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01/7/22

Shri G S Institute of Technology & Sc., Indore
Department of Computer Engineering

Minutes of Meeting of Board of Studies in Computer Engineering, held on 8th June, 2022

A meeting of Board of Studies in Computer Engineering was held on 8th June 2022 at 2 pm in Cabin of HoD.

Following members attended the meeting:

1)	Dr. Urjita Thakar	(Chairperson)
2)	Mr. V.R. Sathe, IT Consultant, Indore	(External Expert, Member)
3)	Dr. Aruna Tiwari, Professor, Computer Engineering, IIT Indore	(External Expert, Member)
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	(Member)
10)	Ms. Neha Mehra	(Member)

The meeting was conducted in hybrid mode. Some of the experts joined in online mode through Google Meet online meeting platform.

Dr. U.A. Deshpande (VNIT, Nagpur), Prof. D.S. Jinwala (SVNIT, Surat) and Sh. J.K. Khatwani (Principle Engineer, The Data Company) could not join the meeting.

Following are the deliberations:

Item no. 1: To review the schemes of B.Tech. (Computer Science and Engineering) and M.Tech. (Computer Engineering)

The schemes of B.Tech. (Computer Science and Engineering) and M.Tech. (Computer Engineering) were reviewed. Following are the recommendations:

B.Tech. CSE Semester VI

a. Lab component to be added to Open Elective-II. Subject 'IT ACT' be deleted. The revised scheme of (B.Tech. Sem. VI) is attached as **Annexure-I.**

b. The issue of internship was discussed; it was informed by the Head, Computer Engineering and other members that, all students of B.Tech. (CSE) are not getting the internship. After due discussion in the matter, the BoS recommended that, since there are difficulties in getting appropriate internship for CSE students, the issue may be brought to the notice of Academic Council and some guidelines may be provided by the Academic Council to address the issue.

Item no. 2: To review the syllabi of B.Tech. (CSE) subjects

(i) After thorough discussion, minor revision (<15%) is recommended in syllabi of some subjects of B. Tech. IV year as given in the following table. Modified and existing syllabi are enclosed herewith (**Annexure-II**)

S. No.	Subject Code	Subject Name
1	CO 44706	Software Project Management
2	CO 44252	Big Data
3	CO 44707	Blockchain Technology

(ii) The syllabus of CO44607: GAME DESIGN has major revision (>25%) and therefore it is recommended that a new code be assigned for the same. The new syllabus is attached as Annexure-III

V.R.S

The revised syllabii of B.Tech. (CSE) IV year are recommended to be made applicable to students entering IV year in academic year 2022-23.

The revised scheme of B. Tech III Year CSE be applied to students entering III year in academic year 2022-23.

Item no. 3: Any other item with the permission of Chair:
A proposal from Chairman, BoS, Applied Physics was received for offering following Elective subjects of new course M.Tech. (Quantum Computing) starting from year 2022-23.

S. No.	Name of Subject	Semester
1	Machine Learning	I
2	Information Security	I
3	Cyber Security & Forensics	II

After due discussion, the BoS recommended that the above subjects may be taught to M.Tech. (Quantum Computing) students by Computer Engineering Department, provided those students have studied prerequisite subjects specified for each subject, as these are specialised subjects.

The meeting ended with a vote of thanks to the Chair.

Signatures of BoS members:

1.	Dr. Urjita Thakar	Chairperson	
2.	Mr. V. R. Sathe	External Expert, Member	Attended online.
3.	Dr. Aruna Tiwari	External Expert, Member	
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	Member	
10.	Ms. Neha Mehra	Member	

The revised syllabus of B.Tech. (CSE) IV year are recommended to be made applicable to students entering IV year in academic year 2022-23.

The revised syllabus of B. Tech III Year (CSE) be applied to students entering III year in academic year 2022-23.

Item no. 3: Any other item with the permission of Chair:
A proposal from Chairman, BoS, Applied Physics was received for offering following 3 elective subjects new course M.Tech (Quantum Computing) starting from year 2022-23:

S. No.	Name of Subject	Semester
1	Machine Learning	I
2	Information Security	I
3	Cyber Security & Forensics	II

After due discussion, the BoS recommended that the above subjects may be taught to M.Tech. (Quantum Computing) students by Computer Engineering Department, provided those students have studied prerequisite subjects specified for each subject, as these are specialised subjects.

