



PRESIDENCY UNIVERSITY

Private University Estd. in Karnataka State by Act No. 41 of 2013

SCHOOL OF ENGINEERING DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Ref: PU-SOE-CSE/2020-2021/BOS-11/CIR-01
2020

Date: 24-8-

11th BOS MEETING NOTICE

The 11th Board of Studies (BOS) meeting of Department of Computer Science and Engineering, SOE is convened on Friday, 4th September, 2020, at 02.30 p.m. online hosted from Presidency University Campus Itgalpur, Rajankunte, Yelahanka, Bengaluru.

You are hereby requested to attend the meeting.

Agenda:

SOE-CSE 11.1: To approve the minutes of 10th Board of Studies Meeting held on 17th January 2020.

SOE-CSE 11.2: To consider and approve the Program Regulations and Curriculum for B.Tech SOE-CSE

2020 Batches

1. Computer Science and Engineering (Cyber Security)
2. Computer Science and Engineering (Artificial Intelligence and Machine Learning)
3. Computer Science and Engineering (IOT)
4. Computer Science and Engineering (Block Chain)
5. Computer Science and Engineering (Data Science)
6. Computer Science and Technology
7. Computer Science and Technology (DevOps)
8. Computer Science and Technology (Big Data)
9. Computer Science and Technology (specialization in AI & ML)

SOE-CSE 11.3: To consider and approve the changes to B.Tech SOE-CSE 2019 Batch Program Regulations and Curriculum.

1. Computer Science and Engineering
2. Information Science and Engineering
3. Information Science and Technology
4. Computer Engineering
5. Electronics and Computer Engineering
6. Computer and Communication Engineering

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SOE-CSE 11.4.1: To consider and approve the changes to SOE-CSE 2018 Batch Program structure and

Curriculum.

1. Computer Science and Engineering
2. Information Science and Engineering
3. Information Science and Technology
4. Computer Engineering
5. Computer and Communication Engineering

SOE-CSE 11.4.2: To consider and approve the changes to SOE-CSE M.Tech 2019 batch program structure and curriculum

1. M.Tech in Artificial Intelligence
2. M.Tech in Data Science

SOE-CSE 11.5: To consider and approve the Program Regulations and Curriculum for **SOI-BCA** [Gaming and Graphics, AR/VR, General] - 2020 Batch

SOE-CSE 11.6: Approval of list of examiners.

SOE-CSE 11.7: Approval of NPTEL courses to be offered as Discipline/Open electives

SOE-CSE 11.8: Any other matter with the permission of the chair.

**Chairperson
BOS-CSE Committee**

Copy to:

- Pro-Chancellor, PU
- Registrar, PU
- Dean-SoE, PU
- Vice-Chancellor, PU
- Pro-Vice-chancellor, PU
- Dean-Academics, PU
- Members of the BOS-CSE Committee:

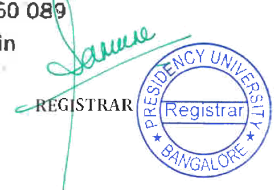
| | | | |
|---|----------------------------|----|---|
| 1 | Dr. C. Kalaiarasan | 10 | Dr. J. Andrews |
| 2 | Dr. T.K.Thivakaran | 11 | Dr. Blessed Prince |
| 3 | Dr. Satish Chandra Kulhari | 12 | Dr. A.Jayachandran |
| 4 | Dr. Smitha Rao | 13 | Dr. Nidhi Mishra |
| 5 | Dr. R Mahalakshmi | 14 | Mr. Tapas Guha |
| 6 | Dr. J Alamelu Mangai | 15 | Dr. H.S. Guruprasad, Prof., BMSCE |
| 7 | Dr. G.Shanmugarathinam | 16 | Dr. Rajanikanth, Former Principal, MSRIT |
| 8 | Dr. Ramesh V | 17 | Dr. Srinivas Vivek, Asst. Prof., CSE, IIITB |
| 9 | Dr. S.P.Anandaraj | 18 | Mr. Dipyaman Banerjee, Principal Data Scientist, Airtel India |

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SCHOOL OF ENGINEERING DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Ref: PU-SOE-CSE/2020-2021/BOS-11/MOM-01

Date: 04-9-2020

Minutes of the 11th Meeting of Board of Studies (Computer Science and Engineering - BOS - CSE)

The 11th meeting of Board of Studies (BOS) of the Computer Science and Engineering is held today on 4th September, 2020 at 02.30 PM, online.

