



PRESIDENCY UNIVERSITY

Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956
Approved by AICTE, New Delhi

**PRESIDENCY SCHOOL OF ARTIFICIAL INTELLIGENCE
AND ADVANCED COMPUTING**

**Program Regulations and Curriculum
2026-2027**

**POST GRADUATE DIPLOMA in
Artificial Intelligence (PAI)
based on Choice Based Credit System (CBCS) and
Outcome Based Education (OBE)**

Table of Contents

Clause No.	Contents	Page Number
PART A – PROGRAM REGULATIONS		
1.	Vision and Mission of the University and the School / Department	3
2.	Preamble to the Program Regulations and Curriculum	3
3.	Short Title and Applicability	3
4.	Definitions	4
5.	Program Description	5
6.	Minimum and Maximum Duration	6
7.	Programme Educational Objectives (PEO)	6
8.	Programme Outcomes (PO) and Programme Specific Outcomes (PSO)	7
9.	Admission Criteria (as per the concerned Statutory Body)	8
10.	Specific Regulations regarding Assessment and Evaluation	8
11.	Additional clarifications - Rules and Guidelines for Transfer of Credits from MOOC, etc.	10
PART B: PROGRAM STRUCTURE		
12.	Structure / Component with Credit Requirements Course Baskets and Minimum Basket wise Credit Requirements	13
13.	Minimum Total Credit Requirements of Award of Degree	13
14.	Other Specific Requirements for Award of Degree, if any, as prescribed by the Statutory Bodies	13
PART C: CURRICULUM STRUCTURE		
15.	Curriculum Structure – Basket Wise Course List	14
16.	Practical / Skill based Courses – Internships / Thesis / Dissertation / Capstone Project Work / Portfolio / Mini project	15
17.	Recommended Semester Wise Course Structure	16
18.	Course Catalogue of all Courses Listed including the Courses Offered by other School / Department and Discipline / Program Electives	17

PART A – PROGRAM REGULATIONS

1. Vision and Mission of the University and the School / Department

1.1 Vision of the University

To be a Value-driven Global University, excelling beyond peers and creating professionals of integrity and character, having concern and care for society.

1.2 Mission of the University

- Commit to be an innovative and inclusive institution by seeking excellence in teaching, research and knowledge-transfer.
- Pursue Research and Development and its dissemination to the community, at large.
- Create, sustain and apply learning in an interdisciplinary environment with consideration for ethical, ecological and economic aspects of nation building.
- Provide knowledge-based technological support and services to the industry in its growth and development.
- To impart globally-applicable skill-sets to students through flexible course offerings and support industry's requirement and inculcate a spirit of new-venture creation.

1.3 Vision of Presidency School of Computer Science and Engineering

To be a value-based, practice-driven Presidency School of Computer Science and Engineering, committed to developing globally competent engineers, dedicated to developing cutting-edge technology to enhance the quality of life.

1.4 Mission of Presidency School of Computer Science and Engineering

- Cultivate a practice-driven environment with computing-based pedagogy, integrating theory and practice.
- Attract and nurture world-class faculty to excel in teaching and research in the realm of computing sciences.
- Establish state-of-the-art computing facilities for effective teaching and learning experiences.
- Promote interdisciplinary studies to nurture talent for global impact.
- Instill entrepreneurial and leadership skills to address social, environmental and community needs.

2. Preamble to the Program Regulations and Curriculum

This is the subset of Academic Regulations and it is to be followed as a requirement for the award of PG Diploma in AI.

The Curriculum is designed to take into the factors listed in the Choice Based Credit System (CBCS) with focus on Social Project Based Learning, Industrial Training, and Internship to enable the students to become eligible and fully equipped for employment in industries, choose higher studies or entrepreneurship.

In exercise of the powers conferred by and in discharge of duties assigned under the relevant provision(s) of the Act, Statutes and Academic Regulations of the University, the Academic Council hereby makes the following Regulations.

3. Short Title and Applicability

- a. These Regulations shall be called the PG Diploma Degree Program Regulations and Curriculum 2026-2027.
- b. These Regulations are subject to, and pursuant to the Academic Regulations.
- c. These Regulations shall be applicable to the ongoing PG Diploma Degree Programs of the 2026-2027 batch, and to all other PG Diploma Degree Programs which may be introduced in future.
- d. These Regulations shall supersede all the earlier PG Diploma Degree Program Regulations and Curriculum, along with all the amendments thereto.
- e. These Regulations shall come into force from the Academic Year 2024-2025.

4. Definitions

In these Regulations, unless the context otherwise requires:

- a. *"Academic Calendar" means the schedule of academic and miscellaneous events as approved by the Vice Chancellor;*
- b. *"Academic Council" means the Academic Council of the University;*
- c. *"Academic Regulations" means the Academic Regulations, of the University;*
- d. *"Academic Term" means a Semester or Summer Term;*
- e. *"Act" means the Presidency University Act, 2013;*
- f. *"AICTE" means All India Council for Technical Education;*
- g. *"Basket" means a group of courses bundled together based on the nature/type of the course;*
- h. *"BOE" means the Board of Examinations of the University;*
- i. *"BOG" means the Board of Governors of the University;*
- j. *"BOM" means the Board of Management of the University;*
- k. *"BOS" means the Board of Studies of a particular Department/Program of Study of the University;*
- l. *"CGPA" means Cumulative Grade Point Average as defined in the Academic Regulations;*
- m. *"Clause" means the duly numbered Clause, with Sub-Clauses included, if any, of these Regulations;*
- n. *"COE" means the Controller of Examinations of the University;*
- o. *"Course In Charge" means the teacher/faculty member responsible for developing and organising the delivery of the Course;*
- p. *"Course Instructor" means the teacher/faculty member responsible for teaching and evaluation of a Course;*
- q. *"Course" means a specific subject usually identified by its Course-code and Course-title, with specified credits and syllabus/course-description, a set of references, taught by some teacher(s)/course-instructor(s) to a specific class (group of students) during a specific Academic Term;*
- r. *"Curriculum Structure" means the Curriculum governing a specific Degree Program offered by the University, and, includes the set of Baskets of Courses along with minimum credit requirements to be earned under each basket for a degree/degree with specialization/minor/honours in addition to the relevant details of the Courses and Course catalogues (which describes the Course content and other important information about the Course). Any specific requirements for a particular program may be brought into the Curriculum structure of the specific program and relevant approvals should be taken from the BOS and Academic Council at that time.*
- s. *"DAC" means the Departmental Academic Committee of a concerned Department/Program of Study of the University;*
- t. *"Dean" means the Dean / Director of the concerned School;*

- u. *"Degree Program" includes all Degree Programs;*
- v. *"Department" means the Department offering the degree Program(s) / Course(s) / School offering the concerned Degree Programs / other Administrative Offices;*
- w. *"HOD" means the Head of the concerned Department;*
- x. *"L-T-P-C" means Lecture-Tutorial-Practical-Credit – refers to the teaching – learning periods and the credit associated;*
- y. *"MOOC" means Massive Open Online Courses;*
- z. *"MOU" means the Memorandum of Understanding;*
- aa. *"NPTEL" means National Program on Technology Enhanced Learning;*
- bb. *"Parent Department" means the department that offers the Degree Program that a student undergoes;*
- cc. *"Program Head" means the administrative head of a particular Degree Program/s;*
- dd. *"Program Regulations" means the PG Diploma Degree Program Regulations and Curriculum, 2026-2027;*
- ee. *"PSCS" means the Presidency School of of Computer Science and Engineering;*
- ff. *"Registrar" means the Registrar of the University;*
- gg. *"School" means a constituent institution of the University established for monitoring, supervising and guiding, teaching, training and research activities in broadly related fields of studies;*
- hh. *"Section" means the duly numbered Section, with Clauses included in that Section, of these Regulations;*
- ii. *"SGPA" means the Semester Grade Point Average as defined in the Academic Regulations;*
- jj. *"Statutes" means the Statutes of Presidency University;*
- kk. *"Sub-Clause" means the duly numbered Sub-Clause of these Program Regulations;*
- ll. *"Summer Term" means an additional Academic Term conducted during the summer break (typically in June-July) for a duration of about eight (08) calendar weeks, with a minimum of thirty (30) University teaching days;*
- mm. *"SWAYAM" means Study Webs of Active Learning for Young Aspiring Minds.*
- mm. *"UGC" means University Grant Commission;*
- nn. *"University" means Presidency University, Bengaluru; and*
- oo. *"Vice Chancellor" means the Vice Chancellor of the University.*

5. Program Description

The PG Diploma Degree Program Regulations and Curriculum 2026-2027 are subject to, and, pursuant to the Academic Regulations. These Program Regulations shall be applicable to the following ongoing PG Diploma (Artificial Intelligence) Program of 2026-2027 offered by the Presidency School of Computer Science and Engineering (PSCS):

5.1 These Program Regulations shall be applicable to other similar programs, which may be introduced in future.

5.2 These Regulations may evolve and get amended or modified or changed through appropriate approvals from the Academic Council, from time to time, and shall be binding on all concerned.

5.3 The effect of periodic amendments or changes in the Program Regulations, on the students admitted in earlier years, shall be dealt with appropriately and carefully, so as to ensure that those students are not subjected to any unfair situation whatsoever, although they are required to conform to these revised Program Regulations, without any undue favour or considerations

6. Minimum and Maximum Duration

- 6.1 PG Diploma Degree Program is a One-Year, Full-Time Semester based program. The minimum duration of the PG Diploma Program is One year and comprises of two academic Semesters (Odd and Even Semesters) and hence the duration of the PG Diploma Degree is Two (02) Semesters.
- 6.2 A student who for whatever reason is not able to complete the Program within the normal period or the minimum duration (number of years) prescribed for the Program, may be allowed a period of One year beyond the normal period to complete the mandatory minimum credits requirement as prescribed by the concerned Program Regulations and Curriculum. In general, the permissible maximum duration (number of years) for completion of Program is 'N' + 1 year, where 'N' stands for the normal or minimum duration (number of years) for completion of the concerned Program as prescribed by the concerned Program Regulations and Curriculum.
- 6.3 The time taken by the student to improve Grades/CGPA, and in case of temporary withdrawal/re-joining (Refer to Clause 16.1 of Academic Regulations), shall be counted in the permissible maximum duration for completion of a Program.
- 6.4 In exceptional circumstances, such as temporary withdrawal for medical exigencies where there is a prolonged hospitalization and/or treatment, as certified through hospital/medical records, women students requiring extended maternity break (certified by registered medical practitioner), and, outstanding sportspersons representing the University/State/India requiring extended time to participate in National/International sports events, a further extension of one (01) year may be granted on the approval of the Academic Council.
- 6.5 The enrolment of the student who fails to complete the mandatory requirements for the award of the concerned Degree (refer Section 19.0 of Academic Regulations) in the prescribed maximum duration (Sub-Clauses 18.1 and 18.2 of Academic Regulations), shall stand terminated and no Degree shall be awarded.

