalism and Mass Communication.

Course Outcomes (COs):
- **CO-1**: Understand the key concepts in development and the different models of development
- **CO-2**: Assess the opportunities of using Journalism as an agent of development and change
- **CO-3**: Understand the concept of development journalism
- **CO-4**: Describe how media communicates various development issues
- **CO-5**: Create powerful media narrative aimed at development and social change

COURSE NAME : Communication for Social Impact
COURSE CODE : BAJ3007
PROGRAM NAME : BA Journalism and Mass Communication

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,2,3,4,5,6,7,8,9,10,11,12,13,16,18
National	Goal Nos. 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
Regional	Goal Nos. 1,2,3,4
Local	Goal Nos. 1,2,3,4,6

Program Outcomes (POs):
- **PO-1**: Disciplinary Knowledge: Acquiring knowledge of different dimensions of communication, and historical perspectives and presenting the events or news within the ethical framework to the masses.
- **PO-3**:Influential and effective communication: Ability to share thoughts, ideas and applied skills of communication in its various perspectives like written communication, speech communication & language efficiency.
- **PO-4**: Critical/ Reflective thinking: Employ critical and reflective thinking along with the ability to create a sense of awareness of self and society.
- **PO-5**: Ethical Awareness: As a communication learner, one understands the importance of ethical values and their application in professional life.
- **PO-6**: Skilled and Industry-ready Professionals: Strengthening the abilities of a learner by skills, and knowledge of the present scenario of the M & E industry including advertising, public relations, corporate communication, digital communication & media management.

Program Specific Outcomes (PSOs):
- PS0-1: Exhibit a sound understanding and knowledge of Journalism and Mass Communication.
- PS0-2: Display the competence to explore career opportunities as per the demands and requirements of the Media Industry.
- PS0-3: Think critically, and creatively, and demonstrate curiosity to discover new horizons in Journalism and Mass Communication.

Course Outcomes (COs):
- **CO-1**: Understand social change theories and their impact on social, cultural, political problems. [Knowledge]
- **CO-2**: Evaluate media's role and impact as a tool for social change. [Evaluation]
- **CO-3**: Assess the role and value of different media [Analysis]
- **CO-4**: Create social change campaigns addressing a specific systemic social/political problem. [Synthesis]

REGISTRAR

COURSE NAME   : Introduction to Media Studies

COURSE CODE   : BAJ1018

PROGRAM NAME   : BA Journalism and Mass Communication

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,9,12
National	Goal Nos. 5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**: Disciplinary Knowledge: Acquiring knowledge of different dimensions of communication, and historical perspectives and presenting the events or news within the ethical framework to the masses.
- **PO-2**: Understanding the Role of the Press: The press in a democratic society, the importance of freedom of the press and its limitations.
- **PO-3**: Influential and effective communication: Ability to share thoughts, ideas and applied skills of communication in its various perspectives like written communication, speech communication & language efficiency.
- **PO-4**: Critical/ Reflective thinking: Employ critical and reflective thinking along with the ability to create a sense of awareness of self and society.
- **PO-11**:Lifelong Learning: Every learner consistently updates oneself with current knowledge, skills and technologies. Acquiring Knowledge and creating the understanding in learners that learning will continue throughout life.

Program Specific Outcomes (PSOs):
- PS0-1: Exhibit a sound understanding and knowledge of Journalism and Mass Communication.
- PS0-2: Display the competence to explore career opportunities as per the demands and requirements of the Media Industry.
- PS0-3: Think critically, and creatively, and demonstrate curiosity to discover new horizons in Journalism and Mass Communication.

Course Outcomes (COs):
- **CO-1**: Understand the historical overview of Media and its role in various contexts
- **CO-2**: Interpret the role of language in development of communication
- **CO-3**: Describe the role of media in persuasion and dissemination of information among individuals and groups
- **CO-4**: Enumerate various type of Media and their usage
- **CO-5**: Evaluate the interplay of Media and Society leading to development activity

SCHOOL OF COMMERCE AND ECONOMCS

COURSE NAME   : **Contemporary Management**
COURSE CODE   : COM2003
PROGRAM NAME   : B.Com

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-3**: An ability to realize and follow professional and ethical principles.
- ➢ **PO-5**:An ability to acquire contemporary issues.
- ➢ **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- ➢ **PSO-3**:Further the horizon of accounting, finance, banking, insurance, corporate accounting and taxation.

Course Outcomes (COs):
- ➢ **CO-1**:Explain the principles of Management
- ➢ **CO-2**:Review the importance of planning and organizing
- ➢ **CO-3**:Summarize various theories of motivation and selection process
- ➢ **CO-4**:Explain the techniques to overcome barriers in communication
- ➢ **CO-5**:Summarize the process of Change management

COURSE NAME : Financial Securities and Derivatives

COURSE CODE : CAT105

PROGRAM NAME : B.Com

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-5**:An ability to acquire contemporary issues.
- **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-3**:Further the horizon of accounting, finance, banking, insurance, corporate accounting and taxation.

Course Outcomes (COs):
- **CO-1**:Describe the concepts of various derivative instruments used in derivatives market
- **CO-2**:Explain the procedures and systems being followed in derivatives market
- **CO-3**:Apply the knowledge for managing investment risks by using suitable derivative instruments
- **CO-4**:Demonstrate the pricing techniques for option derivative instrument
- **CO-5**:Illustrate the functioning of Exotic options and Credit Derivatives

COURSE NAME : Income Tax
COURSE CODE : COM2015
PROGRAM NAME : B.Com

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-3**: An ability to realize and follow professional and ethical principles.
- **PO-5**: An ability to acquire contemporary issues.
- **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-3**: Further the horizon of accounting, finance, banking, insurance, corporate accounting and taxation.

Course Outcomes (COs):
- **CO-1**: Describe the basics of Indian Income Tax System
- **CO-2**: Explain the Residential Status and Incidence of Tax
- **CO-3**: Explain the Exempted Incomes of individuals
- **CO-4**: Discuss the different Components of Salary
- **CO-5**: Discuss the Computation of House property Income

COURSE NAME : Corporate Taxation
COURSE CODE : COM3035
PROGRAM NAME : B.Com

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
 ➢ **PO-3**: An ability to realize and follow professional and ethical principles.
 ➢ **PO-5**:An ability to acquire contemporary issues.
 ➢ **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
 ➢ **PSO-3**:Further the horizon of accounting, finance, banking, insurance, corporate accounting and taxation.

Course Outcomes (COs):
 ➢ **CO-1**:Describe the practice of corporate taxation
 ➢ **CO-2**:Discuss tax computation methods
 ➢ **CO-3**:Explain the practice of tax planning
 ➢ **CO-4**:Identify the steps in tax planning for a new business
 ➢ **CO-5**:illustrate the deductions in corporate taxation

COURSE NAME   **: Principle & Practices of Auditing**

COURSE CODE   **: COM2017**

PROGRAM NAME   **: B.Com**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-3**: An ability to realize and follow professional and ethical principles.
- **PO-5**:An ability to acquire contemporary issues.
- **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-3**:Further the horizon of accounting, finance, banking, insurance, corporate accounting and taxation.

Course Outcomes (COs):
- **CO-1**:Understanding the basic concepts of Auditing
- **CO-2**:Discuss the meaning and objectives of Internal control, Internal Check & Internal Audit
- **CO-3**:Explain the Importance and types of Vouching
- **CO-4**:Show the verification and valuation of assets and liabilities
- **CO-5**:Understanding the basic concepts of corporate governance

REGISTRAR Registrar

COURSE NAME   **: Labour Economics**

COURSE CODE   **: BSE2028**

PROGRAM NAME   **: B.Sc. (Economics)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,10,12
National	Goal Nos. 1,2,15,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-3**: An ability to function in multidisciplinary teams.
- **PO-5**: An understanding of professional and ethical responsibility in the field of Economics.