The following members were present:

| S. No. | Name | Designation with Affiliation | Status |
|--------|-----------------------|--|----------|
| 1 | Dr. K.G. Mohan | Professor & Head, CSE, Presidency University | Chairman |
| 2 | Dr. C. Kalaiarasan | Associate Dean & Professor, CSE, Presidency University | Member |
| 3 | Dr. Smitha Rao | Professor, CSE, Presidency University | Member |
| 4 | Dr. T.K.Thivakaran | Professor, CSE, Presidency University | Member |
| 5 | Dr. Satish C Kulhari | Professor, CSE, Presidency University | Member |
| 6 | Dr. R Mahalakshmi | Associate Professor, CSE, PU | Member |
| 7 | Dr. J Alamelu Mangai | Associate Professor, CSE, Presidency University | Member |
| 8 | Dr.G.Shanmugarathinam | Associate Professor, CSE, Presidency University | Member |
| 9 | Dr. Ramesh V | Associate Professor, CSE, Presidency University | Member |
| 10 | Dr. S.P.Anandaraj | Associate Professor, CSE, Presidency University | Member |
| 11 | Dr. A.Jayachandran | Associate Professor, CSE, Presidency University | Member |
| 12 | Dr. Nidhi Mishra | Associate Professor, CSE, Presidency University | Member |

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| | | | |
|----|-----------------------|---|-----------------------------------|
| 13 | Dr. Blessed Prince | Associate Prof., CSE, Presidency University | Member |
| 14 | Dr. J. Andrews | Associate Prof., CSE, Presidency University | Member |
| 15 | Dr. H.S.Guruprasad | Professor & Head, BMSCE, Bangalore. | External Member (Academics) |
| 16 | Dr. K. Rajanikanth | Former Principal, M.S.R.I.T, Bangalore | Special Invitee/Co-opted Member |
| 17 | Dr. Srinivas Vivek | Assistant Professor, CSE, IIIT Bangalore | External Member (Academics) |
| 18 | Mr. Dipyaman Banerjee | Principal Data Scientist, Airtel India, Former Advisory Research Engineer at IBM Research Lab, IEEE Senior Member | External Member (Industry Expert) |
| 19 | Mr. Tapas Guha | Assistant Professor, CSE, Presidency University | Member Secretary |

The following members are given leave of absence:

| Sr. No. | Name | Designation | Status |
|---------|------|-------------|--------|
| | | NIL | |

The Chairman welcomed the Members and all the members were formally introduced to each other.

Agenda SOE-CSE 11.1: To approve the minutes of 10th Board of Studies Meeting held on 17th January 2020.

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The minutes of the 10th meeting of the Board of Studies of Computer Science and Engineering held on 17th January 2020 was placed before the members and the same was unanimously approved (**Annexure CSE 11.1**).

Agenda SOE-CSE 11.2: To consider and approve the Program Regulations and Curriculum for SOE-CSE 2020 Batch

1. Computer Science and Engineering (Cyber Security)
2. Computer Science and Engineering (Artificial Intelligence and Machine Learning)
3. Computer Science and Engineering (IOT)
4. Computer Science and Engineering (Block Chain)
5. Computer Science and Engineering (Data Science)
6. Computer Science and Technology
7. Computer Science and Technology (DevOps)
8. Computer Science and Technology (Big Data)
9. Computer Science and Technology [specialization in AI & ML]

The details of the program regulations and curriculum for the new 2020-2024 programs were presented before the members (**Annexure CSE 11.2**). The members discussed the same at length.

Resolution: Resolved that the program regulations and curriculum of the new programs 2020-2024 are approved with the following suggestions.

- Computer Science and Engineering (Cyber Security)
 - i. Practical components should be increased in the course Advanced Cryptography.
 - ii. The open elective courses should be more practical oriented.
- Computer Science and Engineering (IOT)
 - i. A course 'IOT for Smart Cities' may be designed and included in the curriculum.
 - ii. The Elective courses may be grouped into different baskets with relevant practical components.
- Computer Science and Engineering (Artificial Intelligence and Machine Learning)
 - i. For the courses from 3rd semester onwards, more practical components and credits should be included.

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- ii. In the course 'Database for AI', Graph databases should be covered.

Agenda SOE-CSE 11.3: To consider and approve the changes to SOE-CSE 2019 Batch Program Regulations and Curriculum.

1. Computer Science and Engineering
2. Information Science and Engineering
3. Information Science and Technology
4. Computer Engineering
5. Electronics and Computer Engineering
6. Computer and Communication Engineering

The members were presented with the following revised curriculum of the four B.Tech programs.

Change in Course

| Programs | Existing | | Revised | |
|-----------------------------|-------------------------------|-----------------------|---|------------------------|
| | Course name | Course code | Course name | Course code |
| CSE,ISE,IS T,COM, CCE | Data Structure Theory and Lab | CSE 201,CSE 251 | Data Structure and Algorithm Theory and Lab | CSE 221, CSE 259 |
| ISE,IST ,COM,CCE | Computer Organization | CSE 223 | Computer Architecture and Organization | CSE 223 |

Resolution: The proposed changes are accepted and approved.

