DEPARTMENT OF COMPUTER ENGINEERING

Minutes of Meeting of Board of Studies in Computer Engineering held on 14.08.21

A meeting of Board of Studies in Computer Engineering was held on 14th August 2021 at 10:00 am on Google Meet online meeting platform.

Following members attended the meeting.

1.	Dr. Urjita Thakar	(Chairperson)
2.	Mr. V.R. Sathe	IT Consultant, Indore (External Expert)
3.	Prof. B.K. Joshi	Professor, Computer Engineering, MCTE, Mhow (External Expert)
4.	Prof. D A Mehta	(Member)
5.	Mr. Surendra Gupta	(Member)
6.	Dr. Vandan Tewari	(Member)
7.	Mr. Rajesh Dhakad	(Member)
8.	Dr. Anuradha Purohit	(Member)
9.	Ms. Priyanka Bamne	(Invitee)
10.	Ms. Neha Mehra	(Invitee)

Discussions were held on all the agenda items. Following are the deliberations

Item no 1: To discuss the scheme of B.Tech., Computer Engineering as per AICTE Model Curriculum for inclusion of mandatory courses.
The scheme of II, III and IV year of the course B.Tech. Computer Sc. & Engg. was reviewed. After due discussion the scheme was recommended as given in enclosure-I. The revised scheme will be effective from academic session 2022-23.

Item no 2: Syllabus for CO____: Data Science (Elective subject in final year B.Tech. (Electronics and Telecommunication)
The syllabus for the elective subject CO : Data Science was discussed and finalised. The same is attached herewith as Enclosure-II.

The meeting ended with vote of thanks to the chair.

Signatures of members:-

1. Dr. Urjita Thakar (Chairperson)
2. Mr. V.R. Sathe (External Expert)
3. Prof. B.K. Joshi (External Expert)
4. Prof. D A Mehta (Member)
5. Mr. Surendra Gupta(Member)
6. Dr. Vandan Tewari(Member)
7. Mr. Rajesh Dhakad(Member)
8. Dr. Anuradha Purohit (Member)
9. Ms. Priyanka Bamne (Invitee)
10. Ms. Neha Mehra (Invitee)

Attended online
Attended online

B.TECH. II YEAR COMPUTER SCIENCE & ENGINEERING

SEMESTER 'A'

S. No.	Subject Category	Subject Code	Subject Name	Hours per Week			Credits			Max. Marks				
										Theory		Practical		Total
				L	T	P	Th.	Pr.	Total	Th.	CW	SW	Pr	
1.	BSC	MA 24003	Mathematics -III	3	1	-	4	-	1	70	30	-	-	100
2.	PCC	CO 24057	Object Oriented Programming Systems	3	1	2	4	1	5	70	30	60	40	200
3.	PCC	CO 24009	Computer Architecture	3	-	2	3	1	4	70	30	60	40	200
4.	ESC	EC 24010	Analog and Digital Electronics	3	-	2	3	1	4	70	30	60	40	200
5.	HSMC	HU 24005	Economics for Engineers	3	-	-	3	-	3	70	30	-	-	100
6.	LC	CO 24497	Programming Practices	-	1	2	1	1	2	-	-	60	40	100
7.	ESC LC	EC 24498	Electronics Workshop	-	-	2	-	1	1	-	-	60	40	100
			Total	15	3	10	18	5	23	350	150	300	200	1000

SEMESTER 'B'

S. No.	Subject Category	Subject Code	Subject Name	Hours per Week			Credits			Max. Marks				
										Theory		Practical		Total
				L	T	P	Th.	Pr.	Total	Th.	CW	SW	Pr	
1.	PCC	CO 24553	Discrete Structures	3	-	-	3	-	3	70	30	-	-	100
2.	BSC	MA 24554	Mathematics - IV	3	1	-	4	-	4	70	30	-	-	100
3.	PCC	CO 24507	Data Structures	3	1	2	4	1	5	70	30	60	40	200
4.	PCC	CO 24508	Operating Systems	3	-	2	3	1	4	70	30	60	40	200
5.	OEC	EC 24509	Digital Communication	3	-	2	3	1	4	70	30	60	40	200
6.	LC	CO 24992	Computer Workshop	-	-	2	-	1	1	-	-	30	20	50
7.	LC	CO 24991	Design thinking Lab-I	-	-	2	-	1	1	-	-	30	20	50
8.	HSBC	HU 24505	Values, Humanities and Professional Ethics	-	2	-	2	-	2	-	100	-	-	100
9.	MC	HU	Constitution of India(Audit)	-	2	-	-	-	-	-	-	-	-	-
			Total	15	6	10	19	5	24	350	250	240	160	1000

B.TECH. III YEAR COMPUTER SCIENCE & ENGINEERING (wef. 2022-23)