Program Specific Outcomes (PSOs):
- **PSO-3**:An ability to use the data analytic Techniques for professional practice and for research in the areas of Economics

Course Outcomes (COs):
- **CO-1**:Describe the relationship between the labour market and the other sectors of the economy
- **CO-2**:Evaluate and interpret the labour market policies of governments, unions and other factors in the labour market
- **CO-3**:Identify the actions of economic factors within the labour market, and identify various outcomes of the labour market, that are driven by economic incentives
- **CO-4**:Analyse labour market issues through the application of economic data and theories.

COURSE NAME : Indian Economy

COURSE CODE : BSE1013

PROGRAM NAME : B.Sc. (Economics)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,10,12
National	Goal Nos. 1,2,15,16
Regional	Goal Nos. 0
Local	Goal Nos. 1,2

Program Outcomes (POs):
- **PO-3**: An ability to function in multidisciplinary teams.
- **PO-5**: An understanding of professional and ethical responsibility in the field of Economics.

Program Specific Outcomes (PSOs):
- **PSO-3**:An ability to use the data analytic Techniques for professional practice and for research in the areas of Economics

Course Outcomes (COs):
- **CO-1**:Develop ideas of the basic characteristics of Indian economy
- **CO-2**:Describe the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.
- **CO-3**:Describe different policies and role of agriculture, industry, and service sectors in Indian economy.
- **CO-4**:Explain the different five year plans of India

COURSE NAME : **Human Development Economics**

COURSE CODE : **BSE2032**

PROGRAM NAME : **B.Sc. (Economics)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,10,12
National	Goal Nos. 1,2,15,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- ➢ **PO-3**: An ability to function in multidisciplinary teams.
- ➢ **PO-5**: An understanding of professional and ethical responsibility in the field of Economics.

Program Specific Outcomes (PSOs):
- ➢ **PSO-3**:An ability to use the data analytic Techniques for professional practice and for research in the areas of Economics

Course Outcomes (COs):
- ➢ **CO-1**:Explain the concept of human development.
- ➢ **CO-2**:Relate the economic growth and human development.
- ➢ **CO-3**:Highlight the basic concepts of education and health sectors.
- ➢ **CO-4**:Outline the importance of education and health sectors in human development

COURSE NAME : Economics of Development

COURSE CODE : BSE1012

PROGRAM NAME : B.Sc. (Economics)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,10,12
National	Goal Nos. 1,2,15,16
Regional	Goal Nos. 0
Local	Goal Nos. 1,2

Program Outcomes (POs):
- ➢ **PO-3**: An ability to function in multidisciplinary teams.
- ➢ **PO-5**: An understanding of professional and ethical responsibility in the field of Economics.

Program Specific Outcomes (PSOs):
- ➢ **PSO-3**:An ability to use the data analytic Techniques for professional practice and for research in the areas of Economics

Course Outcomes (COs):
- ➢ **CO-1**:Define the basic concepts of Development
- ➢ **CO-2**:Discuss General theories of development
- ➢ **CO-3**:Discuss Partial theories of development
- ➢ **CO-4**:Define the different factors in development process

COURSE NAME   : **Agricultural Economics**

COURSE CODE   : **BSE2030**

PROGRAM NAME   : **B.Sc. (Economics)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 1,10,12
National	Goal Nos. 1,2,15,16
Regional	Goal Nos. 0
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-3**: An ability to function in multidisciplinary teams.
- ➢ **PO-5**: An understanding of professional and ethical responsibility in the field of Economics.

Program Specific Outcomes (PSOs):
- ➢ **PSO-3**:An ability to use the data analytic Techniques for professional practice and for research in the areas of Economics

Course Outcomes (COs):
- ➢ **CO-1**:Define the basic concepts of Development
- ➢ **CO-2**:Discuss General theories of development
- ➢ **CO-3**:Discuss Partial theories of development
- ➢ **CO-4**:Define the different factors in development process

COURSE NAME : Business Decision Making

COURSE CODE : COM2016

PROGRAM NAME : B.Com (Hons)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-2**: An ability to identify, evaluate and resolve real-time business problems with the specialized knowledge developed through practical training.
- **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**:Ability to apply the knowledge of the corporate accounting in his professional career.
- **PSO-3**:Analyze the economic, social and environmental issues related to business in financial terms.

Course Outcomes (COs):
- **CO-1**:Describe the various elements of the business environment and their influence on business
- **CO-2**:Describe the various elements of the political and legal environment
- **CO-3**:Explain the economic systems and economic planning in India
- **CO-4**:Identify the socio- cultural environment impact on business decisions
- **CO-5**:Discuss the influence of various industrial policies of the government of Indian business decision making

COURSE NAME   : Banking and Insurance

COURSE CODE   : SOC2002

PROGRAM NAME   : B.Com (Hons)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- ➤ **PO-2**: An ability to identify, evaluate and resolve real-time business problems with the specialized knowledge developed through practical training.
- ➤ **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- ➤ **PSO-1**:Ability to apply the knowledge of the corporate accounting in his professional career.
- ➤ **PSO-3**:Analyze the economic, social and environmental issues related to business in financial terms.

Course Outcomes (COs):
- ➤ **CO-1**:Describe the Commercial Banking and Insurance Systems in India.
- ➤ **CO-2**:Identify the Emerging Trends in the Banking Sector
- ➤ **CO-3**:Identify different forms of risk in Banking Sector
- ➤ **CO-4**:Summarize the process of Insurance

COURSE NAME   **: Financial Information System**

COURSE CODE   **: COM3016**

PROGRAM NAME   : B.Com (Hons)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- ➢ **PO-2**: An ability to identify, evaluate and resolve real-time business problems with the specialized knowledge developed through practical training.
- ➢ **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:Ability to apply the knowledge of the corporate accounting in his professional career.
- ➢ **PSO-3**:Analyze the economic, social and environmental issues related to business in financial terms.

Course Outcomes (COs):
- ➢ **CO-1**:Outline the difference between Data & Information
- ➢ **CO-2**:Describe the functions of various information system
- ➢ **CO-3**:Describe the applicability of financial information system
- ➢ **CO-4**:Explain the different methods available to manage Information systems
- ➢ **CO-5**:Explain the Audit standards and security system for IT

COURSE NAME   : **Principles and Parctices in Banking**
COURSE CODE   : **COM3004**
PROGRAM NAME : **B.Com (Hons)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- ➢ **PO-2**: An ability to identify, evaluate and resolve real-time business problems with the specialized knowledge developed through practical training.
- ➢ **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:Ability to apply the knowledge of the corporate accounting in his professional career.
- ➢ **PSO-3**:Analyze the economic, social and environmental issues related to business in financial terms.

Course Outcomes (COs):
- ➢ **CO-1**:Describe audit and its basic concepts
- ➢ **CO-2**:Define internal control system and its components
- ➢ **CO-3**:Apply auditing measures for vouching of transactions
- ➢ **CO-4**:Analyze verification and valuation of assets and liabilities
- ➢ **CO-5**:Examine the audit of limited companies and others

COURSE NAME   : International Banking and Finance

COURSE CODE   : COM3009

PROGRAM NAME   : B.Com (Hons)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-2**: An ability to identify, evaluate and resolve real-time business problems with the specialized knowledge developed through practical training.
- **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**:Ability to apply the knowledge of the corporate accounting in his professional career.
- **PSO-3**:Analyze the economic, social and environmental issues related to business in financial terms.