Agenda SOE-CSE 11.4:

11.4.1: To consider and approve the changes to SOE-CSE 2018 Batch Program structure and Curriculum.

1. Computer Science and Engineering
2. Information Science and Engineering
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Introduction of course:

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A new course Optimization Techniques has been proposed for ISE and COM branches. The members were presented with the course descriptions and outline.

| | | | | | | |
|---------------------|-------------------------------|-------------------------|----------|----------|----------|----------|
| Course Name: | Optimization Technique | | | | | |
| Course Code: | CSE 226 | Credit Structure | L | T | P | C |
| | | : | 3 | 0 | 0 | 3 |

Course Description:

Optimization is one of the most important branch of modern applied mathematics. Optimization models attempt to express, in mathematical terms, the goal of solving a problem in the best way. Various problems arising in areas of engineering design, economic theory, physical, biological and technological sciences call for minimizing or maximizing functions. The objective of the course is to provide students with the value of optimization and mathematical modeling in real life. Basic techniques to formulate single and multi-objective real problem into a mathematical model. Various techniques to solve linear and nonlinear programming problem. Various techniques to solve transportation and assignment problems.

Reference Materials:

Text Book(s):

1. H.A.Taha, Operations Research: An Introduction, Pearson Education, 9th Ed., 2012.
2. Boyd and Vandenberghe: Convex Optimization, Cambridge University Press 2004.

Reference Books:

1. T. Hastie, R. Tibshirani and M. J. Wainwright, Statistical Learning with Sparsity: the Lasso and Generalizations, Chapman and Hall/CRC Press, 2015.
2. E. Hazan. Introduction to Online Convex Optimization.
3. S. Boyd and L. Vandenberghe, Convex Optimization, The Cambridge University Press, 2003.
4. D. Bertsekas, Nonlinear programming, Athena Scientific, 1999.
5. Y. Nesterov, Introductory lectures on convex optimization, Kluwer-Academic, 2003.
6. E. K. P. Chong and S. H. Zak, An Introduction to Optimization, 2nd Edn., Wiley India Pvt. Ltd., 2010.
7. S. Bubeck, Convex Optimization: Algorithms and Complexity, Foundations and Trends in Machine Learning, 8(3-4): 231-357, 2015.
8. S. Sra, S. Nowozin, and S. Wright, Optimization for Machine Learning, The MIT Press, 2011.

Resolution: The proposed inclusion is approved with the following suggestion.

- Keeping the credit structure as it is, some practical components may be included in the syllabus, which can be demonstrated in the theory lecture hour.

Change in Course title:

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| Programs | Existing Course title | Revised Title |
|---------------------|--|--|
| Core course for all | Introduction to Artificial Intelligence CSE 228 | Principles of Artificial Intelligence CSE 228 |

Resolution: The proposed change is accepted and approved.

Introduction of Elective courses:

The members were presented with the course descriptions and outline of the following newly proposed Discipline Elective courses.

| | | | | | | |
|---------------------|---------------------------|---------------------------|----------|----------|----------|----------|
| Course Name: | Data Visualization | | | | | |
| Course Code: | CSE 367 | Credit Structure : | L | T | P | C |
| | | | 1 | 0 | 4 | 3 |

Course Description:

This course provides an introduction to turning data into presentable graphics. Data Visualization is important today as the usage of data is growing in many different fields. Data visualization techniques help people to better understand this data. The goal of this course is to introduce students to data visualization including principles, techniques and algorithms for creating effective visualizations based on principles from graphic design, visual art, perceptual psychology, and cognitive science. Students will learn the value of visualization, specific techniques in data visualization, grammar of graphics and how to leverage visualization tools.

Reference Materials:

(i) Textbook(s)

1. Ward, Matthew O., Georges Grinstein, and Daniel Keim. Interactive data visualization: foundations, techniques, and applications. CRC Press, 2010.
2. Madhavan, Samir. Mastering Python for Data Science. Packt Publishing Ltd, 2015.