The meeting ended with a vote of thanks to the Chair.

Signatures of BoS members:

1.	Dr. Urjita Thakar	Chairperson	
2.	Mr. V. R. Sathe	External Expert, Member	
3.	Dr. Aruna Tiwari	External Expert, Member	
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	Member	
10.	Ms. Neha Mehra	Member	

Annexure-I

B.TECH. III YEAR COMPUTER SCIENCE & ENGINEERING (wef. ~~2020-21~~ 2022-23)

SEMESTER 'A'

S. No.	Category	Subject Code	Subject Nomenclature	Periods Per Week			No. of Credits			Maximum Marks				
				L	T	P	Th.	Pr.	Total	Th.	CW	SW	Pr.	Total
1.	PCC	CO 34002	*Theory of Computation	4	1	-	4	-	4	70	30	-	-	100
2.	PCC	CO 34005	*Data Base Management Systems	4	1	2	4	1	5	70	30	40	60	200
3.	PCC	CO 34007	*Computer Networks	4	1	2	4	1	5	70	30	40	60	200
4.	PCC	CO 34014	Agile Software Methodology	4	-	2	3	1	4	70	30	40	60	200
5.	LC	CO 34451	Skill Development Lab	-	-	2	-	1	1	-	-	20	30	50
6.	LC	CO 34452	Design Thinking Lab-II	-	-	2	-	1	1	-	-	20	30	50
7.	SI	CO 34481	Evaluation of Industrial Training/Internship-I	-	-	-	-	2	2	-	-	100	-	100
8.	OEC	CO ___	Open Elective Course-I	4	1	-	4	-	4	70	30	-	-	100
9.	MC	HU___	Essence of Indian Traditional Knowledge(Audit)	-	2	-	-	-	-	-	-	-	-	-
			Total	20	6	10	19	7	26	350	150	260	240	1000

SEMESTER 'B'

S. No.	Category	Subject Code	Subject Nomenclature	Periods Per Week			No. of Credits			Maximum Marks				
				L	T	P	Th.	Pr.	Total	Th.	CW	SW	Pr.	Total
1.	PCC	CO 34553	Machine Learning	4	-	2	3	1	4	70	30	40	60	200
2.	PCC	CO 34554	Foundation of Information Security	4	-	-	3	-	3	70	30	-	-	100
3.	PCC	CO 34563	* Design and Analysis of Algorithms	4	-	2	3	1	4	70	30	40	60	200
4.	PCC	CO 34881	Internet of Things	-	1	2	-	2	2	-	-	40	60	100
5.	PEC	CO _____	Elective-I	4	-	2	3	1	4	70	30	40	60	200
6.	PROJ	CO 34999	Major Project Planning and Seminar	-	-	4	-	2	2	-	-	40	60	100
7.	OEC	CO ___	Open Elective Course-II	2	2	2	3	1	4	70	30	60	40	200
			Total	18	3	14	15	8	23	350	150	260	340	1100

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.

of Open Elective Course-I Subjects

	CO34298	Artificial Intelligence
		Human Resource Development and Organizational Behavior

List of Open Elective Course-II Subjects

1.	CO34701	Android Application Developmem
2		Open Source Technologies
3.		IT Act

ANNEXURE-II OLD

DEPARTMENT OF COMPUTER ENGINEERING

B. Tech. IV YEAR (4YDC)

SEMESTER-B (ELECTIVE-6)

CO 44706: SOFTWARE PROJECT MANAGEMENT

*Periods per Week			Th. Credit	Pr. Credit	MAXIMUM MARKS				
L	T	P			TH	CW	SW	Pr.	Total
2	1	-	2	-	70	30	-	-	100

PRE-REQUISITES: CO34014: Agile Software Methodology

COURSE OBJECTIVES: To enable students to understand the fundamental principles of Software Project Management and be familiar with the process and techniques used for software project management.

COURSE OUTCOMES:

After completing the course student should be able to:

1. Demonstrate basic concepts and issues of software project management.
2. Demonstrate Planning, Execution and Evaluation of software projects.
3. Apply mechanisms for monitoring, tracking and risk management of software projects.
4. Design activities necessary to perform quality management and successful completion of Software Projects.