Course Outcomes (COs):
- **CO-1**:Describe the evolution of International Banking
- **CO-2**:Discuss the international banking operations
- **CO-3**:Explain the international finance activities and debt products
- **CO-4**:Discuss about the FEMA ACT and the key regulations of RBI
- **CO-5**:Classified the risk involved in International Banking

REGISTRAR

SCHOOL OF MANAGEMENT -UG

COURSE NAME   : Human Resource Management
COURSE CODE   : BBA2003
PROGRAM NAME : BBA (Bachelor of Business Administration)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**:An ability to integrate functional knowledge and apply managerial skills in improving business environment.
- **PO-3**: An ability to effectively communicate with different stakeholders.
- **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**:An ability to apply a significant amount of knowledge in the domains like HR management, Marketing, Supply chain & Logistics management and Business Analytics.
- **PSO-3**:An ability to start a new entrepreneurial journey.

Course Outcomes (COs):
- **CO-1**:Outline the evolution of HRM and roles and responsibilities of a HR Manager.
- **CO-2**:Describe the process of Human resources planning and Job design
- **CO-3**:Outline the factors affecting Recruitment and Selection Process
- **CO-4**:Recognize the importance of training and its process
- **CO-5**:Identify various methods of Performance Appraisal

COURSE NAME : Industrial Relation and Labour Laws
COURSE CODE : BBA3011
PROGRAM NAME : BBA (Bachelor of Business Administration)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-1**:An ability to integrate functional knowledge and apply managerial skills in improving business environment.
- **PO-3**: An ability to effectively communicate with different stakeholders.
- **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**:An ability to apply a significant amount of knowledge in the domains like HR management, Marketing, Supply chain & Logistics management and Business Analytics.
- **PSO-3**:An ability to start a new entrepreneurial journey.

Course Outcomes (COs):
- **CO-1**:Recognize the importance of Industrial Relation.
- **CO-2**:Explain the provisions of payment of wage and bonus.
- **CO-3**:Discuss the social security aspect of Industrial workers.
- **CO-4**:Identify the provisions that are a part of Industrial Relations code.

REGISTRAR
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COURSE NAME   **: Marketing Management**

COURSE CODE   **: BBA2005**

PROGRAM NAME   **: BBA (Bachelor of Business Administration)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- ➢ **PO-1**:An ability to integrate functional knowledge and apply managerial skills in improving business environment.
- ➢ **PO-3**: An ability to effectively communicate with different stakeholders.
- ➢ **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:An ability to apply a significant amount of knowledge in the domains like HR management, Marketing, Supply chain & Logistics management and Business Analytics.
- ➢ **PSO-3**:An ability to start a new entrepreneurial journey.

Course Outcomes (COs):
- ➢ **CO-1**:Describe the basic concept of Marketing and its application in business.
- ➢ **CO-2**:Infer the various internal and external factors which affects Marketing of a product in an organization
- ➢ **CO-3**:Explain marketing mix to meet growing needs of the customer
- ➢ **CO-4**:Identify the basis of segmentation, targeting and positioning for products and services
- ➢ **CO-5**:Relate the factors influencing consumer behavior and its impact on consumer decision making process.

COURSE NAME   : Rural Marketing
COURSE CODE   : BBA3022
PROGRAM NAME   : BBA (Bachelor of Business Administration)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,10,15
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**:An ability to integrate functional knowledge and apply managerial skills in improving business environment.
- **PO-3**: An ability to effectively communicate with different stakeholders.
- **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**:An ability to apply a significant amount of knowledge in the domains like HR management, Marketing, Supply chain & Logistics management and Business Analytics.
- **PSO-3**:An ability to start a new entrepreneurial journey.

Course Outcomes (COs):
- **CO-1**:Describe rural and agricultural market in India
- **CO-2**:Describe consumer behavior in the context of rural environment
- **CO-3**:Discuss the concept of Rural consumer behavior
- **CO-4**:Explain the Marketing Mix in Rural Environment.

COURSE NAME : Performance Management

COURSE CODE : BBA3019

PROGRAM NAME : BBA (Bachelor of Business Administration)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-1**:An ability to integrate functional knowledge and apply managerial skills in improving business environment.
- ➢ **PO-3**: An ability to effectively communicate with different stakeholders.
- ➢ **PO-6**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:An ability to apply a significant amount of knowledge in the domains like HR management, Marketing, Supply chain & Logistics management and Business Analytics.
- ➢ **PSO-3**:An ability to start a new entrepreneurial journey.

Course Outcomes (COs):
- ➢ **CO-1**:Describe the importance of managing employee performance at work and its impact on organization
- ➢ **CO-2**:Identify performance management techniques, rewards and sanctions to improve performance
- ➢ **CO-3**:Discuss the procedure for implementation of PMS
- ➢ **CO-4**:Explain the significance of ethics in performance management system

COURSE NAME   : Internet and Related Technologies
COURSE CODE   : BBA3056
PROGRAM NAME : BBA (Digital Marketing)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
  ➢ **PO-5**: An ability to realize and follow professional and ethical principles.
  ➢ **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
  ➢ **PSO-1**: An ability to apply the managerial skills in the domain of Digital Marketing.
  ➢ **PSO-3**: Develop tools and techniques to facilitate Digital Marketing activities'.

Course Outcomes (COs):
  ➢ **CO-1**:Describe the basics of IoT
  ➢ **CO-2**:Discuss the state of the Architecture of an IoT
  ➢ **CO-3**:Identify the design methodology and hardware platforms involved in IoT
  ➢ **CO-4**:Classify the data and analyze the data
  ➢ **CO-5**:Illustrate the uses of IOT Applications in Industrial & real-world

COURSE NAME   **: Digital Media Laws**
COURSE CODE   **: BBA3075**
PROGRAM NAME   **: BBA (Digital Marketing)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
- **PO-5**: An ability to realize and follow professional and ethical principles.
- **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply the managerial skills in the domain of Digital Marketing.
- **PSO-3**: Develop tools and techniques to facilitate Digital Marketing activities'.

Course Outcomes (COs):
- **CO-1**:Evaluate ongoing developments of law relating to Digital Media.
- **CO-2**:Display an understanding of how the socio-legal developments relate to one another.
- **CO-3**:Examine areas of socio-legal discourses surrounding rules and theories
- **CO-4**:Evaluate the socio-legal rules and theories in terms of internal coherence and pragmatic outcomes
- **CO-5**:Draw on the analysis and evaluation contained in primary and secondary sources of Digital Media Laws.

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COURSE NAME   **: Social Media Marketing**

COURSE CODE   **: BBA3061**

PROGRAM NAME : BBA (Digital Marketing)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
- **PO-5**: An ability to realize and follow professional and ethical principles.
- **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply the managerial skills in the domain of Digital Marketing.
- **PSO-3**: Develop tools and techniques to facilitate Digital Marketing activities'.

Course Outcomes (COs):
- **CO-1**:Define the key concepts in Social Media Marketing
- **CO-2**:Discuss a various social media platforms and content designing Marketing strategies
- **CO-3**:Explain the best practices used in Social Marketing using various tools
- **CO-4**:Apply social media marketing for personal branding and corporate objectives
- **CO-5**:Illustrate the metrics used in e marketing and mobile marketing

COURSE NAME   : **Web Analytics**
COURSE CODE   : **BBA3066**
PROGRAM NAME : **BBA (Digital Marketing)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
- ➢ **PO-5**: An ability to realize and follow professional and ethical principles.
- ➢ **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**: An ability to apply the managerial skills in the domain of Digital Marketing.
- ➢ **PSO-3**: Develop tools and techniques to facilitate Digital Marketing activities'.