(ii) Reference Book(s)

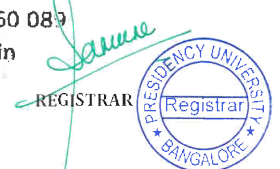
1. Wilkinson, Leland, The Grammar of Graphics, Springer-Verlag New York, 2015
2. Wilke, Claus O. Fundamentals of data visualization: a primer on making informative and compelling figures. O'Reilly Media, 2019.
3. Tamara Munzner, Visualization Analysis and Design (VAD), CRC press, 2014
4. Show Me the Numbers: Designing Tables and Graphs to Enlighten, Few, Stephen. 2nd Edition. Analytics Press.
5. Interactive Data Visualization for the Web by Scott Murray 2nd Edition (2017)
6. Andy Kirk, Data Visualization A Handbook for Data Driven Design, Sage Publications, 2016

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7. Philipp K. Janert, Gnuplot in Action, Understanding Data with Graphs, Manning Publications, 2010.
8. Semiology of Graphics by Jacques Bertin (2010)
9. Sosulski, K. (2018). Data Visualization Made Simple: Insights into Becoming Visual. New York: Routledge.
10. Christopher M. Bishop. 2006. Pattern Recognition and Machine Learning (Information Science and Statistics). Springer-Verlag, Berlin, Heidelberg.

| | | | | | | |
|---------------------|----------------------------|-------------------------|----------|----------|----------|----------|
| Course Name: | Distributed Systems | | | | | |
| Course Code: | CSE 368 | Credit Structure | L | T | P | C |
| | | : | 3 | 0 | 0 | 3 |

Course Description:

This course is designed to provide the knowledge of the concepts related to distributed system. The course is aimed at understanding the foundations of distributed systems. It also deals with Peer to peer services and to understand about the system level and support required for distributed system. Further, it focuses on Synchronization, Process and Resource Management. Students will also learn the overview of Distributed system. Topics include: Introduction to Distributed Systems, Communication in Distributed System, Peer to peer services and file system, Synchronization, Process and resource Management.

Reference Materials:

Text Book(s):

1. T1: George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012.

Reference Book(s):

1. R1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Ninth edition, Prentice Hall of India, 2007.
2. R2. Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Second Edition, Pearson Education, 2007.
3. R3. Liu M.L., "Distributed Computing, Principles and Applications", First Edition, Pearson Education, 2004.
4. R4. Nancy A Lynch, "Distributed Algorithms", Second Edition, Morgan Kaufman Publishers, USA, 2003.

| | | | | | | |
|---------------------|---------------------------------------|-------------------------|----------|----------|----------|----------|
| Course Name: | Introduction to Bioinformatics | | | | | |
| Course Code: | CSE 325 | Credit Structure | L | T | P | C |
| | | : | 3 | 0 | 0 | 3 |

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Course Description:

This course is designed to provide the knowledge of the concepts related to bioinformatics. The course is aimed at understanding the DNA and Protein sequences and databases. It also deals with Pairwise comparison and calculating the scoring matrix. Further, it focuses on Sequence Alignment techniques, discovering the Motifs in the sequence. Students will also learn the overview of Structural Bioinformatics and Genome sequencing.

Reference Materials:

Text Book(s):

1. Bioinformatics: Sequence and Genome Analysis, David W. Mount, Cold Spring Harbor Laboratory Press, 2004.
2. Introduction to Bioinformatics, Arthur Lesk, Fifth Edition, Oxford University Press, 2019

Reference Book(s):

1. Bioinformatics Methods and Applications, S. C. Rastogi, N.Mendiratta, P.Rastogi, Fourth Edition, Prentice Hall India.
2. Bioinformatics Algorithms- An Active Learning Approach, Phillip Compeau & Pavel Pevzner, 2nd Edition, Vol. I & II, Active Learning Publishers, 2015

Resolution: Resolved that the proposed elective courses are relevant with the current industry trend and should be offered to the students. The same is approved.

Change in offering semester

| Programs | Course title | Existing Semester | Proposed Semester |
|----------|--|-------------------|-------------------|
| COM,ISE | Machine Learning using Python CSE 261 | 6 | 5 |

Resolution: The proposed change in offering semester is approved.

Removal of Course

The existing course Principles of Programming Languages is removed from 5th semester CSE.

| | | | | | | |
|--------------|-------------------------------------|------------------|---|---|---|---|
| Course Name: | Principles of Programming Languages | | | | | |
| Course Code: | CSE 214 | Credit Structure | L | T | P | C |
| | | : | 3 | 0 | 0 | 3 |

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Course Description:

The Course covers features of programming languages and introduces different programming paradigms, and their semantics.

Topics include: Data types and Data Abstraction, Scope and Parameter passing and Concurrency related features. Various aspects of runtime environments like global and local data, code, function call stacks, dynamically allocated data, exceptions and threads, formal elements of lambda calculus, functional paradigm. Logic programming paradigm, Scripting as a paradigm. Domain specific languages.

Reference Materials:

Text Book(s):

Robert W. Sebesta, "Concepts of Programming Languages", The Benjamin Cummings Publishing Company, Inc.

Reference Book(s):

1. Ravi Sethi, "Programming Languages: Concepts and Constructs" Addison Wesley.
2. Aho, Lam, Sethi and Ullman, "Compilers Principles, Techniques, and Tools". Pearson Education.

