Shri Shankaracharya Technical Campus,
Shri Shankaracharya Group of Institutions
(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekananda Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

Second Year (3nd semester) M. Tech

S.N.	Subject Name	Subject Code	Periods per week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
			L	T	P	Theory/Practical				
						ESE	CT	TA		
1	Data Warehousing & Data Mining	**CS221301**	3	1	-	100	20	20	140	4
2	Elective–III Data Science	**CS221344**	3	1	-	100	20	20	140	4
3	Preliminary work on Dissertation	**CS221391**	-	-	28	100	-	100	200	14
4	Seminar based on Dissertation	**CS221392**	-	-	3	-	-	20	20	2
Total			**6**	**2**	**31**	**300**	**40**	**160**	**500**	**24**

L-Lecture, T- Tutorial, P- Practical, ESE- End Semester Examination, CT- Class Test, TA- Teacher's Assessment

Elective –III			
S.No.	**Board of Study**	**Code**	**Subject**
1	Computer Science Engineering	CS221341	Embedded Systems
2	Computer Science Engineering	CS221342	Object Oriented Software Engineering
3	Computer Science Engineering	CS221343	Enterprise Resource Planning
4	Computer Science Engineering	CS221344	Data Science
5	Computer Science Engineering	CS221345	Multimedia and Wireless Technology

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Second Year (3nd semester) M. Tech

Subject Code	Data Warehousing & Data Mining	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
To understand the overall architecture of a data warehouse. • The different data mining models and techniques will be discussed in this course. • Evaluate different models used for OLAP and data pre-processing; • Design and implement systems for data mining and evaluate the performance of different data mining algorithms; • Propose data mining solutions for different applications. • Differentiate Online Transaction Processing and Online Analytical processing	After successful completion of this course students will be : CO1:Design a data warehouse for an organization CO2: Develop skills to write queries using DMQL CO3:Extract knowledge using data mining techniques CO4: Adapt to new data mining tools. CO5: Explore recent trends in data mining such as web mining , spatial-temporal mining

Unit-I **[CO1] [10 Hrs]**

Data Warehousing:

Introduction to Data Warehousing: Evolution of Data Warehousing, Data Warehousing concepts, Benefits of Data Warehousing, Comparison of OLTP and Data Warehousing, Problems of Data Warehousing.

Data Warehousing Architecture

Architecture: Operational Data and Data store, Load Manager, Warehouse Manager, Query Manager, Detailed Data, Lightly and highly summarized Data, Archive/Backup Data, Meta-Data, architecture model, 2-tier, 3-tier and 4-tier data warehouse, End user Access tools.

Unit – II **[CO2] [10 Hrs]**

Data Warehousing Tools and Technology

Tools and Technologies: Extraction, cleaning and Transformation tools, Data Warehouse DBMS, Data Warehouse Meta-Data, Administration and management tools, operational vs. information systems. OLAP & DSS support in data warehouse

Unit-3 **[CO3] [10 Hrs]**

Types of Data Warehouses & Data Warehouse Design

Host based, single stage ,LAN based,Multistage,stationarydistributed&virtualdata-warehouses.Data warehousing Design: Designing Data warehouse Database, Database Design Methodology for Data Warehouses, Data Warehousing design Using Oracle.

Unit—IV **[CO4] [10 Hrs]**

Data Mining

Basic Data Mining tasks, Knowledge discovery in databases, Issues, OLTP systems, Fuzzy sets and Fuzzy logic, Information Retrieval, Dimensional Modeling, OLAP, Web search engines, Data Mining Techniques [09 Hrs]

Unit-5	**[CO5] [09 Hrs]**
Classification Statistical based algorithms, Distance based algorithms **Clustering** Minimum Spanning tree, K-means clustering, nearest neighbor algorithm **Association Rules** Large items sets, Basic Algorithms Web Mining	

Text Books:

S.No.	Title	Authors	Publisher
1	"Building the Data Warehouse	W.H.Inmon	John Wiley &Sons.
2	"Developing the Data Warehouse"	W.H.Inmon, C.Kelly	John Wiley &Sons
3	Data Mining-Introductory and Advanced Topics	Margaret H.Dunham	M Pearson Education

References:

S.No.	Title	Authors	Publisher
1	"Managing the Data Warehouse	W.H .Inman ,C.L.Gassey	John Wiley &Sons.
2	"Advances in knowledge discovery &Data Mining	Fayyad ,UsamaM.et.al	MIT Press
3	Data Mining Techniques	ArunK.Pujari	University press(India) Pvt.Ltd .,Hyderabad

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SCHEME OF EXAMINATION AND SYLLABUS

Second Year (3nd semester) M. Tech

Elective–III

Subject Code	Data Science	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
To provide strong foundation for data science and application area related to it and understand the underlying core concepts and emerging technologies in data science.	CO1: Understand the fundamental concepts of data science CO2: Evaluate the data analysis techniques for applications handling large data CO3: Demonstrate the various machine learning algorithms used in data science process CO4: Understand the ethical practices of data science CO5:Visualize and present the inference using various tools CO6:Learn to think through the ethics surrounding privacy, data sharing and algorithmic decision-making

Unit – I **[CO2] [10 HRS]**

Introduction to Data Science , Evolution of Data Science , Data Science Roles , Stages in a Data Science Project Applications of Data Science in various fields , Data Security Issues.

Unit – II **[CO2] [10 HRS]**

Data Collection and Data Pre-Processing Data Collection Strategies, Data Pre-Processing Overview, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization.

Unit – III **[CO3] [10 HRS]**

Exploratory Data Analytics Descriptive Statistics , Mean Standard Deviation, Skewness and Kurtosis, Box Plots Pivot Table, Heat Map, Correlation Statistics, ANOVA.

Unit – IV **[C04] [9 HRS]**

Model Development Simple and Multiple Regression, Model Evaluation using Visualization, Residual Plot, Distribution Plot, Polynomial Regression and Pipelines, Measures for In-sample Evaluation, Prediction and Decision Making.

Unit – V **[CO5] [9 HRS]**

Model Evaluation Generalization Error, Out-of-Sample Evaluation Metrics, Cross Validation, Over fitting, Under Fitting and Model Selection, Prediction by using Ridge Regression, Testing Multiple Parameters by using Grid Search.

Text Books:

S.No.	Title	Authors	Publisher
1	Introducing Data Science	Davy Cielen, Arno D. B. Meysman, Mohamed Ali	Manning Publications Co
2	An Introduction to Statistical Learning: with Applications in R	Gareth James, Daniela Witten, Trevor Hastie	Robert Tibshirani, Springer
3	Deep Learning	Ian Good fellow, Yoshua Bengio, Aaron Courville	MIT Press
4	Ethics and Data Science	D J Patil, Hilary Mason, Mike Loukides	O' Reilly

Reference Books:

S.No.	Title	Authors	Publisher
1	The Intersection of IoT and Data Science	Jojo Moolayil	PACKT
2	"Doing Data Science"	Cathy O'Neil and Rachel Schutt	O'Reilly
3	"Data Science and Big data Analytics"	David Dietrich, Barry Heller, Beibei Yang	EMC
4	"Handbook of Research on Cloud Infrastructures for Big Data Analytics"	Raj, Pethuru	IGI Global

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SCHEME OF EXAMINATION AND SYLLABUS
Second Year (3nd semester) M. Tech

Subject Code	Embedded Systems	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
To use assembly and high level languages to interface the microcontrollers to various applications. • To provide comprehensive knowledge of the architecture, features and interfacing with 8051 microcontroller. • To make students familiar with the basic blocks of microcontroller device and Embedded system in general.	1. To understand Microcontroller 8051 its architecture and its instruction set. 2. Gain knowledge about Counter/timer and interrupts in 8051 Microcontroller and Programming concepts. 3. Students will be able to do serial communication programming and gain knowledge of serial communication. 4. Students will be able to understand interfacing Microcontroller 8051 with devices.

Unit - I
Software and hardware aspects of Embedded system **[CO1] [10 hrs]**
The concepts of embedded system design, embedded microcontroller cores, embedded memories, examples of embedded systems.
Technological aspects of embedded system: interfacing between analog and digital blocks, signal conditioning, Digital signal processing, subsystem interfacing, interfacing with external systems, user interfacing, Design tradeoffs due to process compatibility, Thermal consideration etc.
Software aspects of embedded systems: real time programming languages and operating systems.