Course Outcomes (COs):
- ➢ **CO-1**:Recognize what is web analytics and usage in the business
- ➢ **CO-2**:Discuss the Web metrics process and various activities involved.
- ➢ **CO-3**:Awareness on different web analytics tools and their performance in helping business world
- ➢ **CO-4**:Practical knowledge on Google Analytics
- ➢ **CO-5**:Understanding the current and future trends in web analytics

COURSE NAME : Introduction to Digital Marketing

COURSE CODE : BBA3059

PROGRAM NAME : BBA (Digital Marketing)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
- **PO-5**: An ability to realize and follow professional and ethical principles.
- **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply the managerial skills in the domain of Digital Marketing.
- **PSO-3**: Develop tools and techniques to facilitate Digital Marketing activities'.

Course Outcomes (COs):
- **CO-1**:Describe the importance of Digital Marketing and underlying concept behind it.
- **CO-2**:Identify the behavior of online consumer and design online marketing initiatives accordingly
- **CO-3**:Design, launch and manage successful digital marketing campaign using search engine
- **CO-4**:Use Social Media platforms like Facebook Marketing, YouTube etc to achieve marketing objectives
- **CO-5**:Measure the performance of Digital Marketing campaign using Google analytics

COURSE NAME   : HR Analytics
COURSE CODE   : BBA3020
PROGRAM NAME : BBA (Business Analytics)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
- **PO-4**:Develop technical programs for Business Analytics activities.
- **PO-5**:An ability to realize and follow professional and ethical principles.
- **PO-7**:An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**:An ability to apply the managerial skills in the domain of Business Analytics.
- **PSO-2**:An ability to acquire employability skills in the field of Business Analytics Industry.

Course Outcomes (COs):
- **CO-1**:Discuss the foundations of analytics and its relatedness with HR process
- **CO-2**:Discuss metrics for HR functions
- **CO-3**:Demonstrate HR analytics and visualization using MS excel
- **CO-4**:Interpret the data to draw inferences for decision making in Human resources
- **CO-5**:Prepare prescriptive and advanced HR modelling

COURSE NAME   **: Marketing Analytics**

COURSE CODE   **: BBA3029**

PROGRAM NAME   **: BBA (Business Analytics)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
- **PO-4**:Develop technical programs for Business Analytics activities.
- **PO-5**:An ability to realize and follow professional and ethical principles.
- **PO-7**:An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**:An ability to apply the managerial skills in the domain of Business Analytics.
- **PSO-2**:An ability to acquire employability skills in the field of Business Analytics Industry.

Course Outcomes (COs):
- **CO-1**:Describe the basics of marketing analytics for decision making
- **CO-2**:Explain product positioning and its importance
- **CO-3**:Discuss price elasticity modelling
- **CO-4**:Illustrate market mix modelling and the variables involved
- **CO-5**:Apply techniques for data analysis

REGISTRAR

COURSE NAME   **: Entrepreneurship Development**

COURSE CODE   **: BBA2004**

PROGRAM NAME   **: BBA (Business Analytics)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6,13,14
Regional	Goal Nos. 0
Local	Goal Nos. 1,2

Program Outcomes (POs):
- ➤ **PO-4**:Develop technical programs for Business Analytics activities.
- ➤ **PO-5**:An ability to realize and follow professional and ethical principles.
- ➤ **PO-7**:An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- ➤ **PSO-1**:An ability to apply the managerial skills in the domain of Business Analytics.
- ➤ **PSO-2**:An ability to acquire employability skills in the field of Business Analytics Industry.

Course Outcomes (COs):
- ➤ **CO-1**:Describe the fundamentals and development of entrepreneurship
- ➤ **CO-2**:Identify the qualitative aspects of entrepreneur
- ➤ **CO-3**:Review the business environment to form a new business
- ➤ **CO-4**:Classify the sources of funding & legal compliances
- ➤ **CO-5**:Discuss various problems and measures to overcome the problems of MSME

REGISTRAR

COURSE NAME   : **Corporate Governance and Business Ethics**

COURSE CODE   : **SOC1001**

PROGRAM NAME   : **BBA (Business Analytics)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,16
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-4**:Develop technical programs for Business Analytics activities.
- ➢ **PO-5**:An ability to realize and follow professional and ethical principles.
- ➢ **PO-7**:An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:An ability to apply the managerial skills in the domain of Business Analytics.
- ➢ **PSO-2**:An ability to acquire employability skills in the field of Business Analytics Industry.

Course Outcomes (COs):
- ➢ **CO-1**:Define the quality of corporate governance for capital formation
- ➢ **CO-2**:Discuss the role of ethics in business
- ➢ **CO-3**:Review regulations of business for social responsibility
- ➢ **CO-4**:Review regulations of business for social responsibility
- ➢ **CO-5**:Identify the Codes & Systems for corporate Governance

COURSE NAME   : Service Management
COURSE CODE   : BBA2009
PROGRAM NAME   : BBA (Business Analytics)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,2

Program Outcomes (POs):
- **PO-4**:Develop technical programs for Business Analytics activities.
- **PO-5**:An ability to realize and follow professional and ethical principles.
- **PO-7**:An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**:An ability to apply the managerial skills in the domain of Business Analytics.
- **PSO-2**:An ability to acquire employability skills in the field of Business Analytics Industry.

Course Outcomes (COs):
- **CO-1**:Describe the basic principles of Services management
- **CO-2**:Discuss the different services marketing
- **CO-3**:Explain the tourism and Hospital services management
- **CO-4**:Explain the Different Airline services
- **CO-5**:Explain the IT enabled aviation services in India

COURSE NAME   : **Airport Management**

COURSE CODE   : **BAV3012**

PROGRAM NAME   : **BBA (Aviation Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-4**:Develop legal and ethical values for management and operation of aviation activities.
- **PO-5**:An ability to realize and follow professional and ethical principles.
- **PO-7**:An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-3**:Demonstrate critical thinking skills in understanding managerial issues and problems related to the global economy and international business in aviation and allied industries

Course Outcomes (COs):
- **CO-1**:Explain the Airport Strategic Planning and its various types
- **CO-2**:Identify the financial methods and its best practices.
- **CO-3**:Review the Airline Pricing process and Revenue Management
- **CO-4**:Interpret the Airline Planning Process
- **CO-5**:Apply Airline Schedule Optimization techniques

COURSE NAME : **Airport Operations - Basics**
COURSE CODE : **BAV3002**
PROGRAM NAME : **BBA (Aviation Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-4**:Develop legal and ethical values for management and operation of aviation activities.
- ➢ **PO-5**:An ability to realize and follow professional and ethical principles.
- ➢ **PO-7**:An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- ➢ **PSO-3**:Demonstrate critical thinking skills in understanding managerial issues and problems related to the global economy and international business in aviation and allied industries

Course Outcomes (COs):
- ➢ **CO-1**:List the components of airport and its organization structure
- ➢ **CO-2**:Interpret the process of Ground Handling
- ➢ **CO-3**:Explain the components of airport terminal
- ➢ **CO-4**:Illustrate the cargo handling procedures

COURSE NAME   : **Air Cargo and Logistics**

COURSE CODE   : **BAV3006**

PROGRAM NAME   : **BBA (Aviation Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):
- **PO-4**:Develop legal and ethical values for management and operation of aviation activities.
- **PO-5**:An ability to realize and follow professional and ethical principles.
- **PO-7**:An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-3**:Demonstrate critical thinking skills in understanding managerial issues and problems related to the global economy and international business in aviation and allied industries

Course Outcomes (COs):
- **CO-1**:Discuss the types of cargo, and how fright is forwarded
- **CO-2**:Illustrate the detailed process of cool chain business and logistics management
- **CO-3**:Define the various security threats and risks in cargo management
- **CO-4**:Illustrate the inventory planning and management.