SEMESTER 'A'

S. No.	Category	Subject Code	Subject Nomenclature	Hours Per Week L	T	P	No. of Credits Th.	Pr.	Total	Maximum Marks Th.	CW	Pr.	SW	Total
1.	PCC	CO 34002	*Theory of Computation	3	1	-	4	-	4	70	30	-	-	100
2.	PCC	CO 34005	*Data Base Management Systems	3	1	2	4	1	5	70	30	60	40	200
3.	PCC	CO 34007	*Computer Networks	3	-	2	3	1	4	70	30	60	40	200
4.	PCC	CO 34014	Agile Software Methodology	3	-	2	3	1	4	70	30	60	40	200
5.	LC	CO 34451	Skill Development Lab	-	-	2	-	1	1	-	-	30	20	50
6.	LC	CO 34452	Design Thinking Lab-II	-	-	2	-	1	1	-	-	30	20	50
7.	SI	CO 34481	Evaluation of Industrial Training/Internship-I	-	-	-	-	2	2	-	-	-	100	100
8.	OEC	CO___	Open Elective Course-I	3	1	-	4	-	4	70	30	-	-	100
9.	MC	HU	Essence of Indian Traditional Knowledge(Audit)	-	2	-	-	-	-	-	-	-	-	-
				15	6	10	19	7	25	350	150	240	260	1000

SEMESTER 'B'

S. No.	Category	Subject Code	Subject Nomenclature	Hours Per Week L	T	P	No. of Credits Th.	Pr.	Total	Maximum Marks Th.	CW	Pr.	SW	Total
1.	PCC	CO 34553	Machine Learning	3	-	2	3	1	4	70	30	60	40	200
2.	PCC	CO 34554	Foundation of Information Security	3	-	-	3	-	3	70	30	-	-	100
3.	PCC	CO 34563	* Design and Analysis of Algorithms	3	-	2	3	1	4	70	30	60	40	200
4.	PCC	CO 34881	Internet of Things	-	1	2	1	1	2	-	-	60	40	100
5.	PEC	CO_	Elective I	3	-	2	3	1	4	70	30	60	40	200
6.	OEC	CO_	Open Elective Course-II	3	1	-	4	-	4	70	30	-	-	100
7.	PROJ	CO 34999	Major Project Planning and Seminar	-	-	4	-	2	2	-	-	60	40	100
			Total	15	2	12	17	6	23	350	150	300	200	1000

Internship / training in industry or organization of minimum 2 weeks to be carried out after sem. "A" or Sem. "B" but before commencement of IV Year Sem. "A". Evaluation shall be done in IV Year Sem. "A".

* Common Question paper can be set for these subjects, for IIIyr. BE students (ex-students) &IIIyr. B.Tech. students.

All Elective subjects may be offered in offline mode/ MooCs mode.

List of Open Elective-I Subjects

1. CO Artificial Intelligence
2. CO Cyber Law and Ethics
3. MB Human Resource Management and Organizational Behaviour

List of Open Elective-II Subjects

1. CO Android Application Development
2. CO Open Source Technology

B.TECH. IV

SEMESTER 'A'

S. No.	Category	Code No.	Subject Nomenclature	Hours Per Week			No. of Credits		Total	Maximum Marks				
				L.	T	P	L.	P		Th.	CW	SW	Pr.	
1.	PEC		Elective II	3	-	2	3	1	4	70	30	60	40	200
2.	PEC		Elective III	3	-	2	3	1	4	70	30	60	40	200
3.	PEC		Elective IV	3	-	2	3	1	4	70	30	60	40	200
4.	LC	CO 44401	System Operations Lab	-	-	2	-	1	1	-	-	40	60	100
5.	PROJ	CO 44498/ CO 44998	Project Phase-I/ Project Phase-II	-	-	6 4	-	3 2	3 2	-	-	80	120	200
6.	SI	CO	Internship Evaluation - II	-	-	-	-	2	2	-	-	100	100	100
			Total	9	-	14 12	9	9 8	18 17	210	90	400 360	300 340	1000

SEMESTER 'B'

S. No.	Category	Code No.	Subject Nomenclature	Hours Per Week			No. of Credits		Total	Maximum Marks				Total
				L.	T	P	L.	P		Th.	CW	SW	Pr.	
1.	PEC		Elective V	2	1	-	3	-	3	70	30	-	-	100
2.	PEC		Elective VI	2	-	-	2	-	2	70	30	-	-	100
4.	PROJ	CO 44998/ CO 44498	Project Phase - II / Project Phase I	-	-	4	-	2	2	-	-	80	120	200
3.	SI	CO	Internship Evaluation - III	-	-	-	-	4	4	-	-	100	-	100
			Total	4	1	4	5	6	11	140	60	180	120	500

* Common question paper can be set for these subjects, for students under this scheme and under the B.E. scheme of IV yr. B.E.