Resolution: The proposed removal is accepted and approved.

11.4.2: To consider and approve the changes to SOE-CSE M.Tech 2019 batch program structure and curriculum

1. M.Tech In Artificial Intelligence
2. M.Tech In Data Science

Inclusion of two courses to the list of Discipline Electives of M.Tech-Artificial Intelligence program.

CSE 465 – Reinforcement Learning

CSE 466 – Natural Language Processing

The members were presented with the following course details.

| | | | | | | |
|---------------------|-------------------------------|-------------------------|----------|----------|----------|----------|
| Course Name: | Reinforcement Learning | | | | | |
| Course Code: | CSE 465 | Credit Structure | L | T | P | C |
| | | : | 3 | 0 | 0 | 3 |

Course Description:

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This course provides an introduction to Reinforcement Learning and Deep Reinforcement Learning - core challenges, approaches, generalization and exploration. Reinforcement Learning is a branch of machine learning that deals with how software agents take actions in an environment in order to maximize rewards.

Topics to include: Key features of Reinforcement Learning, exploration-exploitation trade-off, value based and policy based methods, bandit problems, Markov's Decision Process, Bellman Equations, dynamic programming, Deep reinforcement learning algorithms: Deep Q-Networks (DQN), Deep Deterministic Policy Gradients (DDPG), Monte Carlo methods, Function Approximation methods, Policy Gradients, criteria for analyzing and evaluating RL algorithms, implementation of common RL algorithms.

Text Books:

1. Reinforcement Learning: An Introduction, Sutton and Barto, 2nd Edition
2. Russell, S. and Norvig, N. Artificial Intelligence: A Modern Approach . Prentice Hall Series in Artificial Intelligence. 2003.

Reference Books:

1. Reinforcement Learning: State-of-the-Art, Marco Wiering and Martijn van Otterlo, Eds
2. Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press.

| | | | | | | |
|---------------------|------------------------------------|-------------------------|----------|----------|----------|----------|
| Course Name: | Natural Language Processing | | | | | |
| Course Code: | CSE 466 | Credit Structure | L | T | P | C |
| | | : | 3 | 0 | 0 | 3 |

Course Description:

This course covers a wide range of tasks, basic to advance, in Natural Language Processing. NLP deals with the study of computing systems that can process, understand, and communicate in human language. It addresses fundamental questions at the intersection of human languages and computer science. This course also provides an introduction to current techniques, strategies and toolkits for natural language processing.

Topics to include: Key features of NLP and text classification, basic text processing, syntax, semantics, pragmatics, parsing, language modelling, N-grams, tokenization, lemmatization, POS tagging, HMMs, Context free grammars, word and sequence embeddings, sequence tagging, sequence to sequence models, sentiment analysis, information extraction, dialogue systems, machine translation, implement NLP Toolkits

Textbook:

1. Daniel Jurafsky and James H. Martin. 2009. Speech and Language Processing: An Introduction to Natural Language Processing, Speech Recognition, and Computational Linguistics. 2nd edition. Prentice-Hall.
- 2.

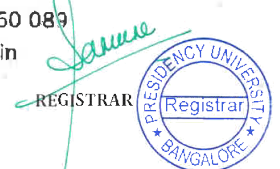
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1. Christopher D. Manning and Hinrich Schütze. 1999. Foundations of Statistical Natural Language Processing. MIT Press
2. Natural Language Processing by Jacob Eisenstein
3. Foundations of Statistical Natural Language Processing by Chris Manning and Hinrich Schuetze
4. Linguistics Fundamentals for NLP by Emily Bender

Resolution: The proposed inclusion of two new Discipline Elective courses is accepted and approved.

Agenda SOE-CSE 11.5: To consider and approve the Program Regulations and Curriculum for SOI-BCA [Gaming and Graphics, AR/VR, General] - 2020 Batch

The details of the program regulations and curriculum were presented before the members (**Annexure CSE 11.3**). The members discussed the same at length

Resolution: Resolved that the program regulations and curriculum of the new Three year B.C.A programs are approved unanimously.

Agenda SOE-CSE 11.6: Approval of list of examiners

List of examiners were presented before the committee.

Resolution: The same was unanimously approved (**Annexure CSE 11.4**).

Agenda SOE-CSE 11.7: Approval of NPTEL courses to be offered as Discipline/Open electives

The proposed list of MOOC courses was presented before the members and was approved. Courses from the same are going to be taken up by the students for credit transfer (**Annexure CSE 11.5**).

Agenda SOE-CSE 11.8: Any other matter with the permission of the Chair

11.8.1: To consider and approve the inclusion of Value Added Courses (VAC)

For all B.Tech 20-24 new programs, Value Added Course is introduced. A proposed list for the same is presented. The members approve the list of VACs (**Annexure CSE 11.6**).