COURSE NAME   **: Innovation and Creativity in Business**
COURSE CODE   **: BBA2007**
PROGRAM NAME   **: BBA (Aviation Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 6
Regional	Goal Nos. 0
Local	Goal Nos. 1

Program Outcomes (POs):
- ➢ **PO-4**:Develop legal and ethical values for management and operation of aviation activities.
- ➢ **PO-5**:An ability to realize and follow professional and ethical principles.
- ➢ **PO-7**:An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- ➢ **PSO-3**:Demonstrate critical thinking skills in understanding managerial issues and problems related to the global economy and international business in aviation and allied industries

Course Outcomes (COs):
- ➢ **CO-1**:Outline Creativity Techniques in Business
- ➢ **CO-2**:Recognize the role of leaders in enhancing creativity
- ➢ **CO-3**:Discuss types of innovation and its application in product. process and service
- ➢ **CO-4**:Discuss the sources of new knowledge and ideas
- ➢ **CO-5**:Analyze the factors influencing commercialization of innovative ideas

COURSE NAME   **: Genesis and overview of Aviation**

COURSE CODE   **: BAV3001**

PROGRAM NAME   **: BBA (Aviation Management)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 6
Regional	Goal Nos. 1
Local	Goal Nos. 1

Program Outcomes (POs):

- ➢ **PO-4**:Develop legal and ethical values for management and operation of aviation activities.
- ➢ **PO-5**:An ability to realize and follow professional and ethical principles.
- ➢ **PO-7**:An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):

- ➢ **PSO-3**:Demonstrate critical thinking skills in understanding managerial issues and problems related to the global economy and international business in aviation and allied industries

Course Outcomes (COs):

- ➢ **CO-1**:Outline the evolution of Aviation Industry
- ➢ **CO-2**:Explain working of an aircraft
- ➢ **CO-3**:Recognize how aviation industry effects environment
- ➢ **CO-4**:Discuss functions of airport at different operational levels

COURSE NAME   : **Introduction to E Commerce and Supply Chain Management**
COURSE CODE   : **BBA2014**
PROGRAM NAME   : **BBA - E Commerce & Supply Chain Management**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
 - ➢ **PO-3**: An ability to acquire employability skills through the practical awareness in E-Commerce and Supply Chain Management Industry.
 - ➢ **PO-4**: Develop tools and techniques to facilitate E-Commerce and Supply Chain Management activities'.
 - ➢ **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
 - ➢ **PSO-1**: An ability to apply the managerial skills in the domain of E-Commerce and Supply Chain Management .
 - ➢ **PSO-2**: An ability to acquire employability skills through the practical awareness in E-Commerce and Supply Chain Management Industry.
 - ➢ **PSO-3**:Develop tools and techniques to facilitate E-Commerce and Supply Chain Management activities'.

Course Outcomes (COs):
 - ➢ **CO-1**:Outline the introduction and drivers of supply chain management
 - ➢ **CO-2**:Identify the material management flow and network operations planning process in supply chain management
 - ➢ **CO-3**:Explain demand forecasting and framework for IT adaptation performed in supply Chain management
 - ➢ **CO-4**:Discuss supply chain co-ordination and architecture.
 - ➢ **CO-5**:Explain the process of managing cross functional drivers in supply chain and certain methodologies for handling supply chain disruptions

COURSE NAME : Quality Management

COURSE CODE : BBA3045

PROGRAM NAME : BBA - E Commerce & Supply Chain Management

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-3**: An ability to acquire employability skills through the practical awareness in E-Commerce and Supply Chain Management Industry.
- **PO-4**: Develop tools and techniques to facilitate E-Commerce and Supply Chain Management activities'.
- **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply the managerial skills in the domain of E-Commerce and Supply Chain Management .
- **PSO-2**: An ability to acquire employability skills through the practical awareness in E-Commerce and Supply Chain Management Industry.
- **PSO-3**:Develop tools and techniques to facilitate E-Commerce and Supply Chain Management activities'.

Course Outcomes (COs):
- **CO-1**:Describe the importance of Quality for an Organization
- **CO-2**:Explain the factors leading to the cost of quality
- **CO-3**:Identify the quality management tools
- **CO-4**:Summarize the importance of teamwork in Quality Management
- **CO-5**:Relate the quality management practices with EQMS

COURSE NAME   : Digital Marketing
COURSE CODE   : MGI264
PROGRAM NAME   : BBA - E Commerce & Supply Chain Management

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-3**: An ability to acquire employability skills through the practical awareness in E-Commerce and Supply Chain Management Industry.
- **PO-4**: Develop tools and techniques to facilitate E-Commerce and Supply Chain Management activities'.
- **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply the managerial skills in the domain of E-Commerce and Supply Chain Management .
- **PSO-2**: An ability to acquire employability skills through the practical awareness in E-Commerce and Supply Chain Management Industry.
- **PSO-3**:Develop tools and techniques to facilitate E-Commerce and Supply Chain Management activities'.

Course Outcomes (COs):
- **CO-1**:Outline the relevance of digital marketing in contemporary world.
- **CO-2**:Identify the behavior of online consumers and design online marketing initiatives.
- **CO-3**:Create successful digital marketing campaign using social media marketing.
- **CO-4**:Apply social media platforms to achieve marketing objectives
- **CO-5**:Analyze Digital Marketing campaign using Google analytics

REGISTRAR

COURSE NAME : E Business Application

COURSE CODE : BBA3046

PROGRAM NAME : BBA - E Commerce & Supply Chain Management

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-3**: An ability to acquire employability skills through the practical awareness in E-Commerce and Supply Chain Management Industry.
- **PO-4**: Develop tools and techniques to facilitate E-Commerce and Supply Chain Management activities'.
- **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply the managerial skills in the domain of E-Commerce and Supply Chain Management .
- **PSO-2**: An ability to acquire employability skills through the practical awareness in E-Commerce and Supply Chain Management Industry.
- **PSO-3**:Develop tools and techniques to facilitate E-Commerce and Supply Chain Management activities'.

Course Outcomes (COs):
- **CO-1**:Describe the fundamentals of E – Business
- **CO-2**:Discuss the various E – Business models
- **CO-3**:Identify how to manage E – Business
- **CO-4**:Summarize the formulation and evaluation of E – Business strategy
- **CO-5**:Explain the challenges and opportunities in E –Business

COURSE NAME   **: Supply chain Modelling and design**
COURSE CODE   **: BBA3047**
PROGRAM NAME   **: BBA - E Commerce & Supply Chain Management**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-3**: An ability to acquire employability skills through the practical awareness in E-Commerce and Supply Chain Management Industry.
- **PO-4**: Develop tools and techniques to facilitate E-Commerce and Supply Chain Management activities'.
- **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply the managerial skills in the domain of E-Commerce and Supply Chain Management .
- **PSO-2**: An ability to acquire employability skills through the practical awareness in E-Commerce and Supply Chain Management Industry.
- **PSO-3**:Develop tools and techniques to facilitate E-Commerce and Supply Chain Management activities'.

Course Outcomes (COs):
- **CO-1**:Explain the process of Supply chain modeling
- **CO-2**:Discuss the application of supply chain software for automating the supply chain process in an organization
- **CO-3**:Sketch the various models involved in inventory management and risk pooling that automate the supply chain
- **CO-4**:Describe the process of Supply Chain production planning for an organization
- **CO-5**:Explain the optimization requirements for a given SCM network.