COURSE CONTENTS: THEORY:

UNIT 1 Project Evaluation and Project Planning: Importance of Software Project Management, Activities Methodologies, Categorization of Software Projects, Setting Objectives, Management Principles, Management Control, Project portfolio Management, Cost, Benefit Evaluation Technology, ~~*Risk Evaluation, Strategic Program Management*~~, Stepwise Project Planning.

UNIT 2 Project Life Cycle and Effort Estimation: Software Process and Process Models, Choice of Process Models, Agile Methods: Importance,~~*Introduction to Extreme Programming, SCRUM: Managing Interactive Processes*~~, Basics of Software Estimation: Effort and Cost Estimation Techniques.

UNIT 3 Activity Planning and Risk Management: Objectives of Activity Planning, Project Schedules, Activities, Sequencing and Scheduling, Network Planning Models, Forward Pass and Backward Pass Techniques, Risk Identification, Assessment, Monitoring, Resource Allocation, Creation of Critical Patterns, Cost Schedules.

UNIT 4 Project Management, Control and Staffing: Framework for Management and Control, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Project Tracking, Change Control, Software Configuration Management, ~~*Contract Management*~~, Managing People, Motivation, Decision Making, Team Structures, ~~*Communication Genres and Plans*~~, Project Closure: Analysis, Report Generation.

UNIT 5 Quality Management: Introduction, Product versus Process Quality Management, Quality Management Systems and Planning, ~~*Process Capability Models, Techniques to Help Enhance Software Quality*~~, Testing and Defect Prevention Planning; Case Studies on Project Management.

COURSE ASSESSMENT (Th.):

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

TEXT BOOKS RECOMMENDED:

1. Bob Hughes, Mike Cotterell and Rajib Mall, "Software Project Management", 5th Edition, Tata McGraw Hill, New Delhi, 2012.
2. Pankaj Jalote, "Software Project Management in Practice", Pearson Publication, 2014.

REFERENCE BOOKS:

1. S. A. Kelkar, "Software Project Management: A Concise Study", 3rd Edition, PHI Publication, 2013.
2. Robert K. Wysocki, "Effective Software Project Management", Wiley Publication, 2011.
3. Walker Royce, "Software Project Management", Addison Wesley, 1998.
4. Gopalaswamy Ramesh, "Managing Global Software Projects", McGraw Hill Education (India), 14th Reprint, 2013.

NEW

DEPARTMENT OF COMPUTER ENGINEERING

B. Tech. IV YEAR (4YDC)

SEMESTER-B (ELECTIVE-6)

CO 44706: SOFTWARE PROJECT MANAGEMENT

*Periods per Week			Th. Credit	Pr. Credit	MAXIMUM MARKS				
L	T	P			TH	CW	SW	Pr.	Total
2	1	-	2	-	70	30	-	-	100

PRE-REQUISITES: CO34014: Agile Software Methodology

COURSE OBJECTIVES: To enable students to understand the fundamental principles of Software Project Management and be familiar with the process and techniques used for software project management.

COURSE OUTCOMES:

After completing the course student should be able to:

1. Demonstrate basic concepts and issues of software project management.
2. Demonstrate Planning, Execution and Evaluation of software projects.
3. Apply mechanisms for monitoring, tracking and risk management of software projects.
4. Design activities necessary to perform quality management and successful completion of Software Projects.

COURSE CONTENTS:

THEORY:

UNIT 1 Project Evaluation and Project Planning: Importance of Software Project Management, Activities Methodologies, Categorization of Software Projects, Setting Objectives, Management Principles, Management Control, Project portfolio Management, Cost, Benefit Evaluation Technology, Stepwise Project Planning.

UNIT 2 Project Life Cycle and Effort Estimation: Software Process and Process Models, Choice of Process Models, Agile Methods: Importance, Introduction to Extreme Programming and SCRUM; Basics of Software Estimation: Effort and Cost Estimation Techniques.

UNIT 3 Activity Planning and Risk Management: Objectives of Activity Planning, Project Schedules, Activities, Sequencing and Scheduling, Network Planning Models, Forward Pass and Backward Pass Techniques, Risk Identification, Assessment, Monitoring, Resource Allocation, Creation of Critical Patterns, Cost Schedules.

UNIT 4 Project Management, Control and Staffing: Framework for Management and Control, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Project Tracking, Change Control, Software Configuration Management, Managing People, Motivation, Decision Making, Team Structures, Project Closure: Analysis, Report Generation.