7 Programme Educational Objectives (PEO)

After successful completion of the PG Diploma in Artificial Intelligence , the learners shall be:

PEO1. Professional Competence

Develop the ability to initiate, design, and incubate AI-based startups, transforming innovative ideas into viable business solutions

PEO2. Innovation and Problem Solving

Cultivate leadership qualities to manage AI projects, lead multidisciplinary teams, and drive innovation in technology-driven environments

PEO3. Ethical and Social Responsibility

Encourage creative thinking to identify real-world challenges and develop scalable AI solutions with societal and industrial impact

PEO4. Lifelong Learning and Career Growth

Promote active engagement with industry and incubation ecosystems for product development, technology transfer, and startup growth

8 Programme Outcomes (PO) and Programme Specific Outcomes (PSO)

8.1 Programme Outcomes (PO)

On successful completion of the Program, the students shall be able to:

After completing the PG Diploma in Artificial Intelligence, learners will be able to:

P01. Advanced Knowledge

Apply advanced concepts of Artificial Intelligence, Machine Learning, and Data Science to solve complex problems.

P02. Problem Analysis

Analyze and model real-world problems using computational and statistical techniques.

P03. Design and Development

Design and develop intelligent systems that meet specified functional requirements.

P04. Investigation and Research

Conduct experiments, interpret results, and validate AI models using appropriate research methods.

P05. Modern Tool Usage

Use modern AI tools, frameworks, programming languages, and cloud platforms effectively.

P06. Ethics and Professional Responsibility

Apply ethical principles in AI including fairness, accountability, transparency, and data privacy.

P07. Communication and Teamwork

Function effectively as an individual and in multidisciplinary teams and communicate technical information clearly.

P08. Lifelong Learning

Engage in independent learning to adapt to emerging AI technologies.

8.2 Program Specific Outcomes (PSOs):

On successful completion of the Program, the students shall be able to:

PS01. Intelligent Model Development

Develop, train, and optimize machine learning and deep learning models for real-world applications.

PS02. Data Analytics and Deployment

Perform advanced data analytics and deploy AI solutions in cloud or enterprise environments.

PS03. AI Application Integration

Integrate AI solutions into industrial, business, or research ecosystems.

9 Admission Criteria (as per the concerned Statutory Body)

The University admissions shall be open to all persons irrespective of caste, class, creed, gender or nation. All admissions shall be made on the basis of merit in the qualifying examinations; provided that forty percent of the admissions in all Programs of the University shall be reserved for the students of Karnataka State and admissions shall be made through a Common Entrance Examination conducted by the State Government or its agency and seats shall be allotted as per the merit and reservation policy of the State Government from time to time. The admission criteria to the PG Diploma in AI. Program is listed in the following Sub-Clauses:

- Have a Bachelor's degree (With Basic Knowledge of Mathematics) from a recognized university.
- Have a minimum aggregate of 50% in your Bachelor's degree.
- Have a minimum aggregate of 45% in your Bachelor's degree if you belong to a reserved category.
- Have to submit score card from any state or central entrance exam or the Presidency University admission qualifying exam

10. Specific Regulations regarding Assessment and Evaluation (including the Assessment Details of NTCC Courses, Weightages of Continuous Assessment and End Term Examination for various Course Categories)

10.1 The academic performance evaluation of a student in a Course shall be according to the University Letter Grading System based on the class performance distribution in the Course.

10.2 Academic performance evaluation of every registered student in every Course registered by the student is carried out through various components of Assessments spread across the Semester. The nature of components of Continuous Assessments and the weightage given to each component of Continuous Assessments (refer Clause 8.8 of academic regulations) shall be clearly defined in the Course Plan for every Course, and approved by the DAC.

10.3 Format of the End-Term examination shall be specified in the Course Plan.

10.4 Grading is the process of rewarding the students for their overall performance in each Course. The University follows the system of Relative Grading with statistical approach to classify the students based on the relative performance of the students registered in the concerned Course except in the following cases:

- Non-Teaching Credit Courses (NTCC)

Absolute grading method may be adopted, where necessary with prior approval of concerned DAC.

Grading shall be done at the end of the Academic Term by considering the aggregate performance of the student in all components of Assessments prescribed for the Course. Letter Grades shall be awarded to a student based on her/his overall performance relative to the class performance distribution in the concerned Course. These Letter Grades not only

indicate a qualitative assessment of the student's performance but also carry a quantitative (numeric) equivalent called the Grade Point.

10.5 Assessment Components and Weightage

Table 1: Assessment Components and Weightage for different category of Courses		
Nature of Course and Structure	Evaluation Component	Weightage
Lecture-based Course L component in the L-T-P Structure is predominant (more than 1) (Examples: 3-0-0; 3-0-2; 2-1-0; 2-0-2, 2-0-4 etc.)	Continuous Assessments	50%
	End Term Examination	50%
Lab/Practice-based Course P component in the L-T-P Structure is predominant (Examples: 0-0-4; 1-0-4; 1-0-2; etc.)	Continuous Assessments	50%
	End Term Examination	50%
Skill based Courses like Industry Internship, Capstone project, Research Dissertation, Integrative Studio, Interdisciplinary Project, Summer / Short Internship, Social Engagement / Field Projects, Portfolio, and such similar Non-Teaching Credit Courses, where the pedagogy does not lend itself to a typical L-T-P structure	Guidelines for the assessment components for the various types of Courses, with recommended weightages, shall be specified in the concerned Program Regulations and Curriculum / Course Plans, as applicable.	

The exact weightages of Evaluation Components shall be clearly specified in the concerned PRC and respective Course Plan.

Normally, for Practice/Skill based Courses, without a defined credit structure (L-P-C) [NTCC], but with assigned Credits (as defined in Clause 5.2 of the Academic Regulations), the method of evaluation shall be based only on Continuous Assessments. The various components of Continuous Assessments, the distribution of weightage among such components, and the method of evaluation/assessment, shall be as decided and indicated in the Course Plan/PRC. The same shall be approved by the respective DAC.

10.6 Minimum Performance Criteria:

10.6.1 Theory only Course and Lab/Practice Embedded Theory Course

A student shall satisfy the following minimum performance criteria to be eligible to earn the credits towards the concerned Course:

- A student must obtain a minimum of 30% of the total marks/weightage assigned to the End Term Examinations in the concerned Course.

- b. The student must obtain a minimum of 40% of the AGGREGATE of the marks/weightage of the components of Continuous Assessments, Mid Term Examinations and End Term Examinations in the concerned Course.

10.6.2 Lab/Practice only Course and Project Based Courses

The student must obtain a minimum of 40% of the AGGREGATE of the marks/weightage of all assessment components in the concerned Course.

- 10.6.3** A student who fails to meet the minimum performance criteria listed above in a Course shall be declared as “Fail” and given “F” Grade in the concerned Course. For theory Courses, the student shall have to re-appear in the “Make-Up Examinations” as scheduled by the University in any subsequent semester, or, re-appear in the End Term Examinations of the same Course when it is scheduled at the end of the following Semester or Summer Term, if offered. The marks obtained in the Continuous Assessments (other than the End Term Examination) shall be carried forward and be included in computing the final grade, if the student secures the minimum requirements (as per sub-clause 8.9.1 and 8.9.2 of academic regulations) in the “Make-Up Examinations” of the concerned Course. Further, the student has an option to re-register for the Course and clear the same in the summer term/ subsequent semester if he/she wishes to do so, provided the Course is offered.

11 Additional clarifications - Rules and Guidelines for Transfer of Credits from MOOC, etc. – Note: These are covered in Academic Regulations

The University allows students to acquire credits from other Indian or foreign institutions and/or Massive Open Online Course (MOOC) platforms, subject to prior approval. These credits may be transferred and counted toward fulfilling the minimum credit requirements for the award of a degree. The process of transfer of credits is governed by the following rules and guidelines:

- 11.1** The transfer of credits shall be examined and recommended by the Equivalence Committee (Refer ANNEXURE B of academic regulations) and approved by the Dean - Academics.
- 11.2** Students may earn credits from other Indian or foreign Universities/Institutions with which the University has an MOU, and that MOU shall have specific provisions, rules and guidelines for transfer of credits. These transferred credits shall be counted towards the minimum credit requirements for the award of the degree.
- 11.3** Students may earn credits by registering for Online Courses offered by *Study Web of Active Learning by Young and Aspiring Minds* (SWAYAM) and *National Program on Technology Enhanced Learning* (NPTEL), or other such recognized Bodies/ Universities/Institutions as approved by the concerned BoS and Academic Council from time to time. The concerned School/Parent Department shall publish/include the approved list of Courses and the rules and guidelines governing such transfer of credits of the concerned Program from time to time. The Rules and Guidelines for the transfer of credits specifically from the Online Courses conducted by SWAYAM/ NPTEL/ other approved MOOCs are as stated in the following Sub-Clauses:

- 11.3.1** A student may complete SWAYAM/NPTEL/other approved MOOCs as mentioned in Clause 11.3 (as per academic regulations) and transfer equivalent credits to partially or fully complete the mandatory credit requirements of Discipline Elective Courses and/or the mandatory credit requirements of Open Elective Courses as prescribed in the concerned Curriculum Structure. However, it is the sole responsibility of the student to complete the mandatory credit requirements of the Discipline Elective Courses and the Open Elective Courses as prescribed by the Curriculum Structure of the concerned Program.
- 11.3.2** SWAYAM/NPTEL/ other approved MOOCs as mentioned in Clause 11.3 (as per academic regulations) shall be approved by the concerned Board of Studies and placed (as Annexures) in the concerned PRC.
- 11.3.3** Parent Departments may release a list of SWAYAM/NPTEL/other approved MOOCs for Pre-Registration as per schedule in the Academic Calendar or through University Notification to this effect.
- 11.3.4** Students may Pre-Register for the SWAYAM/NPTEL/other approved MOOCs in the respective Departments and register for the same Courses as per the schedule announced by respective Online Course Offering body/institute/university.
- 11.3.5** A student shall request for transfer of credits only from such approved Courses as mentioned in Sub-Clause 11.3.2 above.
- 11.3.6** SWAYAM/NPTEL/other approved MOOCs Courses are considered for transfer of credits only if the concerned student has successfully completed the SWAYAM/NPTEL/other approved MOOCs and obtained a certificate of successful/satisfactory completion.
- 11.3.7** A student who has successfully completed the approved SWAYAM/NPTEL/other approved MOOCs and wants to avail the provision of transfer of equivalent credits, must submit the original Certificate of Completion, or such similar authorized documents to the HOD concerned, with a written request for the transfer of the equivalent credits. On verification of the Certificates/Documents and approval by the HOD concerned, the Course(s) and equivalent Credits shall be forwarded to the COE for processing of results of the concerned Academic Term.
- 11.3.8** The credit equivalence of the SWAYAM/NPTEL/other approved MOOCs are based on Course durations and/or as recommended by the Course offering body/institute/university. The Credit Equivalence mapped to SWAYAM/ NPTEL approved Courses based on Course durations for transfer of credits is summarised in Table shown below. The Grade will be calculated from the marks received by the Absolute Grading Table 8.11 in the academic regulations.