COURSE NAME   **: Introduction to Financial Technology**

COURSE CODE   **: COM3015**

PROGRAM NAME   **: BBA - Financial Technology**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-3**:An ability to acquire employability skills through the practical awareness in Financial Technology Industry.
- **PO-4**:Develop tools and techniques to facilitate Financial Technology activities'.
- **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply the managerial skills in the domain of Financial Technology.
- **PSO-2**: An ability to acquire employability skills through the practical awareness in Financial Technology Industry.
- **PSO-3**: Develop tools and techniques to facilitate Financial Technology activities'.

Course Outcomes (COs):
- **CO-1**:Define the meaning of Financial Technology
- **CO-2**:Describe how crypto currency works
- **CO-3**:Describe the different types of Digital finance
- **CO-4**:Discuss various Fin tech regulations
- **CO-5**:Discuss the various Fin tech trends

COURSE NAME : Laws of Financial Safeguard

COURSE CODE : COM3027

PROGRAM NAME : BBA - Financial Technology

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-3**:An ability to acquire employability skills through the practical awareness in Financial Technology Industry.
- **PO-4**:Develop tools and techniques to facilitate Financial Technology activities'.
- **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply the managerial skills in the domain of Financial Technology.
- **PSO-2**: An ability to acquire employability skills through the practical awareness in Financial Technology Industry.
- **PSO-3**: Develop tools and techniques to facilitate Financial Technology activities'.

Course Outcomes (COs):
- **CO-1**:Recognize the roles, responsibilities and challenges of a financial officer
- **CO-2**:Summarize the process of investigation and proceedings in financial wrongs
- **CO-3**:Infer the factors leading to threat to financial structure in India.
- **CO-4**:Relate the importance of training and development in Financial Security sector.
- **CO-5**:Appraise various methods for financial safeguards

COURSE NAME   **: Electronic Payment system**

COURSE CODE   **: COM3029**

PROGRAM NAME   **: BBA - Financial Technology**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-3**:An ability to acquire employability skills through the practical awareness in Financial Technology Industry.
- **PO-4**:Develop tools and techniques to facilitate Financial Technology activities'.
- **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply the managerial skills in the domain of Financial Technology.
- **PSO-2**: An ability to acquire employability skills through the practical awareness in Financial Technology Industry.
- **PSO-3**: Develop tools and techniques to facilitate Financial Technology activities'.

Course Outcomes (COs):
- **CO-1**:Describe the role of central banks and the mechanism of money transfer
- **CO-2**:Discuss the role of cheque clearing and different settlement process
- **CO-3**:Illustrate the usage of mobile payments and digital wallets
- **CO-4**:Demonstrate the application of micropayment systems and Micromint
- **CO-5**:Demonstrate the importance of E Payment Securities

REGISTRAR

COURSE NAME : Forensic Accounting
COURSE CODE : COM3024
PROGRAM NAME : BBA - Financial Technology

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
➢ **PO-3**:An ability to acquire employability skills through the practical awareness in Financial Technology Industry.
➢ **PO-4**:Develop tools and techniques to facilitate Financial Technology activities'.
➢ **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
➢ **PSO-1**: An ability to apply the managerial skills in the domain of Financial Technology.
➢ **PSO-2**: An ability to acquire employability skills through the practical awareness in Financial Technology Industry.
➢ **PSO-3**: Develop tools and techniques to facilitate Financial Technology activities'.

Course Outcomes (COs):
➢ **CO-1**:Define the meaning of Forensic Accounting
➢ **CO-2**:Describe different types of Financial Crimes
➢ **CO-3**:Describe the different methods of Fraud Risk Management
➢ **CO-4**:Discuss a Forensic Investigation program
➢ **CO-5**:Prepare the Forensic investigation Report

COURSE NAME   : **Crypto Currency and its uses**

COURSE CODE   : **COM3028**

PROGRAM NAME   : **BBA - Financial Technology**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9,17
National	Goal Nos. 5,6
Regional	Goal Nos. 1
Local	Goal Nos. 1,5

Program Outcomes (POs):
- **PO-1**: An ability to acquire knowledge and skills in the field of Financial Technology.
- **PO-4**:Develop tools and techniques to facilitate Financial Technology activities'.
- **PO-7**: An ability to function in multidisciplinary teams.

Program Specific Outcomes (PSOs):
- **PSO-1**: An ability to apply the managerial skills in the domain of Financial Technology.
- **PSO-2**: An ability to acquire employability skills through the practical awareness in Financial Technology Industry.
- **PSO-3**: Develop tools and techniques to facilitate Financial Technology activities'.

Course Outcomes (COs):
- **CO-1**:Describe how to navigate investments in crypto currency
- **CO-2**:Explain new payments stacks and digital wallets
- **CO-3**:Discuss frameworks for understanding both Crypto currency and Block chain
- **CO-4**:Illustrate the foundations of digital signatures and blockchain technology in cryptocurrency
- **CO-5**:Explain the Payments, digital wallets, RTGS, new payment stacks and emerging technology in payments

SCHOOL OF INFORMATION SCIENCE

COURSE NAME   : **Introduction to Game Design**

COURSE CODE   : **CSA1008**

PROGRAM NAME   : **BCA (Gaming & Graphics)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,5

Program Outcomes (POs):

PO-1: Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.

PO-3: Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.

PO-4: Conduct Investigations of Events: Carry out Investigation of an event and draw logical conclusions based on critical thinking and analytical reasoning.

PO-8: Ethics: Identify ethical issues and embrace ethical values in conduct of Profession.

PO-11: Project management and finance: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of societal and technological change.

Program Specific Outcomes (PSOs):
  - **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.

Course Outcomes (COs):
  - **CO-1**:Recognize the basic aspects of designing a Game.
  - **CO-2**:Select a story for games in a systematical manner.
  - **CO-3**:Identify the typical methods for designing game mechanics.
  - **CO-4**:Outline the impact of different parts of game like character and objects.
  - **CO-5**:Identify the key aspects of gaming experience and ethics.

COURSE NAME : **UI/UX Design**
COURSE CODE : **CSA3009**
PROGRAM NAME : **BCA (Gaming & Graphics)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,7

Program Outcomes (POs):
- **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.
- **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.
- **PO-4**:Conduct Investigations of Events: Carry out Investigation of an event and draw logical conclusions based on critical thinking and analytical reasoning.
- **PO-5**: Modern Tool usage: Effectively apply relevant ICT Tools and digital tools to carry out Computer Application Attributes.
- **PO-11**:Project management and finance: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.
- **PO-12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of societal and technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.
- **PSO-3**:Design/development of Activities:Conceive, Design and Develop various activities of Computer Applications, Augmented Reality, Virtual Reality, Gaming and Graphics.

Course Outcomes (COs):
- **CO-1**:Explain the UX Design principles .
- **CO-2**:Identify the ideal user experience.
- **CO-3**:Design wireframes using digital tools.

COURSE NAME : 2D Game Design and Developmen

COURSE CODE : CSA3018

PROGRAM NAME : BCA (Gaming & Graphics)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,8

Program Outcomes (POs):
- **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.
- **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.
- **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.
- **PO-4**:Conduct Investigations of Events: Carry out Investigation of an event and draw logical conclusions based on critical thinking and analytical reasoning.
- **PO-11:** Project management and finance: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion

Program Specific Outcomes (PSOs):
- **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.
- **PSO-3**:Design/development of Activities:Conceive, Design and Develop various activities of Computer Applications, Augmented Reality, Virtual Reality, Gaming and Graphics.