UNIT 5 Quality Management: Introduction, Product versus Process Quality Management, Quality Management Systems and Planning, Process Capability Models, Testing and Defect Prevention Planning; Case Studies on Project Management.

RECT ASSESMENT:

SESMENT OF THEORY-

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

INDIRECT ASSESMENT:

1. Feedback of students on attainment of cos.
2. Feedback of students on classroom learning.
3. External examiners feedback on Cos.

TEXT BOOKS RECOMMENDED:

1. Bob Hughes, Mike Cotterell and Rajib Mall, "Software Project Management", 5th Edition, Tata McGraw Hill, New Delhi, 2012.
2. Pankaj Jalote, "Software Project Management in Practice", Pearson Publication, 2014.

REFERENCE BOOKS:

1. S. A. Kelkar, "Software Project Management: A Concise Study", 3rd Edition, PHI Publication, 2013.
2. Robert K. Wysocki, "Effective Software Project Management", Wiley Publication, 2011.
3. Walker Royce, "Software Project Management", Addison Wesley, 1998.
4. Gopalaswamy Ramesh, "Managing Global Software Projects", McGraw Hill Education (India), 14th Reprint, 2013.

B. Tech. IV YEAR (4YDC) OLD

SEMESTER-B (ELECTIVE-6)

CO 44707: BLOCK CHAIN TECHNOLOGY

*Hours per Week			Th. Credit	Pr. Credit	MAXIMUM MARKS				
L	T	P			TH	CW	SW	Pr.	Total
2	-	-	2	-	70	30	-	-	100

PRE-REQUISITES: Data Structure and Algorithms

COURSE OBJECTIVES: To provide students a conceptual understanding of how blockchain technology and cryptocurrency can be used to innovate and improve business processes.

COURSE OUTCOMES:

After completing the course student should be able to:

1. Define the functional/operational aspects of Blockchain Technology.
2. Understand emerging consensus and cryptographic algorithm applied in Blockchain.
3. Define the functional/operational aspects of cryptocurrency ecosystem.
4. Identify major research challenges technical gaps existing between theory and practice in cryptocurrency domain

COURSE CONTENTS:

THEORY:

UNIT 1 Introduction to Blockchain: Need for Distributed Record Keeping, Modeling faults and adversaries, Byzantine Generals problem, Consensus algorithms and their scalability problems. The consensus problem - Asynchronous Byzantine Agreement - ~~AAP protocol and its analysis, Nakamoto Consensus on permission-less, nameless, peer-to-peer network Abstract Models for BLOCKCHAIN – GARAY model – RLA Model~~ - Proof of Work (PoW) , liveness and fairness - Proof of Stake (PoS) based Chains - Hybrid models (PoW + PoS).

UNIT 2 Cryptographic basics for cryptocurrency - a short description of Hashing, signature schemes, encryption schemes and elliptic curve cryptography variable random functions, The challenges, solutions and Bitcoin consensus.

UNIT 3 Bitcoin - Wallet - Blocks - Merkley Tree - hardness of mining - transaction verifiability, anonymity - forks - double spending - mathematical analysis of properties of Bitcoin. Blockchain 1.0,2.0 etc.

UNIT 4 Ethereum - Ethereum Virtual Machine (EVM) - Wallets for Ethereum - Solidity - Smart Contract attacks on smart contracts , The Turing Completeness of Smart Contract Languages and verication challenges, Using smart contracts to enforce legal contracts, comparing Bitcoin scripting vs. Ethereum Smart Contracts.

UNIT 5 (Trends and Topics) - Zero Knowledge proofs and protocols in Blockchain - ~~Succinct non interactive argument for Knowledge (SNARK) – pairing on Elliptic curves – Zcash.~~

)URSE ASSESMENT (Th.):

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

TEXT BOOKS RECOMMENDED:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Pre2016.