11.6.2: To consider and approve the changes in Program structure and Curriculum for SOE-CSE 2018 Batch UTA students of CSE, ISE, IST and COM.

The members were presented with the modifications in curriculum for 2018-2022 SOE-CSE and allied branch students who have registered for the UTA program.

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Note: Students of SOE-CSE 2018 Batch registered for University of Texas, Arlington (UTA) program will complete 3 year of study at Presidency University earning a minimum of 159 credits and will study final year at University of Texas, Arlington, USA and earn a minimum of 21 credits which will be transferred to Presidency University for their B.Tech degree from Presidency University

Details of Summer Term courses

Following courses were offered in Summer Term 2020 for UTA registered students:

- **CSE:** PHY 204 (General Physics), CSE 394 (Circuits and Signals) and CSE 320 (Graphics Programming)
- **COM:** PHY 204 (General Physics), CSE 394 (Circuits and Signals) and CSE 290 (Digital Circuits)
- **ISE & IST:** PHY 204 (General Physics), CSE 394 (Circuits and Signals) and CSE209 (Graph Theory and Combinatorics)

Introduction of the course

Internet of Things (CSE 220) offered to all the UTA registered 2018 batch of students as Special Summer Term Course during Dec 20-Jan21.

Modification of course

- Microprocessors and Microcontrollers (CSE-206) & Microprocessors and Microcontrollers-Lab (CSE-254) will be combined and offered as a 3 credit Open Elective (Fundamentals of Microprocessors) to UTA registered COM students of 2018 batch during 6th semester.
- The syllabi of the courses Microprocessors and Microcontrollers and Operating Systems have to be modified as per UTA requirements.

Resolution: The modifications in curriculum were accepted and approved.

As BOS meetings for all the departments are taking place simultaneously in different venues today, the Chairman has requested approval from the committee to incorporate modifications / alterations, if any, approved by the BOS committee of other departments for the existing courses offered in Computer Science and Engineering by other departments. The BOS Committee for Computer Science and Engineering has approved the proposal unanimously. The BOS Committee authorizes the Chairperson of the BOS to formulate a sub-committee for making any minor modifications required in the program curriculum and seek the approval in the next meeting.

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The BOS Chairperson has conveyed that the decisions taken during the 11th meeting of BOS for Computer Science and Engineering will be implemented for 2020-2024, 2019-2023, and 2018-2022 as early as possible wherever applicable. He has conveyed thanks to all the members and informed that the date of next BOS meeting will be notified soon.

The meeting ended with Vote of Thanks to the Chair.

BOS Committee:

| S. No. | Name | Status | Signature |
|--------|-----------------------|-----------------|-------------|
| 1 | Dr. K.G. Mohan | Chairman | |
| 2 | Dr. C. Kalaiarasan | Internal Member | |
| 3 | Dr. Smitha Rao | Internal Member | |
| 4 | Dr. T.K.Thivakaran | Internal Member | |
| 5 | Dr. Satish C Kulhari | Internal Member | Not Present |
| 6 | Dr. R Mahalakshmi | Internal Member | |
| 7 | Dr. J Alamelu Mangai | Internal Member | |
| 8 | Dr.G.Shanmugarathinam | Internal Member | |
| 9 | Dr. Ramesh V | Internal Member | |
| 10 | Dr. S.P.Anandaraj | Internal Member | |

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| | | | |
|----|-----------------------|--------------------------------------|--|
| 11 | Dr. A.Jayachandran | Internal Member | |
| 12 | Dr. Nidhi Mishra | Internal Member | |
| 13 | Dr. Blessed Prince | Internal Member | |
| 14 | Dr. J. Andrews | Internal Member | |
| 15 | Dr. H.S.Guruprasad | External Member (Academics) | |
| 16 | Dr. K. Rajanikanth | Special Invitee/Co-opted Member | |
| 17 | Dr. Srinivas Vivek | External Member (Academics) | |
| 18 | Mr. Dipyaman Banerjee | External Member (Industry Expert) | |
| 19 | Mr. Tapas Guha | Member Secretary | |

Annexure CSE 11.1

10TH BOS MEETING

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| | | | | | | | | |
|--------------|--------|------------------------|----|-----------|----------|----------|-----------|-----------|
| 3 | DE3 | Discipline Elective 3/ | DE | 3 | 0 | 0 | 3 | 3 |
| 4 | DE4 | Discipline Elective 4 | DE | 3 | 0 | 0 | 3 | 3 |
| 5 | OE2 | Open Elective 2* | OE | 3 | 0 | 0 | 3 | 3 |
| 6 | BCA315 | Dissertation | | 3 | 0 | 0 | 3 | 3 |
| Total | | | | 16 | 0 | 6 | 19 | 22 |