Table 2: Durations and Credit Equivalence for Transfer of Credits from SWAYAM-NPTEL/ other approved MOOC Courses		
Sl. No.	Course Duration	Credit Equivalence
1	4 Weeks	1 Credit
2	8 Weeks	2 Credits
3	12 Weeks	3 Credits

11.3.9 The maximum permissible number of credits that a student may request for credit transfer from MOOCs shall not exceed 20% of the mandatory minimum credit requirements specified by the concerned Program Regulations and Curriculum for the award of the concerned Degree.

11.3.10 The University shall not reimburse any fees/expense; a student may incur for the SWAYAM/NPTEL/other approved MOOCs.

11.4 The maximum number of credits that can be transferred by a student shall be limited to forty percent (40%) of the mandatory minimum credit requirements specified by the concerned Program Regulations and Curriculum for the award of the concerned Degree. However, the grades obtained in the Courses transferred from other Institutions/MOOCs, as mentioned in this Section (11.0), shall not be included in the calculation of the CGPA.

PART B: PROGRAM STRUCTURE

12. Structure / Component with Credit Requirements Course Baskets and Minimum Basket wise Credit Requirements

The PGD in Artificial Intelligence Program Structure (2026-2027) totalling 50 credits. Table 3 summarizes the type of baskets, number of courses under each basket and the associated credits that are mandatorily required for the completion of the Degree.

Table 3: Summary of mandatory courses and minimum credit contribution from various baskets		
S.No	Baskets	Credit Contribution
1	SC	18
2	PCC	32
	TOTAL CREDITS	Min. 50

In the entire Program, the practical and skill based course component contribute to an extent of approximately 61% out of the total credits of 50 for PGD in Artificial Intelligence program of One year duration.

13. Minimum Total Credit Requirements of Award of Degree

As per the AICTE guidelines, a minimum of 50 credits is required for the award of a PG Diploma degree.

14. Other Specific Requirements for Award of Degree, if any, as prescribed by the Statutory Bodies,

- 14.1 The award of the Degree shall be recommended by the Board of Examinations and approved by the Academic Council and Board of Management of the University.
- 14.2 A student shall be declared to be eligible for the award of the concerned Degree if she/he:
 - a. Fulfilled the Minimum Credit Requirements and the Minimum Credits requirements under various baskets;
 - b. Secure a minimum CGPA of 5.0 in the concerned Program at the end of the Semester/Academic Term in which she/he completes all the requirements for the award of the Degree as specified in Sub-clause 19.2.1 a of Academic Regulations;
 - c. No dues to the University, Departments, Hostels, Library, and any other such Centers/ Departments of the University; and
 - d. No disciplinary action is pending against her/him.

PART C: CURRICULUM STRUCTURE

15. Curriculum Structure – Basket Wise Course List (not Semester Wise)

List of Courses Tabled – aligned to the Program Structure

S.No	Course Code	Course Name	L	T	P	C	Contact Hours
1	ENGXXXX	Technical Communication	0	0	2	1	2
2	MAT4007	Mathematics for AI	2	0	2	3	4
3	PAI4006	Research Design and Methods	2	0	0	2	2
4	PAI7500	Masters Project	0	0	0	12	-
Total No. of Credits						18	8

S.No	Course Code	Course Name	L	T	P	C	Contact Hours
1	PAI4000	Foundations of Artificial Intelligence	3	0	2	4	5
2	PAI4001	Fundamentals of Machine Learning	3	0	2	4	5
3	PAI4002	AI Tools, Frameworks and Platforms	2	0	2	3	4
4	PAI4003	Data Mining and Visualization	2	0	2	3	4
5	PAI4004	Object Oriented Analysis and Design	2	0	0	2	2
6	PAI4005	Ethics for the IT Professional	2	0	0	2	2
7	PAI4500	AI and Applications	2	0	0	2	2
8	PAI4501	Emerging Topics in Computing	3	0	2	4	5
9	PAI5000	Intelligent Systems	3	0	2	4	5
10	PAI5001	Mobile Networks and Smartphone Applications	3	0	2	4	5
Total No. of Credits						32	38

16. Practical / Skill based Courses – Internships / Thesis / Dissertation / Capstone Project Work / Portfolio / Mini project

Practical / Skill based Courses like internship, project work, capstone project, research project / dissertation, and such similar courses, where the pedagogy does not lend itself to a typical L-T-P-C Structure as defined in Clause 5.1 of the Academic Regulations are simply assigned the number of Credits based on the quantum of work / effort required to fulfill the learning objectives and outcomes prescribed for the concerned Courses. Such courses are referred to as Non-Teaching Credit Courses (NTCC). These Courses are designed to provide students with hands-on experience and skills

essential for their professional development. These courses aim to equip students with abilities in problem identification, root cause analysis, problem-solving, innovation, and design thinking through industry exposure and project-based learning. The expected outcomes are first level proficiency in problem solving and design thinking skills to better equip PG Diploma in AI. graduates for their professional careers. The method of evaluation and grading for the Practical / Skill based Courses shall be prescribed and approved by the concerned Departmental Academic Committee (refer Annexure A of the Academic Regulations). The same shall be prescribed in the Course Handout.

16.1 Research Project / Masters Project

A student may opt to do a Research Project / Dissertation for a period of 12-14 weeks in an Industry / Company or academic / research institution or the University Department(s) as an equivalence of Capstone Project, subject to the following conditions:

16.1.1 The Research Project / Dissertation shall be approved by the concerned HOD and be carried out under the guidance of a faculty member.

The student may do the Research Project / Dissertation in an Industry / Company or academic / research institution of her / his choice subject to the above mentioned condition (Sub-Clause 18.4.1). Provided further, that the Industry / Company or academic / research institution offering such Research Project / Dissertation confirms to the University that the Research Project / Dissertation work will be conducted in accordance with the Program Regulations and requirements of the University.

17 Recommended Semester Wise Course Structure / Flow including the Programme / Discipline Elective Paths / Options

SEMESTER I

Sl. No.	Course Code	Course Name	L	T	P	Credits	Basket
1	PAI4000	Foundations of Artificial Intelligence	3	0	2	4	PCC
2	MAT4007	Mathematics for AI	2	0	2	3	SC
3	PAI4001	Fundamentals of Machine Learning	3	0	2	4	PCC
4	PAI4002	AI Tools, Frameworks and Platforms	2	0	2	3	PCC
5	PAI4003	Data Mining and Visualization	2	0	2	3	PCC
6	PAI4004	Object Oriented Analysis and Design	2	0	0	2	PCC
7	PAI4005	Ethics for the IT Professional	2	0	0	2	PCC
8	PAI4006	Research Design and Methods	2	0	0	2	SC
9	ENG1109	Technical Communication	0	0	2	1	SC
			Total Credits			24	

SEMESTER II

Sl. No.	Course Code	Course Name	L	T	P	Credits	Basket
1	PAI4500	AI and Applications	2	0	0	2	PCC
2	PAI4501	Emerging Topics in Computing	3	0	2	4	PCC
3	PAI5000	Intelligent Systems	3	0	2	4	PCC
4	PAI5001	Mobile Networks and Smartphone Applications	3	0	2	4	PCC
5	PAI7500	Masters Project	0	0	0	12	SC
			Total Credits			26	

Course Descriptions

Semester I

Course Code: PAI4000	Course Title: Foundations of Artificial Intelligence	L-T-P- C	3	0	2	4
	Type of Course: Integrated Course					
Version No.		2.0				
Course Pre-requisites		--				
Anti-requisites		NIL				
Course Description		The objective of the course is to familiarize the learners with the fundamental concepts, principles, and techniques of Artificial Intelligence, enabling them to analyze intelligent systems, solve complex problems, represent knowledge, and develop AI-based solutions through Experiential Learning techniques.				
Course Objective		The objective of the course is to familiarize the learners with the fundamental concepts and techniques of Artificial Intelligence and attain SKILL DEVELOPMENT through Experiential Learning techniques.				
Course Outcomes		CO1: Understand core concepts and principles of artificial intelligence CO2: Apply search algorithms to solve problems CO3: Represent knowledge and perform logical reasoning CO4: Analyze basic machine learning techniques CO5: Implement AI concepts using programming tool				
Course Content:						

Module 1	Introduction to Artificial Intelligence and Problem Solving	Assignment			10 Sessions
	Topics: Artificial Intelligence definition, history, intelligent agents, applications of AI, state space, problem-solving techniques, uninformed search, informed search, heuristic methods.				
Module 2	Knowledge Representation and Reasoning	Assignment			12 Sessions
	Topics: Knowledge representation, propositional logic, predicate logic, inference mechanisms, reasoning techniques, knowledge-based systems.				
Module 3	Machine Learning Fundamentals	Assignment			12 Sessions
	Topics: Introduction to Machine Learning, supervised learning, unsupervised learning, classification, clustering, applications of Machine Learning in Artificial Intelligence.				
Module 4	Planning, Decision Making and AI Applications	Assignment			11 Sessions
	Topics: Planning, decision trees, game playing, Natural Language Processing (NLP), computer vision, robotics, expert systems, real-world applications of Artificial Intelligence.				
	Targeted Application and Tools that can be used: • Python • Jupyter Notebook • Google Colab • Anaconda • Scikit-learn • NumPy • Matplotlib • OpenAI Gym (Introduction) Lab experiments 1. Setting up the AI programming environment using Python and Jupyter Notebook. 2. Implementation of uninformed and informed search algorithms. 3. Development of heuristic search techniques. 4. Knowledge representation using propositional and predicate logic. 5. Simple inference engine implementation. 6. Classification and clustering using Scikit-learn. 7. Decision tree implementation for intelligent decision-making. 8. Mini-project demonstrating an AI application in a real-world scenario.				
	Project work/Assignment:				
	Design and implementation of an Artificial Intelligence-based solution for a real-world problem involving search techniques, knowledge representation, logical reasoning, or basic Machine Learning algorithms, followed by performance evaluation, documentation, and presentation of the developed system.				
	Text Books 1. Stuart Russell, Peter Norvig, <i>Artificial Intelligence: A Modern Approach</i>, 4th Edition, Pearson, ISBN: 978-0134610993. 2. Elaine Rich, Kevin Knight, Shivashankar B. Nair, <i>Artificial Intelligence</i>, 3rd Edition, McGraw Hill, ISBN: 978-0070087705.				
	References Weblinks				