REFERENCE BOOKS:

1. Draft version of "S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, 'Blockchain Technology: Cryptocurrency and Applications', Oxford University Press, 2019.
   Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming', Create Space Independent Publishing Platform, 2017

NEW

B. E. IV YEAR (4YDC)
SEMESTER-B (ELECTIVE-6)
CO 44707: BLOCK CHAIN TECHNOLOGY

*Hours per Week			Th. Credit	Pr. Credit	MAXIMUM MARKS				
L	T	P			TH	CW	SW	Pr.	Total
2	-	-	2	-	70	30	-	-	100

PRE-REQUISITES: Data Structure and Network Security

COURSE OBJECTIVES:

1. To explain the functional/operational aspects of Blockchain Technology.
2. To illustrate different consensus and cryptographic algorithm applied in Blockchain.
3. To elaborate functional/operational challenges of different cryptocurrency like Bitcoin.
4. To demonstrate designing of Smart contract based platform Ethereum and enterprise based Hyperledger fabric.

COURSE OUTCOMES:

After completing the course student should be able to:

1. Define the functional/operational aspects of Blockchain Technology.
2. Identify and anlyse the consensus and cryptographic algorithm applied in Blockchain system.
3. Define the functional/operational challenges of different cryptocurrency ecosystem.
4. Creating and developing an Ethereum Smart contract for real world problem and also compare contrast Ethereum and Hyperledger blockchain platforms.

COURSE CONTENTS:

THEORY:

UNIT 1 Introduction to Blockchain:Need for Distributed Record Keeping,Blockchain architecture, blockheader detailed design, Consensus algorithms:Bitcoin consensus Proof of Work (PoW) , liveness and fairness - Proof of Stake (PoS) based Chains - Hybrid models (PoW + PoS),Types of Blockchain.

UNIT 2 Introduction to cryptographic basics for cryptocurrency - a short discription of Hashing, signature schemes, encryption schemes and elliptic curve cryptography veriable random functions,.

UNIT 3 Introduction to Bitcoin - Wallet - Blocks - Merkley Tree - hardness of mining - transaction verifiability, anonymity - forks - double spending - mathematical analysis of properties of Bitcoin. Blockchain 1.0,2.0 etc.

UNIT 4 Introduction to Ethereum - Ethereum Virtual Machine (EVM) - Wallets for Ethereum - Solidity - Smart Contract attacks on smart contracts , The Turing Completeness of Smart Contract Languages and verication challenges,

UNIT 5 Introduction to Blockchain Consensus Algorithm challenges, and solutions ,Modeling faults and adversaries,Byzantine Generals problem,and Zero Knowledge proofs and protocols in Blockchain

RECT ASSESMENT:

ESMENT OF THEORY-

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

INDIRECT ASSESMENT:

1. Feedback of students on attainment of cos.
2. Feedback of students on classroom learning.
3. External examiners feedback on Cos.

TEXT BOOKS RECOMMENDED:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Pre2016.

REFERENCE BOOKS:

1. Draft version of "S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, 'Blockchain Technology: Cryptocurrency and Applications', Oxford University Press, 2019.
2. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming', Create Space Independent Publishing Platform, 2017.

B. E. IV YEAR (4YDC)
SEMESTER-A (ELECTIVE-III)
CO 44252 : BIG DATA

*Hours per Week			Th. Credit	Pr. Credit	MAXIMUM MARKS				
L	T	P			TH	CW	SW	Pr.	Total
3	-	2	3	1	70	30	40	60	200

PER-REQUISITES: Statistics, Java and DBMS.

COURSE OBJECTIVES: Students will be able to understand the challenges of Big data and gain knowledge about Hadoop Eco System and develop applications using data processing and analytics to solve real world problems.

COURSE OUTCOMES:
After completing the course student should be able to:
1. Explain the concept and challenges of Big data and Demonstrate knowledge of big data analytics.
2. Examine Hadoop Eco System and develop Big Data Solutions using it.
3. Experiment and evaluate various large-scale analytics tools.
4. Analyze social networks graphs using mining techniques.

COURSE CONTENTS:
THEORY:

UNIT 1: Introduction to Big data, Big data characteristics, Types of big data, Traditional versus Big data, Evolution of Big data, challenges with Big Data, Technologies available for Big Data, Infrastructure for Big data, Use of Data Analytics, Desired properties of Big Data system.

UNIT 2: Introduction to Hadoop, Core Hadoop components, Hadoop Eco system, Hadoop limitations, RDBMS Versus Hadoop, Hadoop Distributed File system, Processing Data with Hadoop, MapReduce Concept, Mapreduce Programming, Managing Resources and Application with Hadoop YARN.