*Students may opt any 2 Discipline Electives from the given specialization list.

| | |
|------------------------------|--|
| Discipline Elective 1 | Programming in Java |
| | Human Computer Interaction |
| | Game Testing and Analysis |
| | Video streaming and AR technologies |
| | Machine Vision |
| Discipline Elective 2 | Social media Marketing/ |
| | UI/UX Design |
| | Intellectual property, Ethics and Legal Issues |

ANNEXURE CSE 11.5.2

BCA 20-24 Gaming and Graphics

SUGGESTED SEMESTER-WISE COURSES

I Semester

| SL.No | COURSE CODE | COURSE NAME | TYPE | CREDIT STRUCTURE | | | | CONTACT HOURS |
|-------|-------------|-------------------------|------|------------------|---|---|---|---------------|
| | | | | L | T | P | C | |
| 1 | MAT 110 | Applied Mathematics | Core | 3 | 1 | 0 | 4 | 4 |
| 2 | BCA 101 | Problem Solving using C | Core | 2 | 0 | 4 | 4 | 6 |

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| | | | | | | | | |
|--------------|---------|---|------|-----------|----------|----------|-----------|-----------|
| 3 | BCA 102 | Digital electronics | Core | 3 | 0 | 0 | 3 | 3 |
| 4 | BCA251 | Digital electronics Lab | Core | 0 | 0 | 2 | 1 | 2 |
| 5 | ENG105 | Essentials of English | AECC | 2 | 0 | 0 | 2 | 2 |
| 6 | LNG106 | Communicative English-1 | AECC | 2 | 0 | 0 | 2 | 2 |
| 7 | KAN 101 | Kannada Kali | F | 1 | 0 | 0 | 1 | 1 |
| 8 | PPD111 | Personal and Professional Development-1 | VAC | 0 | 0 | 2 | - | 2 |
| 9 | EVS107 | Environmental Studies | AECC | 2 | 0 | 0 | 2 | 2 |
| Total | | | | 15 | 1 | 8 | 19 | 24 |

LTPC refers to Lecture, Tutorial, Practical, and Credits

II Semester

| SL.No | COURSE CODE | COURSE NAME | TYPE | CREDIT STRUCTURE | | | | CONTACT HOURS |
|--------------|-------------|---|------|------------------|----------|-----------|-----------|---------------|
| | | | | L | T | P | C | |
| 1 | BCA255 | Preproduction Techniques for Games | Core | 0 | 0 | 4 | 2 | 4 |
| 2 | MAT111 | Statistical Methods and Techniques | Core | 3 | 0 | 0 | 3 | 3 |
| 3 | BCA 105 | Data Structures | Core | 3 | 0 | 0 | 3 | 3 |
| 4 | BCA 252 | Data Structures Lab | Core | 0 | 0 | 4 | 2 | 4 |
| 5 | BCA 106 | Computer Organization | Core | 3 | 0 | 0 | 3 | 4 |
| 6 | BCA107 | Programming in Python | Core | 1 | 0 | 4 | 3 | 5 |
| 7 | ENG207 | Technical Written Communication | AECC | 2 | 0 | 0 | 2 | 2 |
| 8 | LNG206 | Communicative English-2 | AECC | 2 | 0 | 0 | 2 | 2 |
| 9 | PPD112 | Personal and Professional Development-2 | VAC | 0 | 0 | 2 | - | 2 |
| Total | | | | 14 | 0 | 14 | 20 | 29 |

III Semester

| SL.No | COURSE CODE | COURSE NAME | TYPE | CREDIT STRUCTURE | | | | CONTACT HOURS |
|-------|-------------|------------------------------|------|------------------|---|---|---|---------------|
| | | | | L | T | P | C | |
| 1 | BCA219 | Introduction to 3D Animation | Core | 3 | 0 | 0 | 3 | 3 |
| 2 | BCA 203 | Database Management Systems | Core | 3 | 0 | 0 | 3 | 3 |

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| | | | | | | | | |
|--------------|---------|---|------|-----------|----------|-----------|-----------|-----------|
| 3 | BCA 204 | Operating System | Core | 3 | 0 | 0 | 3 | 3 |
| 4 | BCA220 | Introduction to Immersive Technologies | Core | 3 | 0 | 0 | 3 | 3 |
| 5 | BCA 205 | Database Management Systems Lab | Core | 0 | 0 | 4 | 2 | 4 |
| 6 | BCA254 | 3D Modelling Lab | Core | 0 | 0 | 4 | 2 | 4 |
| 7 | BCA 257 | Computer Graphics and Multimedia Lab | Core | 2 | 0 | 2 | 3 | 4 |
| 8 | SIC 501 | Social Immersion course | | - | - | - | 1 | 0 |
| 9 | PPD131 | Personal and Professional Development-3 | SEC | 0 | 0 | 2 | - | 2 |
| Total | | | | 15 | 0 | 12 | 20 | 26 |