Course Code: MAT4007	Course Title: Mathematics for AI	L-T-P- C	2	0	2	3
	Type of Course: Integrated course					
Version No.		2.0				
Course Pre-requisites		--				
Anti-requisites		NIL				
Course Description		This course provides the mathematical foundations required for artificial intelligence and machine learning. It focuses on linear algebra concepts such as vectors, matrices, and eigenvalues, along with probability theory and statistics. These concepts are essential for understanding and developing AI algorithms and models.				
Course Objective		The objective of the course is to familiarize the learners with the mathematical foundations required for Artificial Intelligence and Machine Learning, including linear algebra, probability, and statistics, and to attain SKILL DEVELOPMENT through Experiential Learning techniques by applying mathematical concepts to solve AI and data-driven problems..				
Course Outcomes		CO1: Understand vector and matrix operations used in AI CO2: Apply linear algebra concepts to machine learning problems CO3: Analyze probability distributions and random variables CO4: Apply statistical methods for data analysis CO5: Interpret mathematical foundations behind AI algorithms				
Course Content:						
Module 1	Linear Algebra Basics	Assignment				9 Sessions
	Topics: Vectors, vector spaces, norms, dot product, linear independence, applications of vectors in Artificial Intelligence.					
Module 2	Matrices and Linear Transformations	Assignment				9 Sessions
	Topics: Matrix operations, determinants, matrix inverse, linear transformations, eigenvalues, eigenvectors, applications of matrices in Machine Learning.					
Module 3	Probability Fundamentals	Assignment				9 Sessions
	Topics: Knowledge Representation and Reasoning Propositional logic, predicate logic, inference mechanisms, reasoning techniques					
Module 4	Random Variables and Probability Distributions	Assignment		Exp and modeling.		9 Sessions
	Topics: Sample space, events, conditional probability, Bayes' theorem, probabilistic reasoning, applications of probability in AI.					
Module 5	Statistics for AI and Applications	Assignment				9 Sessions
	Topics: Mean, variance, covariance, correlation, hypothesis testing, statistical inference, applications of linear algebra, probability, and statistics in Artificial Intelligence and Machine Learning.					

	Targeted Application and Tools that can be used: Python NumPy SciPy Jupyter Notebook Google Colab MATLAB (optional) List of Laboratory Task 1. Vector and matrix operations using NumPy. 2. Matrix multiplication, inverse, determinant, and eigenvalue computation. 3. Implementation of probability distributions. 4. Bayes' theorem-based classification examples. 5. Statistical analysis using Python. 6. Correlation and covariance analysis on datasets. 7. Mini-project applying mathematical concepts to an AI dataset.
	Project work/Assignment:
	Text Books 1. Gilbert Strang, <i>Linear Algebra and Its Applications</i>, 4th Edition, Cengage Learning, ISBN: 978-0030105678. 2. Sheldon M. Ross, <i>A First Course in Probability</i>, 10th Edition, Pearson, ISBN: 978-0134753119.
	References Weblinks

Course Code: PAI4001	Course Title: Fundamentals of Machine Learning	L-T-P- C	3	0	2	4
	Type of Course: Integrated course					
Version No.		2.0				
Course Pre-requisites		--				
Anti-requisites		NIL				
Course Description		This course provides the mathematical foundations required for artificial intelligence and machine learning. It focuses on linear algebra concepts such as vectors, matrices, and eigenvalues, along with probability theory and statistics. These concepts are essential for understanding and developing AI algorithms and models.				
Course Objective		The objective of the course is to familiarize the learners with the fundamental concepts, algorithms, and techniques of Machine Learning, enabling them to develop predictive models, evaluate their performance, and solve real-world problems using Experiential Learning techniques and industry-standard Machine Learning tools.				

Course Outcomes		C01: Understand the fundamental concepts and types of Machine Learning. C02: Apply supervised learning algorithms for prediction and classification tasks. C03: Use unsupervised learning techniques for pattern discovery and data analysis. C04: Evaluate the performance of Machine Learning models using appropriate metrics. C05: Implement Machine Learning algorithms using programming tools and libraries.				
Course Content:						
Module 1	Introduction to Machine Learning	Assignment				12 Sessions
	Topics: Introduction to Machine Learning, types of learning, supervised learning, unsupervised learning, machine learning workflow, applications of Machine Learning.					
Module 2	Supervised Learning Techniques, Model Evaluation and Performance Analysis	Assignment				12 Sessions
	Topics: Matrix Regression, classification, linear regression, logistic regression, k-Nearest Neighbors (k-NN), supervised learning applications. Train-test split, cross-validation, accuracy, precision, recall, F1-score, confusion matrix, model performance evaluation.					
Module 3	Unsupervised Learning Techniques	Assignment				10 Sessions
	Topics: Clustering, k-Means clustering, dimensionality reduction, Principal Component Analysis (PCA) basics, feature extraction, unsupervised learning applications.					
Module 4	Advanced Machine Learning Concepts and Applications	Assignment				11 Sessions
	Topics: Overfitting, underfitting, bias-variance tradeoff, regularization, real-world Machine Learning applications, introduction to Scikit-learn library, implementation of Machine Learning models.					
	Targeted Application and Tools that can be used: 1. Python 2. Jupyter Notebook 3. Google Colab 4. Scikit-learn 5. NumPy 6. Pandas 7. Matplotlib 8. Seaborn					
	List of Laboratory Task Laboratory Tasks 1. Introduction to the Scikit-learn environment and Machine Learning workflow. 2. Implementation of Linear Regression and Logistic Regression models. 3. Classification using k-Nearest Neighbors (k-NN). 4. Model evaluation using train-test split and cross-validation. 5. Performance analysis using confusion matrix, precision, recall, and F1-score. 6. Clustering using the k-Means algorithm. 7. Dimensionality reduction using Principal Component Analysis (PCA). 8. Mini-project implementing a Machine Learning solution on a real-world dataset.					
	Project work/Assignment:					

	Implementation of supervised and unsupervised machine learning algorithms using real-world datasets, comparative analysis of regression and classification models, clustering and dimensionality reduction techniques, performance evaluation using accuracy, precision, recall, F1-score, and cross-validation, development of an end-to-end machine learning solution using Scikit-learn, and preparation of a project report with result analysis and presentation.					
	Text Books 1. Tom M. Mitchell, Machine Learning, McGraw-Hill, ISBN: 978-0070428072. 2. Aurélien Géron, Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, 3rd Edition, O'Reilly, ISBN: 978-1098125974.					
	References Weblinks					
Course Code: PAI4002	Course Title: AI Tools, Frameworks and Platforms Type of Course: Integrated course	L-T-P- C	2	0	2	3
Version No.	2.0					
Course Pre-requisites	--					
Anti-requisites	NIL					
Course Description	This course focuses on practical aspects of artificial intelligence using modern tools, frameworks, and platforms. It introduces students to popular AI development environments, libraries, and deployment platforms used for building, training, and deploying AI models. The course emphasizes hands-on learning using Python-based ecosystems and cloud platforms.					
Course Objective	The objective of the course is to familiarize the learners with modern Artificial Intelligence tools, frameworks, and deployment platforms used for developing intelligent applications, and to attain SKILL DEVELOPMENT through Experiential Learning techniques by implementing, training, evaluating, and deploying AI models using industry-standard software and cloud platforms.					
Course Outcomes	CO1: Understand AI development environments and tools CO2: Use popular frameworks for building AI/ML models CO3: Implement AI solutions using libraries like TensorFlow and PyTorch CO4: Deploy AI models on cloud and edge platforms CO5: Evaluate performance and scalability of AI systems					
Course Content:						
Module 1	Introduction to AI tools	Assignment				10 Sessions
	Topics: AI ecosystem, Python environment, Jupyter Notebook, Anaconda, package management, virtual environments, introduction to AI development workflow.					
Module 2	Machine Learning Framework	Assignment				12 Sessions
	Topics: Scikit-learn, TensorFlow basics, PyTorch basics, model creation, training workflows, framework comparison.					
Module 3	Data Handling and Visualization Tools	Assignment				10 Sessions

	Topics: Clu Pandas, NumPy, data preprocessing, data manipulation, Matplotlib, Seaborn, exploratory data analysis, visualization techniques.				
Module 4	Deep Learning Frameworks	Assignment			13 Sessions
	Artificial neural networks, TensorFlow for deep learning, PyTorch for deep learning, model training, model evaluation, hyperparameter tuning. AI Platforms, Deployment and MLOps: Google Colab, Hugging Face, model deployment basics, REST APIs, Docker basics, model versioning, cloud platforms (AWS, Azure), scalability, introduction to MLOps.				
	Targeted Application and Tools that can be used: • Python • Jupyter Notebook • Anaconda • Google Colab • Scikit-learn • TensorFlow • PyTorch • Pandas • NumPy • Matplotlib • Seaborn • Hugging Face • Docker • Git and GitHub • AWS 1. Microsoft Azure				
	List of Laboratory Task 1. Setting up Python, Anaconda, and Jupyter Notebook environments. 2. Data preprocessing and visualization using Pandas, NumPy, Matplotlib, and Seaborn. 3. Building Machine Learning models using Scikit-learn. 4. Developing basic neural networks using TensorFlow. 5. Implementing deep learning models using PyTorch. 6. Training and evaluating AI models using Google Colab. 7. Deploying AI models using Hugging Face Spaces and REST APIs. 8. Containerizing AI applications using Docker. 9. Version control and collaboration using Git and GitHub. 10. Mini-project involving development and deployment of an AI application				
	Project work/Assignment:				
	Development and deployment of an end-to-end Artificial Intelligence application using Python-based frameworks, implementation of Machine Learning and Deep Learning models with TensorFlow and PyTorch, data preprocessing and visualization using Pandas and NumPy, model deployment using Hugging Face or cloud platforms, containerization using Docker, performance evaluation, scalability analysis, and submission of a comprehensive project report with presentation.				