Course Outcomes (COs):
- **CO-1**:Recognize Game Design Process and its Importance.
- **CO-2**:Identify the UI of Unity Game Engine and its Work Flow.
- **CO-3**:Illustrate Object Behavioral scripts using C# and the Unity API..
- **CO-4**:Demonstrate 2D game using Unity Game Engine.

COURSE NAME : Introduction to Immersive Technologies
COURSE CODE : CSA1010
PROGRAM NAME : BCA (Augmented Reality /Virtual Reality)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,5

Program Outcomes (POs):
- **PO-1:** Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.
- **PO-4:** Conduct Investigations of Events: Carry out Investigation of an event and draw logical conclusions based on critical thinking and analytical reasoning.
- **PO-6:** Research: Identify suitable Research Methods and report the findings.
- **PO-10:** Communication: Express thoughts and ideas effectively in writing and oral communication.
- **PO-12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of societal and technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.

Course Outcomes (COs):
- **CO-1**:Describe the fundamental concepts of Augmented Reality and Virtual Reality.
- **CO-2**:Explain different display and tracking techniques.
- **CO-3**:Discuss various modelling techniques.
- **CO-4**:Demonstrate various Perception Models and Processes.
- **CO-5**:Explain the core concept of Metaverse.

REGISTRAR
Registrar

COURSE NAME : Introduction to 3D Animation

COURSE CODE : CSA1011

PROGRAM NAME : BCA (Augmented Reality /Virtual Reality)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,6

Program Outcomes (POs):

➢ **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.

➢ **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.

➢ **PO-4**:Conduct Investigations of Events: Carry out Investigation of an event and draw logical conclusions based on critical thinking and analytical reasoning.

➢ **PO-5**: Modern Tool usage: Effectively apply relevant ICT Tools and digital tools to carry out Computer Application Attributes.

➢ **PO-10**:Communication: Express thoughts and ideas effectively in writing and oral communication.

➢ **PO-12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of societal and technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.

Course Outcomes (COs):

➢ **CO-1**:Apply the fundamental 3D Modeling and Animation.

➢ **CO-2**:Implement the Production with various Modeling Techniques.

➢ **CO-3**:Create 3 D Animation with Edit key frame animation within the graph editor.

➢ **CO-4**:Generate animations with simple objects, characters rigs and cycled animations.

COURSE NAME   : 2D Animation

COURSE CODE   : CSA2012

PROGRAM NAME   : BCA (Augmented Reality /Virtual Reality)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 8,9
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,7

Program Outcomes (POs):

- **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.
- **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.
- **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.
- **PO-8**: Ethics: Identify ethical issues and embrace ethical values in conduct of Profession.

Program Specific Outcomes (PSOs):

- **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.
- **PSO-3**:Design/development of Activities:Conceive, Design and Develop various activities of Computer Applications, Augmented Reality, Virtual Reality, Gaming and Graphics.

Course Outcomes (COs):

- **CO-1**:Illustrate the basic concepts of Animation.
- **CO-2**:Employ character design and motion through key-frames, holds, and in-betweens.
- **CO-3**:Relate knowledge of various animation types and techniques.
- **CO-4**:Compose the executed animation and export.

COURSE NAME   : **Augmented Reality Development**

COURSE CODE   : **CSA2016**

PROGRAM NAME   : **BCA (Augmented Reality /Virtual Reality)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,8

Program Outcomes (POs):
- ➢ **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.
- ➢ **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.
- ➢ **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.
- ➢ **PO-4:** Conduct Investigations of Events: Carry out Investigation of an event and draw logical conclusions based on critical thinking and analytical reasoning.
- ➢ **PO-11:** Project management and finance: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.

Program Specific Outcomes (PSOs):
- ➢ **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.
- ➢ **PSO-3**:Design/development of Activities:Conceive, Design and Develop various activities of Computer Applications, Augmented Reality, Virtual Reality, Gaming and Graphics.

Course Outcomes (COs):
- ➢ **CO-1**:Describe the concepts of augmented reality development.
- ➢ **CO-2**:Illustrate Augmented Reality application using AR concepts.
- ➢ **CO-3**:Develop an AR Applications using Anchors.
- ➢ **CO-4**:Demonstrate the HoloLens AR applications.

COURSE NAME : **Virtual Reality development**

COURSE CODE : **CSA2017**

PROGRAM NAME : **BCA (Augmented Reality /Virtual Reality)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,9

Program Outcomes (POs):

➢ **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.

➢ **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.

➢ **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.

➢ **PO-7**:Profession and Society: Apply the knowledge of the values and beliefs of multicultural society and a global perspective in the profession.

➢ **PO-8**: Ethics: Identify ethical issues and embrace ethical values in conduct of Profession.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.

➢ **PSO-3**:Design/development of Activities:Conceive, Design and Develop various activities of Computer Applications, Augmented Reality, Virtual Reality, Gaming and Graphics.

Course Outcomes (COs):

➢ **CO-1**:Infer design of VR technology relates to human perception and cognition.

➢ **CO-2**:Illustrate applications of VR to conduct of training, industrial design and Gaming.

➢ **CO-3**:Construct VR experience using virtual environment technology for capturing user input.

➢ **CO-4**:Design and implementing demanding empirical experiments using VR.

➢ **CO-5**:Evaluate multimodal virtual displays for conveying and presenting information and techniques for evaluating good and bad virtual interfaces.

COURSE NAME   **: Basic Electronics and Computer Hardware**

COURSE CODE   **: BCA1007**

PROGRAM NAME   : BCA

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,3,4,5

Program Outcomes (POs):

➢ **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.

➢ **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.

➢ **PO-8**: Ethics: Identify ethical issues and embrace ethical values in conduct of Profession.

➢ **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

➢ **PO-10**:Communication: Express thoughts and ideas effectively in writing and oral communication.

➢ **PO-12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of societal and technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.

Course Outcomes (COs):

➢ **CO-1**:Demonstrate the characteristics of basic electronic components.

➢ **CO-2**:Recognize different parts of Computer Hardware.

➢ **CO-3**:Discuss the components of processor and memory hierarchy.

➢ **CO-4**:Practice the installation of Linux/ Windows operating system.

COURSE NAME   **: Relational Database Management System**
COURSE CODE   **: CSA2003**
PROGRAM NAME : BCA

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,6

Program Outcomes (POs):
- **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.
- **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.
- **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.
- **PO-6**:Research: Identify suitable Research Methods and report the findings.
- **PO-9**:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-11:** Project management and finance: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.

Program Specific Outcomes (PSOs):
- **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.
- **PSO-2**:Problem Solving: Identify, formulate and apply appropriate techniques in the areas related to Software development, Augmented and Virtual Reality, Gaming and Graphics and related domains of varying complexities in real-time applications.

Course Outcomes (COs):
- **CO-1**:Understand the basic concepts of database and ER modeling in designing the database.
- **CO-2**:Apply Relational Algebra and Database Querying concepts in designing the database.
- **CO-3**:Analyze various normalization techniques for designing a robust database.
- **CO-4**:Understand the Transaction control and concurrency control mechanisms.

COURSE NAME   **: Computer Networks**

COURSE CODE   **: CSA 2004**

PROGRAM NAME : BCA

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,7

Program Outcomes (POs):
- **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.
- **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.
- **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.
- **PO-8**: Ethics: Identify ethical issues and embrace ethical values in conduct of Profession.

Program Specific Outcomes (PSOs):
- **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.