UNIT 3: Introduction to Apache Spark, Parallel programming with spark, spark built-in libraries.
Introduction to Hive, Hive Architecture, Hive Data types, Hive Query Language, Introduction to Pig, Anatomy of Pig, Pig Architecture, Pig on Hadoop, Use Case for Pig, ETL Processing, Data types in Pig, Execution model of Pig, Pig grunt, Pig script, Pig Operators, Pig Evalfunction.

UNIT 4: Introduction to NoSQL, NoSQL Business Drivers, NoSQL Data architectural patterns-Key-value based, Column-based, Document-based, Graph-based, Variations of NOSQL architectural patterns, using NoSQL to Manage Big Data, CAP theorem, BASE, Introduction of Hbase.

UNIT 5: Mining-social-Network-Graphs:-Introduction-Applications of social Network mining, Social Networks as-a-Graph;-Types-of-social-Networks,-Clustering of social-Graphs Direct-Discovery of communities in a-social-graph.

COURSE ASSESMENT (Th.):

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

COURSE ASSESMENT (Pr.):

1. Internal Assessment for continuous evaluation (40%): Lab assignments, demonstration, Viva, File etc.
2. End semester Practical Exam (60%): Quiz/Programming test, lab journal, demo, viva etc.

TEXT BOOKS RECOMMENDED:

1. Radha Shankarmani, M. Vijaylakshmi, "Big Data Analytics", Wiley, Second edition

2. Seema Acharya, SubhashiniChellappan, "Big Data and Analytics", Wiley, First edition.
3. Thomas Erl, Wajid Khattak, and Paul Buhler, "Big Data Fundamentals, Concepts, Drivers & Techniques", Pearson, First Edition.

REFERENCE BOOKS:

1. KaiHwang,Geoffrey C., Fox. Jack, J. Dongarra, "Distributed and Cloud Computing", Elsevier, First edition
2. Michael Minelli, Michele Chambers, AmbigaDhiraj, "Big Data Big Analytics",Wiley

REFERENCE WEBSITES:

1. https://hadoop.apache.org/
2. https://www.cloudera.com/
3. noc19-cs33-Introduction-Big Data Computing : https://www.youtube.com/watch?v=r5k_RLIpuA&list=PLFW6lRTa1g8L3IvYHLRP_bWJEKQDeEcSP

NEW

B. E. IV YEAR (4YDC)
SEMESTER-A (ELECTIVE-III)
CO 44252 : BIG DATA

*Hours per Week			Th. Credit	Pr. Credit	MAXIMUM MARKS				
L	T	P			TH	CW	SW	Pr.	Total
3	-	2	3	1	70	30	40	60	200

PER-REQUISITES: Statistics, Java and DBMS.

COURSE OBJECTIVES: Students will be able to understand the challenges of Big data and gain knowledge about Hadoop Eco System and develop applications using data processing and analytics to solve real world problems.

COURSE OUTCOMES:

After completing the course student should be able to:

1. Explain the concept and challenges of Big data and Demonstrate knowledge of big data analytics.
2. Examine Hadoop Eco System and develop Big Data Solutions using it.
3. Experiment and evaluate various large-scale analytics tools like Spark, Kafka, Hbase.
4. Apply and Analyze machine learning algorithms on Big Data.

COURSE CONTENTS:

THEORY:

UNIT 1: Introduction to Big data, Big data characteristics, Types of big data, Traditional versus Big data, Evolution of Big data, challenges with Big Data, Technologies available for Big Data, Infrastructure for Big data, Use of Data Analytics, Desired properties of Big Data system.

UNIT 2: Introduction to Hadoop, Core Hadoop components, Hadoop Eco system, Hadoop limitations, RDBMS Versus Hadoop, Hadoop Distributed File system, Processing Data with Hadoop, MapReduce Concept, Mapreduce Programming, Managing Resources and Application with Hadoop YARN.