	Text Books 1. Aurélien Géron, <i>Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow</i>, 3rd Edition, O'Reilly, ISBN: 978-1098125974. 2. François Chollet, <i>Deep Learning with Python</i>, 2nd Edition, Manning Publications, ISBN: 978-1617296864.
	References Weblinks

Course Code: PAI4003	Course Title: Data Mining and Visualization	L-T-P- C	2	0	2	3
	Type of Course: Integrated Course					
Version No.		2.0				
Course Pre-requisites		--				
Anti-requisites		NIL				
Course Description		This course introduces fundamental concepts of data mining, knowledge discovery, and data visualization techniques. It covers preprocessing, pattern mining, classification, clustering, and modern visualization tools to extract meaningful insights from large datasets.				
Course Objective		The objective of the course is to familiarize the learners with the concepts, techniques, and applications of Data Mining and Data Visualization, enabling them to discover meaningful patterns, analyze large datasets, and communicate insights effectively through Experiential Learning techniques using modern data mining and visualization tools.				
Course Outcomes		CO1: Understand data mining concepts, tasks, and preprocessing techniques. CO2: Apply classification and clustering algorithms to real-world datasets. CO3: Analyze association rules and pattern mining techniques. CO4: Use visualization tools to represent and interpret data effectively. CO5: Implement data mining models using Python and relevant libraries.				
Course Content:						
Module 1	Introduction to Data Mining	Assignment				12 Sessions
	Topics: Introduction to data mining, knowledge discovery in databases (KDD) process, data types, data mining tasks, applications of data mining.					
Module 2	Data Preprocessing	Assignment				11 Sessions
	Topics: Data cleaning, data integration, data transformation, data reduction, normalization, feature selection, preprocessing techniques for data mining.					
Module 3	Association Rule Mining and Classification Techniques	Assignment				11 Sessions
	Topics: Frequent itemsets, Apriori algorithm, FP-Growth algorithm, support, confidence, lift, decision trees, Naïve Bayes, k-Nearest Neighbors (k-NN), model evaluation					
Module 4	Clustering Techniques	Assignment				11 Sessions
	Topics: k-Means clustering, hierarchical clustering, DBSCAN, cluster evaluation, comparison of clustering algorithms, applications of clustering					

	Targeted Application and Tools that can be used: • Python • Jupyter Notebook • Google Colab • Scikit-learn • NumPy • Pandas • Matplotlib • Seaborn
	List of Laboratory Task Laboratory Tasks 1. Introduction to the Scikit-learn environment and Machine Learning workflow. 2. Implementation of Linear Regression and Logistic Regression models. 3. Classification using k-Nearest Neighbors (k-NN). 4. Model evaluation using train-test split and cross-validation. 5. Performance analysis using confusion matrix, precision, recall, and F1-score. 6. Clustering using the k-Means algorithm. 7. Dimensionality reduction using Principal Component Analysis (PCA). 8. Mini-project implementing a Machine Learning solution on a real-world dataset.
	Project work/Assignment:
	Implementation of supervised and unsupervised machine learning algorithms using real-world datasets, comparative analysis of regression and classification models, clustering and dimensionality reduction techniques, performance evaluation using accuracy, precision, recall, F1-score, and cross-validation, development of an end-to-end machine learning solution using Scikit-learn, and preparation of a project report with result analysis and presentation.
	Text Books 1. Jiawei Han, Jian Pei, Hanghang Tong, <i>Data Mining: Concepts and Techniques, 4th Edition</i>, Elsevier (Morgan Kaufmann), 2022, ISBN: 978-0128117606. 2. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, <i>Introduction to Data Mining, 2nd Edition</i>, Pearson, 2019 (reprint), ISBN: 978-0321321367.
	References Weblinks

Course Code: PAI4004	Course Title: Object Oriented Analysis and Design	L-T-P- C	2	0	0	2
	Type of Course: Integrated course					
Version No.		2.0				
Course Pre-requisites		--				
Anti-requisites		NIL				

Course Description		This course focuses on analyzing and designing software systems using object-oriented principles. It introduces requirement analysis, system modeling using UML diagrams, and design methodologies that help transform real-world problems into structured software solutions				
Course Objective		The objective of the course is to familiarize the learners with the principles and methodologies of Object-Oriented Analysis and Design (OOAD), enabling them to analyze software requirements, model software systems using UML, and design robust object-oriented solutions through Experiential Learning techniques.				
Course Outcomes		CO1: Understand object-oriented concepts and the software development process. CO2: Apply UML diagrams for system analysis and software modeling. CO3: Design software systems using object-oriented principles and design methodologies. CO4: Transform software requirements into structured object-oriented design models.				
Course Content:						
Module 1	Introduction to Object-Oriented Analysis and Design	Assignment				8 Sessions
	Topics: Object-oriented concepts, principles of object-oriented programming, Software Development Life Cycle (SDLC), need for Object-Oriented Analysis and Design, advantages of OOAD.					
Module 2	Object-Oriented Analysis	Assignment				8 Sessions
	Topics: Requirement gathering, functional and non-functional requirements, use case diagrams, actors, use case relationships, domain modeling, object identification.					
Module 3	UML Modeling	Assignment				7 Sessions
	Topics: Unified Modeling Language (UML), class diagrams, sequence diagrams, activity diagrams, state diagrams, interaction modeling, behavioral modeling.					
Module 4	Object-Oriented Design	Assignment				7 Sessions
	Topics: Object-oriented design principles, software architecture, design patterns basics, system design, design validation, transformation of analysis models into design models.					
	Targeted Application and Tools that can be used: ☐ StarUML ☐ Visual Paradigm ☐ Lucidchart ☐ Draw.io (diagrams.net) ☐ Enterprise Architect (Introduction)					
	Project work/Assignment:					
	Requirement analysis and object-oriented modeling of a real-world software system, preparation of UML diagrams including use case, class, sequence, activity, and state diagrams, application of object-oriented design principles and basic design patterns, and submission of a complete software design document with presentation..					

	Text Books 1. Grady Booch, James Rumbaugh, Ivar Jacobson, <i>The Unified Modeling Language User Guide</i>, 2nd Edition, Addison-Wesley, ISBN: 978-0321267979. 2. Michael Blaha, James Rumbaugh, <i>Object-Oriented Modeling and Design with UML</i>, 2nd Edition, Pearson, ISBN: 978-0130159205.
	References Weblinks

Course Code: PAI4005	Course Title: Ethics for the IT Professional Type of Course: Theory course	L- T- P- C	2	0	0	2
Version No.		2.0				
Course Pre-requisites		--				
Anti-requisites		NIL				
Course Description		This course introduces techniques for representing knowledge in AI systems. Topics include propositional logic, predicate logic, semantic networks, frames, and ontologies. Students will also learn inference mechanisms, rule-based reasoning, and reasoning under uncertainty. Practical sessions involve building simple expert systems.				
Course Objective		The objective of the course is to familiarize the learners with the concepts of Ethics for IT Professional and attain SKILL DEVELOPMENT through Experiential Learning techniques				
Course Outcomes		On successful completion of this course the students shall be able to: CO1: Understand ethical principles, professional values, and responsibilities in the field of Information Technology. CO2: Analyse legal, social, and cybersecurity issues related to computing technologies. CO3: Apply ethical decision-making models to resolve real-world professional and technological challenges. CO4: Evaluate the impact of information technology on individuals, organizations, and society.				
Course Content:		Introduction to IT Ethics: Ethics, morals, values, professional ethics, code of conduct, Legal and Social Issues: Cyber laws, intellectual property rights, privacy, data protection, Cyber Ethics and Security: Cybercrime, ethical hacking, digital rights, misuse of technology, Professional Responsibility: Workplace ethics, accountability, whistleblowing, case studies				

Module 1	Foundations of Ethics and Professional Conduct	Assignment		Introduces the fundamental concepts of ethics, professional values, and ethical responsibilities in Information Technology.	6 Sessions
	Topics: Introduction to Ethics, Morals and Values, Professional Ethics, Code of Professional Conduct, Ethical Decision-Making Models, Ethical Dilemmas in IT				
Module 2	Legal and Social Issues in Information Technology	Assignment		Examines legal frameworks and the social implications associated with the use of information technology.	6 Sessions
	Topics: Cyber Laws, Intellectual Property Rights, Copyrights, Patents, and Trademarks, Privacy and Data Protection, Digital Governance, Social Impact of Computing Technologies				
Module 3	Cyber Ethics and Information Security	Assignment		Focuses on ethical issues in cyberspace, cybersecurity threats, and responsible use of digital technologies.	6 Sessions
	Topics: Cyber Ethics, Cybercrime and Cyber Offences, Ethical Hacking, Digital Rights and Responsibilities, Misuse of Technology, Information Security Ethics				
Module 4	Professional Responsibility and Workplace Ethics	Assignment		Explores ethical responsibilities, accountability, and professionalism in organizational and workplace settings.	6 Sessions
	Topics: Professional Responsibility, Workplace Ethics, Accountability and Transparency, Whistleblowing, Conflict of Interest, Ethical Leadership in IT				
Module 5	Case Studies and Emerging Ethical Challenges	Assignment		Applies ethical principles to contemporary issues through case studies involving emerging technologies and professional practice.	6 Sessions
	Topics: Case Studies in IT Ethics, Artificial Intelligence and Ethical Issues, Ethics in Social Media and Digital Platforms, Responsible Use of Emerging Technologies, Sustainability and Technology, Future Trends in IT Ethics				

	Targeted Application and Tools that can be used: List of Laboratory Task
	Project work/Assignment:
	Project Assignment: NIL Assignment 1:
	Text Books 1. George Reynolds, <i>Ethics in Information Technology</i> , 6th Edition, Cengage Learning, ISBN: 978-1337405874. 2. Sara Baase, Timothy Henry, <i>A Gift of Fire: Social, Legal, and Ethical Issues for Computing Technology</i> , 5th Edition, Pearson, ISBN: 978-0134615271.
	References Weblinks W1. https://presiuniv.knimbus.com/user#/home W2.
	Topics relevant to development of “SKILL DEVELOPMENT”: Information retrieval of Search Engines Information Retrieval. for developing SKILL DEVELOPMENT through Experiential Learning techniques . This is attained through assessment component mentioned in course handout.

Course Code: PAI4006	Course Title: Research Design and Methods Type of Course: Theory course	L- T- P- C	2	0	0	2
Version No.	2.0					
Course Pre-requisites	--					
Anti-requisites	NIL					
Course Description	This course introduces the fundamentals of research methodology, focusing on problem identification, research design, data collection, analysis, and interpretation. It equips students with the skills required to conduct systematic research, write technical reports, and understand ethical considerations in research.					
Course Objective	The objective of the course is to familiarize the learners with the concepts of Research Design and Methods and attain SKILL DEVELOPMENT through Experiential Learning techniques					

Course Outcomes		On successful completion of this course, the students shall be able to: • C01: Understand basic concepts and types of research • C02: Formulate research problems and hypotheses • C03: Design appropriate research methodologies • C04: Analyze and interpret research data • C05: Prepare technical reports and research papers			
Course Content:		Introduction to Research: Research concepts, types of research, research process, Research Problem and Design: Problem formulation, hypothesis, research design types, Data Collection Methods: Primary and secondary data, surveys, sampling techniques, Data Analysis and Reporting: Data analysis techniques, interpretation, report writing, ethics			
Module 1	Introduction to Research	Assignment		Introduces the fundamentals of research, its significance, classifications, and the overall research process.	6 Sessions
	Topics: Introduction to Research, Objectives and Importance of Research, Types of Research, Characteristics of Scientific Research, Research Process, Research Paradigms				
Module 2	Research Problem and Research Design	Assignment		Focuses on identifying research problems, formulating hypotheses, and selecting suitable research designs.	6 Sessions
	Topics: Identification of Research Problems, Problem Statement Formulation, Research Questions, Hypothesis Formulation and Testing, Types of Research Design, Qualitative, Quantitative, and Mixed-Method Research				
Module 3	Data Collection Methods	Assignment		Explores various techniques for collecting reliable and valid research data.	6 Sessions
	Topics: Primary and Secondary Data, Data Collection Methods, Questionnaire and Survey Design, Interviews and Observation Techniques, Sampling Methods, Sampling Errors and Sample Size				
Module 4	Data Analysis and Interpretation	Assignment		Introduces techniques for analysing research data and interpreting results for meaningful conclusions.	6 Sessions
	Topics: Data Preparation and Cleaning, Descriptive Data Analysis, Introduction to Inferential Statistics, Data Interpretation, Presentation of Results, Drawing Conclusions				