Unit- II [CO2] **[10 hrs]**
Introduction, CPU architecture, registers, instruction sets addressing modes Loop timing, timers, Interrupts, Interrupt timing, I/o Expansion, I2C Bu s Operation Serial EEPROM, Analog to digital converter, UART Baud Rate-Data Handling-Initialization, Special Features - serial Programming-Parallel Slave Port.**[10 hrs]**

Unit-III [CO3] **[10 hrs]**
Motorola MC68H11 Family Architecture Registers, Addressing modes Programs. Interfacing methods parallel/ IO Interface, Parallel Port interfaces, Memory Interfacing, High Speed I/O Interfacing, Interrupts- interrupt service routine-features of interrupts-Interrupt vector and Priority, timing generation and measurements, Input capture, Output compare, Frequency Measurement, Serial I/o devices RS.232, RS.485.AnalogInterfacing,Applications.AR processors

Unit-IV **[CO4] [9 hrs]**
Embedded system development, Embedded system evolution trends. Round - Robin, robin with Interrupts, function-One-Scheduling Architecture, Algorithms. Introduction to -assembler-compiler-cross compilers and Integrated Development Environment (IDE). Object Oriented Interfacing, Recursion, Debugging strategies, Simulators.

Unit-V **[CO5] [9 hrs]**

RTOS & its overview:

Real Time Operating System: Task and Task States, tasks and data, semaphores and shared Data Operating system Services-Message queues-Timer Function-Events-Memory Management, Interrupt Routines in an RTOS environment, basic design Using RTOS

Text Books/ References:

S.No.	Title	Authors	Publisher
1	An embedded software primer	David E Simon	Pearson education
2	Design with Microcontroller	John B Peat man	Pearson education
3	Embedded Micro computer Systems .Real time Interfacing	JonartthanW.Valv anoBrooks/ cole	Thomson learning2001

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Subject Code	Object Oriented Software Engineering	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration

Course Objective	Course Outcomes
1.Understand object-oriented programming features in C++, 2. Apply these features to program design and implementation, 3. Understand object-oriented concepts and how they are supported by C++, 4. Understand implementation issues related to object-oriented techniques, 5. Build good quality software using object-oriented programming technique	Knowledge and Understanding- At the end of a course the student will understand the concepts of: CO1:Variables, data Types (including strings and arrays) and Expressions CO2:Functional and procedural abstraction and its importance in good program design CO3:Pointers and memory allocation (static and dynamic CO4:Analyse a simple programming problem specification CO5: Design a high-level (programming language independent) solution to the problem using functional abstraction and general imperative programming language constructs.

Unit-1 **[CO1] [10 hrs]**
Introduction to Software Engineering:
Software Engineering Development, Software Life Cycle Models, Standards for developing life cycle models.

Unit-2 **[CO2] [10 hrs]**
Object Methodology & Requirement Elicitation:
Introduction to Object Oriented Methodology, Overview of Requirements Elicitation, Requirements Model-Action & Use cases, Requirements Elicitation Activities, Managing Requirements Elicitation

Unit-3 **[CO3] [10 hrs]**
Architecture:
Model Architecture, Requirements Model, Analysis Model, Design Model, Implementation Model, Test Model
Modeling with UML:
Basic Building Blocks of UML, A Conceptual Model of UML, Basic Structural Modeling, UML Diagrams

Unit-4 **[CO4] [9 hrs]**
System Analysis:
Analysis Model, Dynamic Modeling & Testing
System Design:
Design concepts & activities, Design models, Block design, Testing

Unit-5 **[CO5] [9 hrs]**

Component Based Computing

Fundamentals: Definition and nature of components, components and interfaces, Interfaces as contracts, the benefits of components.

Basic Techniques: component design and assembly, Relationship with the client-server model and with patterns, Use of objects and object lifecycle services, use of object brokers

Text/Reference Books:

S.No.	Title	Authors	Publisher
1	"Classical & Object Oriented Software Engineering with UML and Java"	Stephen R. Scach	McGraw Hill
2	Object Oriented Software Engineering: A use Case Driven approach	Ivar Jacobson, Magnus Christerson.	Addison wisely

Subject Code	Enterprise Resource Planning	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
To know To know the basics of ERP and business modules of ERP • To understand the key implementation issues of ERP. • To be aware of some popular products in the area of ERP. • To appreciate the current and future trends in ERP the basics of ERP and business modules of ERP.	Students will know the strategic importance of Enterprise Resource Planning CO1: Identify the important business functions provided by typical business software such as enterprise resource planning and customer relationship management. CO2: Describe basic concepts of ERP systems for manufacturing or service companies. CO3: Analyze the technical aspect of telecommunication systems, internet and their roles in business environment. CO4: Develop skills necessary for building and managing relationships with customers, and stakeholders. CO5:Analyze the strategic options for ERP identification and adoption