UNIT 3: Introduction to Apache Spark, Parallel programming with spark, spark built-in libraries. *Design of Key-Value Stores, Data Placement Strategies,* CAP theorem, *Consistency Solutions, CQL, Design of Zookeepaer.* Introduction to Hive, Introduction to Pig

UNIT 4: Introduction to NoSQL, NoSQL Business Drivers, NoSQL Data architectural patterns-Key-value based, Column-based, Document-based, Graph-based, Variations of NOSQL architectural patterns, using NoSQL to Manage Big Data, BASE, Introduction of Hbase, Spark Streaming *and Sliding window Analytics, Introduction to Kafka*

UNIT 5: *Big Data Machine Learning, ML algorithm K-means using* Map Reduce for Big Data Analytics, *Parallel K-Means* using Map Reduce on Big Data *cluster Analysis, Decision trees for Big Data Analytics, Big Data Predictive analysis..*

ECT ASSESMENT:
SSMENT OF THEORY:

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

ASSESSMENT OF PRACTICAL:

1. Internal Assessment for continuous evaluation (40%): Lab assignments, demonstration, Viva, File etc.
2. End semester Practical Exam (60%): Quiz/Programming test, lab journal, demo, viva etc.

INDIRECT ASSESMENT:

1. Feedback of students on attainment of cos.
2. Feedback of students on classroom learning.
3. External examiners feedback on Cos.

TEXT BOOKS RECOMMENDED:

1. Radha Shankarmani, M. Vijaylakshmi, "Big Data Analytics", Wiley, Second edition.
2. Seema Acharya, SubhashiniChellappan, "Big Data and Analytics", Wiley, First edition.
3. Thomas Erl, Wajid Khattak, and Paul Buhler, "Big Data Fundamentals, Concepts, Drivers & Techniques", Pearson, First Edition.

REFERENCE BOOKS:

1. KaiHwang,Geoffrey C., Fox. Jack, J. Dongarra, "Distributed and Cloud Computing", Elsevier, First edition
2. Michael Minelli, Michele Chambers, AmbigaDhiraj, "Big Data Big Analytics",Wiley

REFERENCE WEBSITES:

1. https://hadoop.apache.org/
2. https://www.cloudera.com/
3. noc19-cs33-Introduction-Big Data Computing : https://www.youtube.com/watch?v=r5k_RLIpuA&list=PLFW6lRTa1g813IyYHLRP_bWJEKQDeEcSP

V.P.S

ANNEXURE-III

OLD

DEPARTMENT OF COMPUTER ENGINEERING
B.TECH. IV YEAR (4YDC)
SEMESTER-B (ELECTIVE-5)
CO 44607: GAME DESIGN

*Periods per Week			Th. Credit	Pr. Credit	MAXIMUM MARKS				
L	T	P			TH	CW	SW	Pr.	Total
2	1	-	2	-	70	30	-	-	100

PRE-REQUISITES: CO24497: Programming Practices

COURSE OBJECTIVES:

1. To understand the basic concepts of game design, such as rules and play.
2. To analyse various types of game design rules, concepts and technique.
3. To develop game design solutions having theoretical, narrative, perceptual and aesthetic coherence.
4. To implement several real world games to gain experience of creating playable games.

COURSE OUTCOMES:

After completing the course student should be able to:

1. Demonstrate fundamental game design principles.
2. Define game development process.
3. Design and build characters and game environments.
4. Design and develop a complete game as per specifications.

COURSE CONTENTS:

THEORY:

UNIT 1 Overview: What is a Game, Game Design Schema, Game Design fundamentals, Design Process: Iterative design, Commissions, Design & Testing of the Board Game, Introduction to meaningful play, two kinds of meaningful play- discernable & integrated.

UNIT 2 Introducing design, design & meaning, Semiotics: A brief overview, four semiotic Concepts, Context Shapes interpretations.

UNIT 3 Introduction to Systems, elements of a System, Framing Systems, open & closed systems, Introduction to Interactivity, a multivalent model of interactivity, interaction & choice, choice mofecules, anatomy of choice, space of possibility.

UNIT 4 Defining games: overview of digital games, magic circle. Primary Schemas: conceptual framework, rule, play, culture.

UNIT 5 Rules: defining rules, a deck of cards, quality of rules, rules in context, Rules on three levels: Operational, Constitutive, Implicit, Identity of a Game, Specificity of Rules, Rules of Digital games. Case Studies: Tic Tac Toe, Deck of Cards.

COURSE ASSESSMENT (Th.):

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

TEXT BOOKS RECOMMENDED:

1. Brathwaite, Brenda, and Ian Schreiber. Challenges for Game Designers: Non-digital Exercises for Video Game Designers. Boston, MA: Charles River Media/Course Technology, 2009. ISBN: 97815845058081.
2. Game Design Workshop: A Playcentric Approach to Creating Innovative Games by Tracy Fullerton. ISBN-10: 1482217163.
3. Challenges for Game Designers by Brenda Brathwaite (now: Romero) and Ian Schreiber. ISBN-10: 158450580X.