Module 5	Research Reporting and Ethics	Assignment		Develops skills in technical writing while emphasizing ethical practices in conducting and publishing research.	6 Sessions
	Topics: Structure of Technical Reports, Research Paper Writing, Referencing and Citation Styles, Plagiarism and Academic Integrity, Research Ethics, Publication and Peer Review Process				
	Targeted Application and Tools that can be used: List of Laboratory Task				
	Project work/Assignment:				
	Project Assignment: NIL Assignment 1:				
	Text Books 1. C.R. Kothari, Gaurav Garg, <i>Research Methodology: Methods and Techniques</i>, 4th Edition, New Age International, ISBN: 978-9386649225. 2. John W. Creswell, J. David Creswell, <i>Research Design: Qualitative, Quantitative, and Mixed Methods Approaches</i>, 5th Edition, Sage Publications, ISBN: 978-1506386706				
	References Weblinks W1. https://presiuniv.knimbus.com/user#/home W2.				
	Topics relevant to development of “SKILL DEVELOPMENT”: Information retrieval of Search Engines Information Retrieval. for developing SKILL DEVELOPMENT through Experiential Learning techniques . This is attained through assessment component mentioned in course handout.				

Course Code: ENG1109	Course Title: Technical Communication Type of Course: Laboratory course	L-T-P-C	0	0	2	1
Version No.						
Course Pre-requisites	NIL					
Anti-requisites	NIL					

Course Description	The course is designed to develop students' ability to communicate technical information clearly and effectively in professional and interdisciplinary environments. Through hands-on laboratory activities, students gain practical experience in technical writing, visual communication, professional presentations, and workplace correspondence. The course also emphasizes the use of digital tools and collaborative platforms commonly used in modern workplaces. By engaging in practical exercises such as report writing, documentation, data visualization, presentations, and professional communication tasks, students enhance their ability to convey complex technical ideas to both technical and non-technical audiences.			
Course Objective	The course aims to develop practical technical communication skills among students by enabling them to apply the principles of clear, concise, and effective communication in professional contexts. It focuses on helping students produce structured technical documents such as reports, summaries, and instructional materials that meet professional and academic standards. The course also seeks to strengthen students' ability to present technical information visually and orally using appropriate tools and presentation techniques. Through practical exercises, students learn to communicate complex ideas in an organized and engaging manner for different audiences. In addition, the course aims to equip students with essential workplace communication skills, including professional email writing, meeting documentation, and collaborative communication practices. By the end of the course, students are expected to demonstrate improved competence in communicating technical information accurately, ethically, and effectively in professional environments.			
Course Outcomes	CO1: Explain the principles of effective technical communication such as clarity, conciseness, coherence, and audience awareness in professional contexts. CO2: Apply professional standards and conventions to prepare technical documents such as reports, summaries, documentation files, and instructional materials. CO3: Design and present technical information using appropriate visual, written, and digital tools to enhance clarity and impact. CO4: Demonstrate effective oral communication skills by presenting, explaining, and discussing technical ideas confidently for diverse audiences. CO5: Exhibit professional and ethical workplace communication skills through collaboration, documentation, digital communication, and audience-sensitive practices.			
Course Content:				
Module 1	Foundations of Technical Communication	Practice	Rewrite unclear technical text, peer review exercises	6 Sessions

• Introduction to technical communication in professional environments • Understanding the communication process • Principles of effective technical writing (clarity, conciseness, correctness, coherence, consistency) • Audience analysis and purpose in communication • Ethical considerations and intellectual property in technical documentation Practical Tasks • Editing and rewriting unclear technical text • Peer review of technical writing samples • Short documentation exercise • Audience analysis activity: Rewrite a technical explanation for two different audiences (technical vs non-technical). • Technical terminology exercise: Create a glossary of key technical terms related to a given topic.				
Module 2	Technical Writing Practice	Practice	Write report, README file, executive summary	6 Sessions
• Structure of technical reports • Writing executive summaries and abstracts • Preparing documentation and README files • Writing instructions and process descriptions • Grammar and style essentials for technical writers Practical Tasks • Write a short technical report • Prepare a README documentation file • Write an executive summary of a project • Write a step-by-step user manual or instruction guide for a simple tool or software. • Edit and improve a poorly written technical document by correcting grammar, clarity, and structure.				
Module 3	Visual Communication and Data Presentation	Practice	Create infographic, dashboard, data visualization	6 Sessions

- Principles of visual design in technical documents - Creating charts, graphs, and tables - Designing infographics for complex information - Basics of data visualization tools Practical Tasks - Create charts and graphs from sample datasets - Design an infographic explaining a technical concept - Develop a simple data visualization dashboard - Convert a text-heavy report section into visual representation (charts, diagrams, or flowcharts). - Create a process flow diagram or system architecture diagram for a technical process.				
Module 4	Presentations and Oral Communication	Demonstration	Deliver presentation, pitch deck, recorded demo	6 Sessions
- Structuring technical presentations - Slide design principles - Presenting technical ideas to different audiences - Managing Q&A sessions and discussions - Non-verbal communication and presentation etiquette Practical Tasks - Prepare and deliver a technical presentation - Create a pitch deck for a project idea - Record a short demonstration presentation - Deliver a 3-minute technical concept explanation (micro-presentation). - Participate in a simulated Q&A session or panel discussion on a technical topic.				
Module 5	Workplace Communication and Professional Development	Practice	Email writing, Agile documentation, LinkedIn profile	6 Sessions
- Introduction to workplace communication in professional and technical environments - Professional email writing and digital communication etiquette - Writing meeting agendas, minutes, and brief reports - Basics of proposal writing and project communication - Professional networking and online communication platforms Practical Tasks - Professional Email Writing: Draft formal and Semi-formal emails for workplace situations such as project updates, requests, and follow-ups. - Meeting Documentation: Prepare a meeting agenda and record minutes for a simulated team meeting. - Short Project Proposal: Write a brief proposal outlining a technical idea or project plan. - Professional Profile Creation: Create or improve a professional LinkedIn profile highlighting academic and technical skills. - Technical Blog / Professional Post: Write a short technical blog or professional social media post explaining a technical concept for a general audience.				

Targeted Application and Tools that can be used: Google Docs, MS Word, Overleaf, GitHub (README, Wikis), Tableau Public, Matplotlib / Seaborn, Canva / Adobe Express, PowerPoint, Canva, Prezi, Zoom, MS Teams, Loom, ChatGPT, Claude, Grammarly, Hemingway	
Project Work/ Assignment: NIL	
Text Book(s): 1. Markel, M. H. and Selber, S. A. Technical Communication (13th ed.) Bedford/St. Martin's, 2022 2. Lannon, J. M. and Gurak, L. J. Technical Communication (15th ed.) Pearson, 2023 3. Raman, M. and Sharma, S. Technical Communication: Principles and Practice Oxford University Press, 2015	
Reference Book (s): - Anderson, P. V. Technical Communication: A Reader-Centred Approach, Cengage Learning, 2017 - Mike, L. The Elements of Technical Writing Longman, 2016 - Alley, M. The Craft of Scientific Presentations, Springer, 2013 - Doumont, J. L. Trees, Maps and Theorems, Principiae, 2009 - Every, D. Technical Writing for Engineers and Scientists, CRC Press, 2020	
Tools and Software: - Word Processing and Academic Writing: Microsoft Word, Google Docs, Overleaf (LaTeX for technical papers) - Presentation Tools: Microsoft PowerPoint, Google Slides, Canva, Prezi - Visual Communication: Canva, Adobe Express, Piktochart, Tableau Public, Matplotlib (Python) - Grammar and Style Assistance: Grammarly, Hemingway Editor, QuillBot - Documentation Platforms: Confluence, Notion, GitHub (README, Wikis) - AI Writing Assistants (Critical Use): ChatGPT, Claude — evaluated for accuracy, bias, and ethical use - Reference and Citation: Zotero, Mendeley, APA/IEEE citation standards - Video and Oral Presentation: Loom (async video), Zoom, Teams (virtual presentation practice)	
Topics relevant to “SKILL DEVELOPMENT”: professional, academic, and networking and online professional identity (Linkedin).	
Catalogue prepared by	Dr. T. Naresh Naidu, Assistant Professor
Recommended by the Board of Studies on	
Date of Approval by the Academic Council	

Course Descriptions-Semester II

Course Code: PAI4500	Course Title: AI and Applications Type of Course:Theory Course		L- T- P- C	2	0	0	2
Version No.		2.0					
Course Pre-requisites		--					
Anti-requisites		NIL					
Course Description		This course provides an in-depth understanding of artificial intelligence concepts and their real-world applications. It covers core AI techniques such as search, knowledge representation, machine learning, and deep learning, along with applications in domains like healthcare, natural language processing, computer vision, and robotics. The course emphasizes hands-on implementation using modern AI tools and frameworks.					
Course Objective		The objective of the course is to familiarize the learners with the concepts of AI and Applications and attain SKILL DEVELOPMENT through Experiential Learning techniques					
Course Outcomes		On successful completion of this course the students shall be able to: ● C01: Understand fundamental concepts and techniques of artificial intelligence ● C02: Apply machine learning algorithms to solve real-world problems ● C03: Analyze AI models in domains like NLP, computer vision, and robotics ● C04: Develop AI-based applications using modern frameworks ● C05: Evaluate ethical and societal impacts of AI					
Course Content:		Introduction to Artificial Intelligence: AI concepts, history, intelligent agents, problem-solving approaches, Search and Knowledge Representation: Uninformed and informed search, heuristic search, knowledge representation, reasoning, Machine Learning: Supervised and unsupervised learning, regression, classification, clustering, Deep Learning Neural networks, CNN, RNN, basics of deep learning frameworks, AI Applications: Natural language processing, computer vision, robotics, healthcare applications, Ethics and Future of AI: AI ethics, bias, privacy, societal impact, future trends					
Module 1	Introduction to Artificial Intelligence	Assignment		Introduces the fundamental concepts, evolution, and problem-solving capabilities of Artificial Intelligence.		6 Sessions	
	Topics: Introduction to Artificial Intelligence, History and Evolution of AI, Characteristics and Applications of AI, Intelligent Agents, Types of Intelligent Agents, Problem-Solving Approaches in AI						

Module 2	Search Techniques and Knowledge Representation	Assignment		Focuses on search strategies and techniques for representing and reasoning with knowledge in intelligent systems.	6 Sessions
	Topics: State Space Representation, Uninformed Search Techniques, Informed Search Techniques, Heuristic Search, Knowledge Representation, Logical Reasoning and Inference				
Module 3	Machine Learning Fundamentals	Assignment		Introduces the core machine learning paradigms and their role in developing intelligent systems.	6 Sessions
	Topics: Introduction to Machine Learning, Supervised Learning, Unsupervised Learning, Regression, Classification, Clustering				
Module 4	Deep Learning	Assignment		Explores the fundamentals of deep learning architectures and widely used neural network models.	6 Sessions
	Topics: Introduction to Deep Learning, Artificial Neural Networks, Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN), Training Deep Learning Models, Overview of Deep Learning Frameworks				
Module 5	AI Applications, Ethics, and Future Trends	Assignment		Examines practical applications of AI along with ethical considerations and emerging developments in the field.	6 Sessions
	Topics: Natural Language Processing, Computer Vision, Robotics and Healthcare Applications, AI Ethics and Bias, Privacy and Societal Impact, Future Trends in Artificial Intelligence				
	Targeted Application and Tools that can be used:				
	List of Laboratory Task				
	Project work/Assignment:				
	Project Assignment: NIL				
	Assignment 1:				
	Text Books				

	References Weblinks W1. https://presiuniv.knimbus.com/user#/home W2.
	Topics relevant to development of “SKILL DEVELOPMENT”: Information retrieval of Search Engines Information Retrieval. for developing SKILL DEVELOPMENT through Experiential Learning techniques . This is attained through assessment component mentioned in course handout.