IV Semester

| SL.No | COURSE CODE | COURSE NAME | TYPE | CREDIT STRUCTURE | | | | CONTACT HOURS |
|--------------|-------------|---|------|------------------|----------|-----------|-----------|---------------|
| | | | | L | T | P | C | |
| 1 | BCA264 | Introduction to Game Design | Core | 3 | 0 | 0 | 3 | 3 |
| 2 | BCA 265 | 2D Game Design and Development | Core | 2 | 0 | 4 | 4 | 6 |
| 3 | BCA266 | Game Mechanics and Dynamics | Core | 3 | 0 | 0 | 3 | 3 |
| 4 | BCA313 | Image Processing | Core | 2 | 0 | 2 | 3 | 4 |
| 5 | BCA208 | Computer Networks | Core | 3 | 0 | 0 | 3 | 3 |
| 6 | BCA217 | Artificial Intelligence for Gaming | Core | 3 | 0 | 0 | 3 | 3 |
| 7 | BCA259 | Video and Audio for Games | Core | 2 | 0 | 2 | 3 | 4 |
| 8 | PPD132 | Personal and Professional Development-4 | SEC | 0 | 0 | 2 | - | 2 |
| Total | | | | 18 | 0 | 10 | 22 | 28 |

Note: Summer Internship during Summer Vacation

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V Semester

| SL.No | COURSE CODE | COURSE NAME | TYPE | CREDIT STRUCTURE | | | | CONTACT HOURS |
|--------------|-------------|--------------------------------|------|------------------|----------|-----------|-----------|---------------|
| | | | | L | T | P | C | |
| 1 | BCA221 | Animation and Shaders | Core | 2 | 0 | 2 | 3 | 4 |
| 2 | BCA222 | Character Modeling and Rigging | Core | 1 | 0 | 4 | 3 | 5 |
| 3 | BCA260 | 3D Game Engine | Core | 1 | 0 | 4 | 3 | 5 |
| 4 | DE1 | Discipline Elective 1* | DE | 3 | 0 | 0 | 3 | 3 |
| 5 | DE2 | Discipline Elective 2 | DE | 3 | 0 | 0 | 3 | 3 |
| 6 | OE1 | Open Elective 1* | OE | 3 | 0 | 0 | 3 | 3 |
| 7 | | Internship | | 2 | 0 | 0 | 2 | 2 |
| Total | | | | 15 | 0 | 10 | 20 | 25 |

*Students may opt any 2 Discipline Electives from the below given specialization list.

| | |
|------------------------------|-----------------------------------|
| Discipline Elective 1 | Game Architecture |
| | Motion Capture |
| | AR/ VR based Game Development |
| | Game Interface and Level Design |
| Discipline Elective 2 | Cryptography and Network security |
| | Embedded Systems |
| | Cloud Storage Applications |

VI Semester

| SL.No | COURSE CODE | COURSE NAME | TYPE | CREDIT STRUCTURE | | | | CONTACT HOURS |
|--------------|-------------|---|------|------------------|----------|-----------|-----------|---------------|
| | | | | L | T | P | C | |
| 1 | BCA262 | Digital Compositing | Core | 2 | 0 | 4 | 4 | 6 |
| 2 | BCA214 | Mobile and Web Applications Development | Core | 1 | 0 | 4 | 3 | 5 |
| 3 | DE3 | Discipline Elective 3 | DE | 3 | 0 | 0 | 3 | 3 |
| 4 | DE4 | Discipline Elective 4 | DE | 3 | 0 | 0 | 3 | 3 |
| 5 | OE2 | Open Elective 2* | OE | 3 | 0 | 0 | 3 | 3 |
| 6 | BCA315 | Dissertation | | - | - | 8 | 4 | 8 |
| Total | | | | 12 | 0 | 16 | 19 | 28 |

*Students may opt any 2 Discipline Electives from the given specialization list.

| | |
|------------------------------|----------------------------|
| Discipline Elective 1 | Programming in Java |
| | Human Computer Interaction |
| | Game Testing and Analysis |

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| | |
|------------------------------|--|
| | Video streaming and AR technologies |
| | Machine Vision |
| Discipline Elective 2 | Social media Marketing/ |
| | UI/UX Design |
| | Intellectual property, Ethics and Legal Issues |

Note: The course structure of BCA is tentative & subject to revision & approval of the Academic Council.

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