REFERENCE BOOKS:

1. Rules of Play - Game Design Fundamentals, Katie Salen and Eric Zimmerman, The MIT Press Cambridge, Massachusetts London, England, book design and photography.

NEW

B. E. IV YEAR (4YDC)
SEMESTER-B (ELECTIVE-5)
CO_____: GAME DESIGN

*Hours per Week			Th. Credit	Pr. Credit	MAXIMUM MARKS				
L	T	P			TH	CW	SW	Pr.	Total
2	-	2	2	1	70	30	40	60	200

PRE-REQUISITES: **Any Programming Language (C/C++/Java/Python)**

COURSE OBJECTIVES:

1. To understand the basic concepts of game design, such as rules and play.
2. To analyse various types of game design rules, concepts and technique.
3. To develop game design solutions having theoretical, narrative, perceptual and aesthetic coherence.
4. To implement several real world games to gain experience of creating playable games.

COURSE OUTCOMES:

After completing the course student should be able to:

1. Understand fundamental concepts relating to games and design, such as rules and play.
2. Compare and contrast different types of game design rules, concepts and technique.
3. Develop game design solutions having theoretical, narrative, perceptual and aesthetic coherence.
4. Implement several real world games to gain experience of creating playable games.

COURSE CONTENTS:

THEORY:

UNIT 1 Introduction Game Terminologies: Language,Objects and verbs,Scenes,Context, Dialogue, Resistance, Storytelling, Classifications of games: genres of games,Commercial and psychological impact of games; Crowdsourcing knowledge game in science,Games for healthy minds, Fair play.

UNIT 2 Game Design Interfaces: Region based interface,Offline vs Online Interface,Hardware vs software interface,Game Design Controls ,Defining behavior interface of objects, like car,gun,soldiers etc.

UNIT 3 Graphics and effects:Sprites:Layering with depth, sheets and the GPU,scaling , Animation,Tiling,Illusion of Depth, Particle System: Particle,Creating effects,Blending Types,Types of effects and Effect System,GPU Programming.

UNIT 4 Tools in game:Unity,Stencyl,Game Maker,Blender,Photoshop,Blender etc.Game design framework:MDA, Data Structures for game design:STL etc. Game Design Protocols and Communication Overheads.

UNIT 5 Case study of game:on quality and performance parameters,user engagement and interactivity ,commercial and psychological impact.

DIRECT ASSESMENT:

ASSESSMENT OF THEORY:

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

SESSMENT OF PRACTICAL:

1. Internal Assessment for continuous evaluation (40%): Lab assignments, demonstration, Viva, File etc.
2. End semester Practical Exam (60%): Quiz/Programming test, lab journal, demo, viva etc.

INDIRECT ASSESMENT:

1. Feedback of students on attainment of cos.
2. Feedback of students on classroom learning.
3. External examiners feedback on Cos.

TEXT BOOKS RECOMMENDED:

1. Making Games for Impact KURT SQUIRE
2. Nystrom Robert, Game Programming Patterns, 3rd edition, Genever Benning, 2014.
3. The evolution of social impact of video game economics.
4. 2D Graphic Programming for games. Game Graphics programming

REFERENCE BOOKS:

1. Anna Anthropy and Naomi Clark, A Game Design Vocabulary: Exploring the Foundational Principles Behind Good Game Design, 2014, Addison-Wesley Professional.
2. Sung, K., Pavleas, J., Arnez, F., Pace, J., Build Your Own 2D Game Engine and Create Great Web Games: Using HTML5, JavaScript, and WebGL, 2015, Apress Publishers.
3. Zach Hiwiller, Players Making Decisions, 2nd Edition, 2019, New Riders Publishers.
4. Patrick Alessi, Beginning IOS Game Development, 2011, Wrox Publishers.
5. The business of Gamification A critical analysis Edited by Mikolaj Dymek and Peter Zackarisson.
6. Game psychology and behavior(Springer)
7. DATA STRUCTURES AND ALGORITHMS FOR GAME DEVELOPERS by Allen Sherrod.