Course Code: PAI4501	Course Title: Emerging Topics in Computing		L-T-P-C	3	0	2	4
Version No.		2.0					
Course Pre-requisites		--					
Anti-requisites		NIL					
Course Description		This course introduces recent advancements and emerging trends in computing technologies. It covers cutting-edge areas such as artificial intelligence, cloud computing, Internet of Things (IoT), blockchain, quantum computing, and cybersecurity trends. The course aims to expose students to innovative technologies and their real-world applications.					
Course Objective		The objective of the course is to familiarize the learners with the concepts of Emerging Topics in Computing and attain SKILL DEVELOPMENT through Experiential Learning techniques					
Course Outcomes		On successful completion of this course the students shall be able to: • C01: Understand key emerging technologies in computing • C02: Analyze applications of modern computing trends • C03: Evaluate challenges and opportunities in new technologies • C04: Explore research directions and future developments					
Course Content:		Artificial Intelligence and Machine Learning: Basics of AI, machine learning concepts, applications, Cloud Computing and Edge Computing: Cloud models, services, edge computing concepts, Internet of Things (IoT): IoT architecture, sensors, applications, Blockchain and Cybersecurity Trends: Blockchain basics, cryptocurrencies, security challenges, future trends					
Module 1	Foundations of Artificial Intelligence and Machine Learning	Assignment		Introduces the fundamental concepts of Artificial Intelligence, Machine Learning, and their significance in modern computing.		12 Sessions	

	Topics: Introduction to Artificial Intelligence, History and Evolution of AI, Types and Applications of AI, Introduction to Machine Learning, Machine Learning Workflow, Types of Machine Learning, Supervised Learning, Unsupervised Learning, Reinforcement Learning, AI and ML Applications, Challenges in AI and ML, Case Studies				
Module 2	Cloud Computing and Edge Computing	Assignment		Explores cloud computing architectures, deployment models, service models, and the role of edge computing in distributed applications.	12 Sessions
	Topics: Introduction to Cloud Computing, Characteristics of Cloud Computing, Cloud Deployment Models, Cloud Service Models (IaaS, PaaS, SaaS), Cloud Virtualization, Cloud Storage, Introduction to Edge Computing, Edge Computing Architecture, Cloud vs Edge Computing, Edge AI, Applications of Edge Computing, Challenges and Future Directions				
Module 3	Internet of Things (IoT)	Assignment		Introduces IoT architecture, enabling technologies, communication protocols, and real-world applications.	12 Sessions
	Topics: Introduction to IoT, IoT Architecture, IoT Components, Sensors and Actuators, IoT Communication Protocols, IoT Networking, IoT Data Management, Smart Devices, Smart Homes and Smart Cities, Industrial IoT, Healthcare IoT, Challenges in IoT				
Module 4	Blockchain Technologies	Assignment		Provides an overview of blockchain technology, distributed ledgers, cryptocurrencies, and smart contracts.	12 Sessions
	Topics: Introduction to Blockchain, Distributed Ledger Technology, Blockchain Architecture, Consensus Mechanisms, Cryptography in Blockchain, Cryptocurrencies, Bitcoin and Ethereum, Smart Contracts, Blockchain Applications, Blockchain in Supply Chain, Blockchain Challenges, Emerging Blockchain Trends				
Module 5	Cybersecurity and Emerging Technology Trends	Assignment		Examines cybersecurity challenges, security mechanisms, and emerging technological trends shaping the future of computing.	12 Sessions
	Topics: Fundamentals of Cybersecurity, Common Cyber Threats and Attacks, Network Security, Data Privacy and Protection, Security Challenges in AI, Cloud, IoT, and Blockchain, Risk Management, Ethical and Legal Issues, Zero Trust Security, AI for Cybersecurity, Emerging Computing Technologies, Future Trends in Digital Technologies, Industry Case Studies				

	Targeted Application and Tools that can be used: Application Areas: Artificial Intelligence, Machine Learning, Cloud Computing, Edge Computing, Internet of Things (IoT), Smart Devices, Blockchain Applications, Smart Contracts, Cybersecurity, Network Security, Threat Detection, Data Analytics Professionally Used Software/Tools: Anaconda Navigator, Python, Jupyter Notebook, Google Colab, Scikit-learn, TensorFlow, Weka, Docker, Cisco Packet Tracer, ThingSpeak, MQTT Explorer, Google Cloud Platform (GCP), Amazon Web Services (AWS), Microsoft Azure, Ganache, Remix IDE, MetaMask, Wireshark, Nmap List of Laboratory Task Experiment No. 1: Introduction to Artificial Intelligence and Machine Learning Workflow using Python Experiment No. 2: Implementation of Supervised Machine Learning Algorithms for Classification Experiment No. 3: Implementation of Unsupervised Machine Learning using K-Means Clustering Experiment No. 4: Cloud Computing Services and Virtual Machine Deployment Experiment No. 5: Application Virtualization using Docker Containers Experiment No. 6: IoT Sensor Data Acquisition and Cloud-Based Monitoring Experiment No. 7: IoT Communication using MQTT Protocol Experiment No. 8: Development and Deployment of Smart Contracts using Solidity Experiment No. 9: Blockchain Transaction and Distributed Ledger Simulation Experiment No. 10: Network Traffic Analysis using Wireshark Experiment No. 11: Network Vulnerability Assessment using Nmap Experiment No. 12: AI-Based Cybersecurity Threat Detection using Machine Learning
	Project work/Assignment:
	Project Assignment: NIL Assignment 1:
	Text Books 1. Rajkumar Buyya, James Broberg, Andrzej Goscinski, <i>Cloud Computing: Principles and Paradigms</i>, Wiley, ISBN: 978-0470887998. 2. Arshdeep Bahga, Vijay Madisetti, <i>Internet of Things: A Hands-On Approach</i>, Universities Press, ISBN: 978-8173719547.
	References Weblinks W1. https://presiuniv.knimbus.com/user#/home W2.

	Topics relevant to development of “SKILL DEVELOPMENT”: Information retrieval of Search Engines Information Retrieval. for developing SKILL DEVELOPMENT through Experiential Learning techniques . This is attained through assessment component mentioned in course handout.
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Course Code: PAI5000	Course Title: Intelligent Systems Type of Course: Integrated Course	L- T- P- C	3	0	2	4
Version No.		2.0				
Course Pre-requisites		--				
Anti-requisites		NIL				
Course Description		This course introduces the concepts and techniques used to build intelligent systems capable of decision-making, learning, and problem-solving. It covers knowledge-based systems, machine learning, fuzzy logic, neural networks, and evolutionary algorithms, along with real-world applications in various domains.				
Course Objective		The objective of the course is to familiarize the learners with the concepts of Intelligent Systems and attain SKILL DEVELOPMENT through Experiential Learning techniques				
Course Outcomes		On successful completion of this course the students shall be able to: • C01: Understand the fundamentals of intelligent systems and AI techniques • C02: Apply machine learning and reasoning methods to solve problems • C03: Analyze fuzzy logic, neural networks, and evolutionary algorithms • C04: Design intelligent systems for real-world applications • C05: Evaluate performance and limitations of intelligent systems				
Course Content:		Introduction to Intelligent Systems: Intelligent agents, characteristics, applications, problem-solving approaches, Knowledge Representation and Reasoning: Logic, inference, rule-based systems, expert systems, Machine Learning Techniques: Supervised, unsupervised learning, classification, clustering, Neural Networks: Artificial neural networks, learning algorithms, basic architectures, Fuzzy Logic and Evolutionary Computing: Fuzzy sets, fuzzy inference systems, genetic algorithms, Applications of Intelligent Systems: Case studies in healthcare, robotics, business intelligence				
Module 1	Introduction to Intelligent Systems	Assignment		Introduces the fundamental concepts, characteristics, architectures, and applications of intelligent systems, along with problem-solving approaches used in artificial intelligence.	6 Sessions	

	Topics: Introduction to Intelligent Systems Characteristics of Intelligent Systems Types of Intelligent Agents, Agent Architectures, Rational Agents, Environment Representation, Problem Formulation, State Space Representation, Problem-Solving Approaches, Search Strategies Overview, Applications of Intelligent Systems, Case Studies				
Module 2	Knowledge Representation and Reasoning	Assignment		Focuses on techniques for representing knowledge and performing logical reasoning in intelligent systems.	6 Sessions
	Topics: Introduction to Knowledge Representation, Knowledge Representation Techniques, Propositional Logic, Predicate Logic, Inference Mechanisms, Forward Chaining, Backward Chaining, Rule-Based Systems, Expert Systems, Knowledge Acquisition, Reasoning under Uncertainty, Applications of Knowledge-Based Systems				
Module 3	Machine Learning Techniques	Assignment		Introduces the fundamental machine learning paradigms and their applications in intelligent systems.	6 Sessions
	Topics: Introduction to Machine Learning, Machine Learning Workflow, Types of Machine Learning, Supervised Learning, Unsupervised Learning, Classification Techniques, Clustering Techniques, Model Training and Testing, Performance Evaluation, Feature Selection, Applications of Machine Learning, Case Studies				
Module 4	Neural Networks	Assignment		Explores the principles of artificial neural networks, learning algorithms, and basic neural network architectures.	6 Sessions
	Topics: Introduction to Artificial Neural Networks, Biological Inspiration, Artificial Neuron Model, Network Architectures, Activation Functions, Learning Paradigms, Perceptron Learning Algorithm, Feedforward Neural Networks, Multilayer Neural Networks, Backpropagation Algorithm, Performance Evaluation, Applications of Neural Networks				
Module 5	Fuzzy Logic, Evolutionary Computing, and Applications	Assignment		Introduces soft computing techniques including fuzzy logic and evolutionary computing, followed by their applications in intelligent systems.	6 Sessions
	Topics: Introduction to Fuzzy Logic, Fuzzy Sets and Membership Functions, Fuzzy Inference Systems, Applications of Fuzzy Logic, Introduction to Evolutionary Computing, Genetic Algorithms, Selection, Crossover, and Mutation, Optimisation using Genetic Algorithms, Intelligent Systems in Healthcare, Intelligent Robotics, Business Intelligence Applications, Emerging Trends in Intelligent Systems				