Unit-1 **[CO1] [10 hrs]**
Introduction to ERP: Evolution, What is ERP? Reasons for the growth of ERP market, the advantages of ERP, **Enterprise An overview:** Integrated Management Information, Business Modeling, Integrated Data Model**.**

Unit-2 **[CO2] [10 hrs]**
ERP & Related Technologies: BPR, MIS, DSS, EIS, Data Warehousing, Data Mining, OLAP, SCM; **ERP – A Manufacturing Perspective:**MRP, BOM, MRP- II, DRP, JIT and Kanban , CAD/CAM, PDM , MTO, MTS, ATO, ETO, CTO

Unit-3 **[CO3] [10 hrs]**
ERP Modules: Finance, Plant Maintenance, Quality Management, Materials Management; Benefits of ERP. **ERP Markets:** SAP AG, Baan Company, Oracle Corporation, PeopleSoft, JD Edwards, SSA , QAD.

Unit-4 **[CO4] [10 hrs]**
ERP Implementation Lifecycle: Pre-evaluation screening, Package evaluation, Project planning phase,GapAnalysis,Reengineering,Configuration,Training,Testing,GoingLive,Postimplementation; Vendors, Consultants and Users

Unit-5 **[CO5] [9 hrs]**
Future Directions in ERP: New Markets, New channels, Faster implementation methodologies, Business models and BAPIs, convergence on windows NT, Application platforms, New Business Segments, Web Enabling, Market Snapshots.
ERP case studies

Text Books:

S.No.	Title	Authors	Publisher
1	Enterprise Resource Planning	Alexis Leon	Tata McGraw Hill
2	Enterprise Resource Planning Concepts & Practice	VinodKuma r Garg, N.K.VenkitaK rishan.	

Subject Code	Mobile Computing	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
• To introduce the fundamental design principles & issues in cellular & mobile communications. • To enable the student to understand the basic features of cellular-mobile communication systems and digital radio system. • To motivate students to understand the different technology for working of mobile devices, their advantages and disadvantages and emerging problems.	After successful completion of the course students will be able to : CO1: Explain the basics of mobile Computing. CO2: Describe the functionality of Mobile IP and Transport Layer. CO3: Classify different types of mobile telecommunication systems. CO4: Demonstrate the Adhoc networks concepts and its routing protocols. CO5: Make use of mobile operating systems in developing mobile applications.

Unit-1 **[CO1]** [10 hrs]
Issues in Mobile Computing, Overview of wireless Telephony, IEEE 802.11 & Blue Tooth, Wireless Multiple access protocols, channel Allocation in cellular systems.

Unit-2 **[CO2] [10 hrs]**
Data Management Issues, data replication for mobile computers, adaptive Clustering for Mobile Wireless networks.

Unit-3 **[CO3] [10 hrs]**
Distributed location Management ,pointer forwarding strategies ,Energy Efficient Indexing on air ,Energy Indexing for wireless broadcast data, Mobile IP, TCP Over wireless.
[10 hrs]

Unit-4 **[CO4] [10 hrs]**
Mobile Agents Computing, Security and fault tolerance, transaction processing in Mobile computing environment.

Unit-5 **[CO5] [9 hrs]**
Adhocnetwork, Routing Protocol, Global State Routing (GSR), Dynamic State Routing (DSR), Fisheye, State Routing (FSR), Adhoc On-Demand Distance Vector (AODV), Destination Sequenced Distance– Vector Routing (DSDV).

Text Books:

S.No.	Title	Authors	Publisher
1	Mobile Communication	Jochen Schiller	Prentice Hall
2	Mobile Computing Technology Applications and service creation	Asoke K Telukder, Roopa R Yavagal	Tata McGraw Hill
3	TCP/IP Protocol Suite	Behrouz A Forouzan	Tata McGraw Hill

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Second Year (3nd semester) M. Tech

Subject Code	Multimedia and Wireless Technology	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration

Course Objective	Course Outcomes
• To understand the technical details of common multimedia data formats, protocols, and compression techniques of digital images, video and audio content. • To understand the technical details of JPEG and MPEG families of standards. • To understand the principles and technical details of several wired and wireless networking protocols. • To understand and describe technical aspects of popular multimedia web applications including VoD and VoIP.	After successfully completing this course, students will be able CO1: To develop a thorough understanding of the major aspects of multimedia data representation and multimedia content delivery platforms. CO2: Have knowledge and understanding of basic mobile network architecture CO3: Have knowledge and understanding of some basic technologies that are in use CO4: Be able to make critical assessment of mobile systems CO5: Be able to analyze and propose broad solutions for a range of mobile scenarios

Unit -1
Multimedia Applications and Quality of Service (QoS) [CO1] [10HRS]
Multimedia Applications, Applications, Main Protocols, Quality of Service Fundamentals, Introduction QoS Parameters, Multimedia Application Requirements, QoS Services, Realization of QoS Services, QoS Mechanisms Introduction, Classification ,Channel Access Mechanism, Packet Scheduling Mechanisms, Traffic Policing ,Mechanism, Resource Reservation Signaling Mechanisms, Admission Control

Unit-2
Multimedia Coding Techniques for Wireless Networks [CO2] [10HRS]
Introduction ,Digital Multimedia and the Need for Compression ,Standardization Activities Basics of Compression ,Entropy, Entropy Reduction and ,Entropy Coding , General Compression Scheme , Understanding Speech Characteristics ,Speech Generation and Perception ,Digital Speech ,Speech Modeling and Linear Prediction, General Aspects of Speech Compression ,Three Types of Speech Compressors , Waveform Compression ,Open-Loop Vocoders: Analysis – Synthesis Coders Closed Loop Coders: Analysis by Synthesis Coding ,Speech Coding Standards ,Understanding Video Characteristics

Unit -3
Multimedia Transport Protocols for Wireless Networks [CO3] [10HRS]
Introduction ,Networked Multimedia-based Services ,Time Relations in Multimedia ,Non-Real-time and Real-time Multimedia Services , CBR vs. VBR Encoding for Video ,Transmission of VBR Content Over Constant,RateChannels,ClassificationofReal-timeServices,One-WayStreaming,MediaonDemand (MoD) Delivery ,Conversational Communication ,Adaptation at the Video Encoding Level ,Non-adaptive Encoding , Adaptive Encoding ,Scalable/Layered Encoding ,Quality of Service Issues for Real-time Multimedia Services , Bandwidth Availability , Delay and Jitter , Recovering Losses

			1.00	
Chairman (AC)	Chairman (BoS)	Date of Release	Version	Applicable for AY2021-22 Onwards

Unit-4

Multimedia Control Protocols for Wireless Networks **[CO4] [10HRS]**

Introduction ,A Premier on the Control Plane of Existing Multimedia Standards , ITU Protocols for Videoconferencing on Packet-switched Networks ,IETF Multimedia Internetworking Protocols , Control, Protocols for Wireless Networks, Protocol for Describing Multimedia Sessions: SDP, The Syntax of SDP Messages, SDP Examples, Control Protocols for Media Streaming, RSTP Operation, RTSP Messages, RTSP Methods, Session Setup: The Session Initiation Protocol (SIP) , Component, SIP Messages , Addresses, Address Resolution, Session Setup, Session Termination and Cancellation, Advanced SIP Features for Wireless Networks

Unit-5

Wireless Multimedia Personal Area Networks **[CO5] [10HRS]**

Introduction ,Multimedia Information Representation , Bluetooth1 (IEEE 802.15.1) ,The Bluetooth1 Protocol Stack , Physical Layer Details ,Description of Bluetooth1 Links and Packets , Link Manager , Secret Discovery and Connection Establishment , TXOP Limit vs. Medium Accessing,Bluetooth1 Security, Application Areas ,Coexistence with Wireless LANs (IEEE 802.15.2) , Overview of 802.11 Standard , 802.11b and Bluetooth1 Interference Basics ,Coexistence Framework ,High-Rate WPANs (IEEE 802.15.3) , Physical Layer ,Network Architecture Basics , Pico net Formation and Maintenance

Text Books:

S.No.	Title	Authors	Publisher
1	Multimedia Wireless	Ali,Kohen, WilleyEastern	
2	Wireless Communications: Principles and Practice	Theodore S. Rapp port	Prentice Hall
3.	Wireless Multimedia Communication Systems: Design, Analysis	K. R. Rao, Bojan M. Bakmaz, Zoran	