Course Outcomes (COs):
- **CO-1**:Describe the basic concepts of computer networks and reference models.
- **CO-2**:Describe the physical and data link layer functionalities.
- **CO-3**:Apply the knowledge of IP addressing and routing mechanisms to connect to a computer network.
- **CO-4**:Explain the functionalities of the transport layer and application layer.

COURSE NAME   **: Internet of Things**
COURSE CODE   **: CSA 3005**
PROGRAM NAME   **: BCA**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,5,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,8

Program Outcomes (POs):
- **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.
- **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.
- **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.
- **PO-5**: Modern Tool usage: Effectively apply relevant ICT Tools and digital tools to carry out Computer Application Attributes.
- **PO-12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of societal and technological change.

Program Specific Outcomes (PSOs):
- **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.
- **PSO-2**:Problem Solving: Identify, formulate and apply appropriate techniques in the areas related to Software development, Augmented and Virtual Reality, Gaming and Graphics and related domains of varying complexities in real-time applications.

Course Outcomes (COs):
- **CO-1**:Identify the application areas of IoT.
- **CO-2**:Understand building blocks of Internet of Things and characteristics.
- **CO-3**:Describe IoT Protocols.
- **CO-4**:Demonstrate use of IoT devices for simple application.

COURSE NAME   : Data Warehousing and Mining
COURSE CODE   : CSA 2021
PROGRAM NAME : BCA

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,9

Program Outcomes (POs):

➢ **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.

➢ **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.

➢ **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.

➢ **PO-4**:Conduct Investigations of Events: Carry out Investigation of an event and draw logical conclusions based on critical thinking and analytical reasoning.

➢ **PO-10**:Communication: Express thoughts and ideas effectively in writing and oral communication.

➢ **PO-12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of societal and technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of Computer Applications, Animation, Augmented and Virtual Reality, Gaming and Graphics.

➢ **PSO-2**:Problem Solving: Identify, formulate and apply appropriate techniques in the areas related to Software development, Augmented and Virtual Reality, Gaming and Graphics and related domains of varying complexities in real-time applications.

➢ **PSO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications, Augmented Reality, Virtual Reality, Gaming and Graphics.

Course Outcomes (COs):

➢ **CO-1**:Describe data warehousing architecture and considerations to build data warehouse.

➢ **CO-2**:Discuss different multidimensional data models for data warehouse.

➢ **CO-3**:Apply various classification and clustering methods for mining information from data.

➢ **CO-4**:Apply different techniques to find outliers in data.

COURSE NAME   **: Elements of Computing System**

COURSE CODE   **: BSD 1004**

PROGRAM NAME   **: B.Sc. (Data Science)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,5

Program Outcomes (POs):

- ➢ **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.
- ➢ **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.
- ➢ **PO-4**:Conduct Investigations of Events: Carry out Investigation of an event and draw logical conclusions based on critical thinking and analytical reasoning.
- ➢ **PO-12**:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of societal and technological change.

Program Specific Outcomes (PSOs):

- ➢ **PSO-1**:Apply the knowledge of mathematics, science, software engineering, structured and object oriented programming concepts to provide efficient solutions.
- ➢ **PSO-2**:Identify, formulate and apply appropriate techniques in the areas related to machine learning, IoT and data analytics of varying complexities in real-time applications.

Course Outcomes (COs):

- ➢ **CO-1**:Relate different number system representations used in computing devices.
- ➢ **CO-2**:Differentiate different logic gates and their behavior.
- ➢ **CO-3**:Discuss different parts of computer and their organization.
- ➢ **CO-4**:Describe Operating system and its functionality.

COURSE NAME   **: Analysis of Algorithms**
COURSE CODE   **: CSA2005**
PROGRAM NAME   **: B.Sc. (Data Science)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,7

Program Outcomes (POs):
- **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.
- **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.
- **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.
- **PO-4**:Conduct Investigations of Events: Carry out Investigation of an event and draw logical conclusions based on critical thinking and analytical reasoning.
- **PO-8**: Ethics: Identify ethical issues and embrace ethical values in conduct of Profession.

Program Specific Outcomes (PSOs):
- **PSO-1**:Apply the knowledge of mathematics, science, software engineering, structured and object oriented programming concepts to provide efficient solutions.
- **PSO-2**:Identify, formulate and apply appropriate techniques in the areas related to machine learning, IoT and data analytics of varying complexities in real-time applications.

Course Outcomes (COs):
- **CO-1**:Identify the efficiency of a given algorithm.
- **CO-2**:Employ divide and conquer approach to solve a problem.
- **CO-3**:Illustrate dynamic programming approach to solve a given problem.
- **CO-4**:Solve a problem using the greedy method.
- **CO-5**:Discuss the techniques to solve a real-world problem based on its complexity classes.

COURSE NAME : R Programming for Data Science

COURSE CODE : CSA3035

PROGRAM NAME : B.Sc. (Data Science)

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,6,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,8

Program Outcomes (POs):

➢ **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.

➢ **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.

➢ **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.

➢ **PO-5**: Modern Tool usage: Effectively apply relevant ICT Tools and digital tools to carry out Computer Application Attributes.

➢ **PO-12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of societal and technological change.

Program Specific Outcomes (PSOs):

➢ **PSO-1**:Apply the knowledge of mathematics, science, software engineering, structured and object oriented programming concepts to provide efficient solutions.

➢ **PSO-2**:Identify, formulate and apply appropriate techniques in the areas related to machine learning, IoT and data analytics of varying complexities in real-time applications.

➢ **PSO-3**:Apply relevant resources, design and develop Web and Cloud based solutions for real-time applications.

Course Outcomes (COs):

➢ **CO-1**:Apply basic R functions pertaining to fundamental data analysis.

➢ **CO-2**:Interpret data using appropriate statistical methods.

➢ **CO-3**:Demonstrate the decision trees concept with the given dataset.

➢ **CO-4**:Demonstrate the Mining concepts for both Data and Text.

COURSE NAME : **Programming in C**
COURSE CODE : **BSD1002**
PROGRAM NAME : **B.Sc. (Data Science)**

Relevant for foundational knowledge of economic developments at the local, national, and global levels

Parameter	Needs Addressed by this Course
Global	Goal Nos. 4,8,9
National	Goal Nos. 3,14,16
Regional	Goal Nos. 1
Local	Goal Nos. 1,2,4,9

Program Outcomes (POs):
- **PO-1**:Application of Domain Knowledge: Apply the domain knowledge such as mathematics, science and software engineering fundamentals into the Computer Application related professions.
- **PO-2**:Problem Solving and Analysis: Identify, Formulate, Analyse and Solve Complex Scenarios related to Computer Applications.
- **PO-3**:Design/development of Activities: Conceive, Design and Develop various activities of Computer Applications.
- **PO-4**:Conduct Investigations of Events: Carry out Investigation of an event and draw logical conclusions based on critical thinking and analytical reasoning.
- **PO-5**: Modern Tool usage: Effectively apply relevant ICT Tools and digital tools to carry out Computer Application Attributes.
- **PO-12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of societal and technological change

Program Specific Outcomes (PSOs):
- **PSO-1**:Apply the knowledge of mathematics, science, software engineering, structured and object oriented programming concepts to provide efficient solutions.
- **PSO-2**:Identify, formulate and apply appropriate techniques in the areas related to machine learning, IoT and data analytics of varying complexities in real-time applications.

Course Outcomes (COs):
- **CO-1**:Identify the solution to the problem through programming.
- **CO-2**:Apply the basic concepts and control structures of programming to solve the problem.
- **CO-3**:Interpret the concepts of array and strings to represent data and its operations.
- **CO-4**:Demonstrate the concepts of functions, structures and unions in solving the related scenarios.