	Targeted Application and Tools that can be used: Application Areas: Intelligent Systems, Intelligent Agents, Knowledge-Based Systems, Expert Systems, Machine Learning, Pattern Recognition, Decision Support Systems, Neural Networks, Fuzzy Logic Systems, Evolutionary Computing, Intelligent Robotics, Business Intelligence Professionally Used Software/Tools: Anaconda Navigator, Python, Jupyter Notebook, Google Colab, Scikit-learn, TensorFlow/Keras, NumPy, Pandas, Matplotlib, NetworkX, CLIPS, Prolog (SWI-Prolog), scikit-fuzzy, DEAP (Distributed Evolutionary Algorithms in Python) List of Laboratory Task Experiment No. 1: Implementation of State Space Representation and Search Strategies for Problem Solving Experiment No. 2: Development of an Intelligent Agent for Goal-Based Decision Making Experiment No. 3: Implementation of Knowledge Representation using Propositional and Predicate Logic Experiment No. 4: Design of a Rule-Based Expert System using Forward and Backward Chaining Experiment No. 5: Implementation of Supervised Machine Learning Algorithms for Classification Experiment No. 6: Implementation of Unsupervised Machine Learning using Clustering Techniques Experiment No. 7: Performance Evaluation of Machine Learning Models using Feature Selection Techniques Experiment No. 8: Implementation of Perceptron Learning Algorithm Experiment No. 9: Design and Training of a Multilayer Feedforward Neural Network using Backpropagation Experiment No. 10: Design of a Fuzzy Inference System for Decision Making Experiment No. 11: Implementation of Genetic Algorithm for Optimisation Problems Experiment No. 12: Development of an Intelligent System Application using Machine Learning, Fuzzy Logic, or Neural Networks
	Project work/Assignment:
	Project Assignment: NIL Assignment 1:
	Text Books 1. Stuart Russell, Peter Norvig, <i>Artificial Intelligence: A Modern Approach</i>, 4th Edition, Pearson, ISBN: 978-0134610993. 2. Simon Haykin, <i>Neural Networks and Learning Machines</i>, 3rd Edition, Pearson, ISBN: 978-0131471399.

	References Weblinks W1. https://presiuniv.knimbus.com/user#/home W2.
	Topics relevant to development of “SKILL DEVELOPMENT”: Information retrieval of Search Engines Information Retrieval. for developing SKILL DEVELOPMENT through Experiential Learning techniques . This is attained through assessment component mentioned in course handout.

Course Code: PAI5001	Course Title: Mobile Networks and Smartphone Applications Type of Course: Integrated Course	L- T- P- C	3	0	2	4
Version No.		2.0				
Course Pre-requisites		--				
Anti-requisites		NIL				
Course Description		The course provides a comprehensive understanding of mobile communication systems and smartphone application development. It covers the evolution of mobile networks, cellular architecture, wireless protocols, and modern technologies such as 4G and 5G. The course also introduces mobile operating systems, particularly Android, and guides students in designing and developing smartphone applications. Additionally, it addresses mobile security, performance challenges, and emerging trends like mobile cloud computing and IoT integration, enabling students to build efficient and secure mobile applications.				
Course Objective		The objective of the course is to familiarize the learners with the concepts of Mobile Networks and Smartphone Applications and attain SKILL DEVELOPMENT through Experiential Learning techniques				
Course Outcomes		On successful completion of this course the students shall be able to: ● C01: Understand fundamentals of mobile communication and wireless networks ● C02: Analyze cellular network architecture and protocols ● C03: Understand mobile operating systems and application frameworks ● C04: Develop smartphone applications using modern tools ● C05: Evaluate security and performance issues in mobile networks and apps				

Course Content:		Introduction to Mobile Networks: Evolution of mobile communication, wireless transmission basics, spectrum, multiple access techniques, Cellular Network Architecture: 2G, 3G, 4G, 5G architecture, GSM, LTE, handoff, mobility management, Mobile Network Protocols: TCP/IP in mobile networks, Mobile IP, routing, QoS in wireless networks, Mobile Operating Systems: Android architecture, iOS basics, components of mobile OS, application lifecycle, Smartphone Application Development: Android app development, UI design, activities, intents, storage, APIs, Security and Advanced Topics: Mobile security threats, encryption, authentication, mobile cloud computing, IoT integration			
Module 1	Fundamentals of Mobile Networks	Assignment		Introduces the evolution of mobile communication systems, wireless transmission principles, radio spectrum, and multiple access techniques used in modern mobile networks.	6 Sessions
	Topics: Introduction to Mobile Communication, Evolution of Mobile Networks, Wireless Communication Fundamentals, Radio Wave Propagation, Frequency Spectrum, Cellular Concept, Multiple Access Techniques, FDMA, TDMA, CDMA, OFDMA, Applications of Mobile Networks.				
Module 2	Cellular Network Architecture	Assignment		Provides an understanding of the architecture and operation of cellular networks from 2G to 5G, including mobility management.	6 Sessions
	Topics: Cellular Network Architecture, GSM Architecture, 2G Network Architecture, 3G Network Architecture, 4G LTE Architecture, 5G Network Architecture, Base Stations and Core Network, Handoff Mechanisms, Mobility Management, Location Management, Network Planning, Evolution towards Beyond 5G				
Module 3	Mobile Network Protocols	Assignment		Focuses on communication protocols, routing mechanisms, and quality of service in mobile networking environments.	6 Sessions
	Topics: TCP/IP in Mobile Networks, Mobile IP, IPv4 and IPv6 Mobility, Routing in Mobile Networks, Ad Hoc Routing Basics, Wireless Routing Protocols, Transport Layer Challenges, Congestion Control, Quality of Service (QoS), Resource Management, Performance Issues, Protocol Case Studies				
Module 4	Mobile Operating Systems and Smartphone Application Development	Assignment		Introduces mobile operating systems and the fundamentals of Android application development.	6 Sessions

	Topics: Introduction to Mobile Operating Systems, Android Architecture, Android Software Stack, iOS Architecture and Features, Android Application Components, Activity Lifecycle, Intents and Intent Filters, User Interface Design, Data Storage Techniques, Android APIs, Application Testing and Debugging, Application Deployment				
Module 5	Mobile Security and Emerging Technologies	Assignment		Explores security challenges in mobile environments and emerging technologies extending mobile computing capabilities.	6 Sessions
	Topics: Mobile Security Fundamentals, Mobile Security Threats, Authentication Mechanisms, Encryption Techniques, Secure Mobile Applications, Privacy Protection, Mobile Device Management, Mobile Cloud Computing, Internet of Things (IoT) Integration, Edge Computing in Mobile Networks, Emerging Trends in Mobile Computing, Case Studies				

	Targeted Application and Tools that can be used: Application Areas: Mobile Network Simulation, Cellular Network Analysis, Mobile Communication Protocols, Mobile Application Development, Android Programming, Mobile Security, Network Performance Analysis, Mobile Cloud Computing, IoT Integration, Edge Computing Professionally Used Software/Tools: Android Studio, Java/Kotlin, Android SDK, Genymotion/Android Emulator, Cisco Packet Tracer, Wireshark, NS-3, OMNeT++, Python, Google Colab, Firebase, SQLite, ADB (Android Debug Bridge) List of Laboratory Task Experiment No. 1: Study of Mobile Network Evolution and Cellular Communication Concepts using Network Simulation Experiment No. 2: Simulation of Multiple Access Techniques (FDMA, TDMA, CDMA, and OFDMA) Experiment No. 3: Simulation of Cellular Network Architecture and Handoff Mechanisms Experiment No. 4: Implementation of Mobile IP and Routing in Mobile Networks Experiment No. 5: Performance Analysis of TCP/IP Protocols and Quality of Service (QoS) in Mobile Networks Experiment No. 6: Development of a Simple Android Application using Android Studio Experiment No. 7: Design of Android Applications using Activities, Intents, and User Interface Components Experiment No. 8: Implementation of Data Storage Techniques in Android Applications using SQLite Experiment No. 9: Testing, Debugging, and Deployment of Android Applications Experiment No. 10: Implementation of Mobile Authentication and Encryption Techniques Experiment No. 11: Simulation of Mobile Cloud Computing and IoT Integration Experiment No. 12: Performance Analysis of Edge Computing in Mobile Networks
	Project work/Assignment:
	Project Assignment: NIL Assignment 1:
	Text Books 1. Jochen Schiller, <i>Mobile Communications</i>, 2nd Edition, Pearson, ISBN: 978-8131700334. 2. Bill Phillips, Chris Stewart, Kristin Marsicano, Brian Hardy, <i>Android Programming: The Big Nerd Ranch Guide</i>, 4th Edition, Addison-Wesley, ISBN: 978-0135245125.

	References Weblinks W1. https://presiuniv.knimbus.com/user#/home W2.
	Topics relevant to development of “SKILL DEVELOPMENT”: Information retrieval of Search Engines Information Retrieval. for developing SKILL DEVELOPMENT through Experiential Learning techniques . This is attained through assessment component mentioned in course handout.

5. Masters Project

Course Code: PAI7500	Course Title: Masters Project Type of Course: SC Skill based Courses	L- T- P- C	0	0	0	12
Version No.		2.0				
Course Pre-requisites		--				
Anti-requisites		NIL				
Course Description		The Masters Project is an extensive research or development-based work carried out by students under faculty supervision. It involves problem identification, literature survey, system design, implementation, testing, and documentation. The project aims to apply theoretical knowledge to solve real-world problems and develop innovative solutions.				
Course Objective		The objective of the course is to familiarize the learners with the concepts of Masters Project and attain SKILL DEVELOPMENT through Experiential Learning techniques				
Course Outcomes		On successful completion of this course the students shall be able to: ● C01: Identify and formulate a research or real-world problem ● C02: Conduct literature review and analyze existing solutions ● C03: Design and implement a solution using appropriate tools and techniques ● C04: Evaluate results and validate the proposed system ● C05: Prepare technical documentation and present the work effectively				