All Elective subjects may be offered in offline mode/ MooCs mode.

corrected on 29/10/2021

of Electives

Elective-I

1.	CO	Data Science & Engineering
2.	CO	Compiler Construction
3.	CO	Wireless & Mobile Networks
4.	CO	Object Oriented Software Engineering
5.	CO	Computer Graphics
6.	CO	Embedded Systems

Elective-II

1.	CO	Computational Intelligence
2.	CO	Advanced Data Structures
3.	CO 44242	Cloud Computing
4.	CO	Software Architecture
5.	CO	Multimedia System
6.	EI	VLSI System Design

Elective-III

1.	CO 44251	Deep Learning
2.	CO	Advanced Algorithms
3.	CO 44252	Big Data
4.	CO___	Human Computer Interaction
5.	CO___	Real Time Systems
6.	CO__	Software Verification

Elective-IV

1.	CO	Reinforcement Learning
2.	CO	Advanced Databases
3.	CO 44307	Cyber Security and Forensics
4.	CO 44308	Web Technologies
5.	CO	Virtual Reality
6.	CO	Robotics

Elective-V

1.	CO___	Bioinformatics Computing
2.	CO___	High Performance Computing
3.	CO___	Machine learning for Security
4.	CO___	Game design
5.	CO	Digital Signal Processing
6.	CO__	Security in Resource Constrained Environment

Elective-VI

1.	CO	Natural Language Processing
2.	CO	Advanced Operating Systems
3.	CO	Network Management & Maintenance
4.	CO	Software Project Management
5.	CO	Image Processing and Computer Vision
6.	CO	Block Chain Technology

Enclosure

DEPARTMENT OF COMPUTER ENGINEERING

CO____: DATA SCIENCE

PRE-REQUISITES: Statistics and probability

COURSE OBJECTIVES: To enable a student in understanding data and analyze data for various learning algorithms.

COURSE OUTCOMES: After completing the course student should be able to:

1. Describe data, data types, and data models and data distributions.
2. Compare and analyze different data pre-processing and data visualization techniques.
3. Examine the nature of the data at hand and determine the best suitable data engineering technique/algorithm.
4. Solve and implement real world problems using data engineering.

COURSE CONTENTS:

THEORY:

UNIT 1 Understanding Data: Types of data, Data Quality, Data Distributions, Data models, Data Wrangling and Exploratory Analysis. Introduction to contemporary tools. Data mathematics: probability, linear programming, statistics, calculus, metrics calculus: SVD, Eigen vectors. Introduction to machine learning techniques

UNIT 2 Data Preprocessing: Data Transformation & Cleaning, Aggregation, Sampling, Dimensionality reduction, Feature subset Selection, feature creation, PCA, LDA, Discretization &Binarization, variable transformation, Data Normalization, Data similarity measures, missing values, filters, Wrapper Method, Noise reduction techniques.

UNIT 3 Statistical & Probabilistic analysis of Data: Multiple hypothesis testing, Parameter Estimation methods, Confidence intervals, Bayesian statistics, Correlation & Regression analysis, logistic regression, Training & Testing data: Overfitting & Under fitting.

UNIT 4 Exploring Data: Summary Statistics, measures of location & spread, Multivariate summary statistics, Data Visualization: boxplots, histograms, scatter plots, features map visualization, t-SNE, learning model data visualization.

UNIT 5 Introduction to Machine Learning tools Tools. Data Analysis, performance metrics, ROC curve, types of errors. Introduction to OLAP & Multidimensional Data Analysis.

COURSE ASSESSMENT (Th.):

1. Internal Assessment for continuous evaluation, mid-term tests, Tutorials, Quizzes, Class Activities and open book exams, etc.(30%)
2. End semester Theory Exam (70%)

Enclosure

T BOOKS RECOMMENDED:

1. Tom Mitchell. Machine Learning. McGraw-Hill. 1997.
2. Field Cady. "The Data Science Handbook" . 1/e .2018.Publisher: Wiley
3. Sinan Ozdemir. "Principles of Data Science ". 1/e. 2016Packt Publishing Limited

REFERENCE BOOKS:

1. Shai Shalev-Shwartz and Shai Ben-David. Understanding Machine Learning: From Theory to Algorithms. Cambridge University Press..2014
2. Peter Bruce. "Practical Statistics for Data Scientists: 50 Essential Concepts".Shroff/O'Reilly: First edition (2017)

RESEARCH JOURNALS:

1. IEEE Transaction on Neural Networks and Learning Systems.
2. ACM Journal of Machine Learning Research.
3. International Journal of Data Science and Analytics