PROGRAMME GUIDE

MASTER OF TECHNOLOGY (SOFTWARE ENGINEERING)
(M. Tech SE)

*Scheme of Examination (CBCS/ELECTIVE)
*Detailed Structure of Syllabus

DR. C.V. RAMAN UNIVERSITY
KARGI ROAD, KOTA, BILASPUR, CHATTISGARH
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MASTER OF TECHNOLOGY

Duration: 24 Months (2 Years)
Eligibility: BE (CS)/ (IT)/MCA in a Related Field with Qualified Marks

w.e.f = July 2020

COURSE STRUCTURE OF M.TECH – SOFTWARE ENGINEERING SEMESTER Ist													
Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
			Total Marks	Major		Minor		Sessional ***		L	T	P	Subject wise Distribution
Course Code	Course Type	Course Title		Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks				
Theory Group													
6TMSE 101	Core-I	Advanced Computational Mathematics	100	50	17	20	07	30	15	2	1	0	3
6TMSE 102	Core- II	Machine Learning	100	50	17	20	07	30	15	2	1	0	3
6TMSE 103	Core- III	Software Architecture & Design Pattern	100	50	17	20	07	30	15	2	1	0	3
6TMSE 104	Core- IV	Object Oriented Technology	100	50	17	20	07	30	15	2	1	0	3
6TMSE 105	Core-V	Advanced Computer Network	100	50	17	20	07	30	15	2	1	0	3
6TMCS 106	Program Elective-1	Audit Course-I 1. English for research paper writing 2. Pedagogy studies 3. Stress management by Yoga	-	-	-	-	-	-	-	-	-	-	-
Practical Group				Term End Practical Exam				Sessional					
6TMSE106	Core- II	Computing with Python	50	25	12			25	12	-	-	1	1
6TMSE107	Core- III	Object Oriented Technology	50	25	12			25	12	-	-	1	1
Grand Total			600							10	5	2	17

Minimum Passing Marks are equivalent to Grade D
L- Lectures T- Tutorials P- Practical
Major- Term End Theory / Practical Exam
Minor- Pre University Test
Sessional weightage – Attendance 50%, Three Class Tests/ Lab Performance Assignment 50%

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Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
Course Code	Course Type	Course Title	Total Marks	Major		Minor		Sessional ***		L	T	P	Subject wise Distribution
				Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks				
Theory Group													
6TMSE 201	Core-VI	Software Design & Testing	100	50	17	20	07	30	15	2	1	0	3
6TMSE 202	Core-VII	Software Project Management	100	50	17	20	07	30	15	2	1	0	3
6TMSE 203	Core-VIII	Advanced Concept in Database	100	50	17	20	07	30	15	2	1	0	3
6TMSE 204	Core-IX	Web Technology and commerce	100	50	17	20	07	30	15	2	1	0	3
6TMSE 205	Program Elective-I	Professional Elective-1	100	50	17	20	07	30	15	2	1	0	3
6TMST 206	Program Elective-2	Audit Course-II 1.Disaster management 2- Personality Development through life enlightenment skills 3- Value addition	-	-	-	-	-	-	-	-	-	-	-
Practical Group				Term End Practical Exam				Sessional					
6TMSE 206	Core-X	Internet of things	50	25	12			25	12	-	-	1	1
6TMSE 207	Core-XI	Big Data	50	25	12			25	12	-	-	1	1
Grand Total			600							10	5	2	17

Minimum Passing Marks are equivalent to Grade D

L- Lectures T- Tutorials P- Practical

Major- Term End Theory / Practical Exam

Minor- Pre University Test

Sessional weightage – Attendance 50%, Three Class Tests/ Lab Performance Assignment 50%

* Professional Elective-1TMSE 205(A) Data structure and Algorithm using Python

6TMSE 205(B) Information theory, coding and Cryptography

6TMSE 205(C) Data Analytic using R-Programming

6TMSE 205(D) Ad-hoc Network

6TMSE 205(E)Image Processing

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COURSE STRUCTURE OF M.TECH – SOFTWARE ENGINEERING SEMESTER IIIrd														
Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits	
Course Code	Course Type	Course Title	Total Marks	Major		Minor		Sessional ***		L	T	P	Subject wise Distribution	
				Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks					
Theory Group														
6TMSE 301	Program elective-II	Professional Elective-II	100	50	17	20	07	30	15	2	1	0	3	
6TMSE-302	Program Elective-III	Professional Elective-III	100	50	17	20	07	30	15	2	1	0	3	
Practical Group				Term End Practical Exam				Sessional						
6TMSE-303	Seminar	Seminar	100	50	25			50	25	-	-	10	10	
6TMSE-304	Dissertation -I	Dissertation -I	200	50	25			50	25	-	-	1	1	
Grand Total			500							4	2	11	17	

Minimum Passing Marks are equivalent to Grade D
Major- Term End Theory / Practical Exam
Minor- Pre University Test
Sessional weightage – Attendance 50%, Three Class Tests/ Lab Performance Assignment 50%

L- Lectures T- Tutorials P- Practical

*Professional Elective-II
6TMSE 301(A) **Data Science**
6TMSE 301(B) **Parallel Algorithm**
6TMSE301(C) **Real time operation system**

** Professional Elective-III
6TMSE302(A) **Deep Learning**
6TMSE302(B) **Privacy and security in online social Media**
6TMSE302(C) **Grid Computing**

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COURSE STRUCTURE OF M.TECH – SOFTWARE ENGINEERING SEMESTER IVth													
Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
Course Code	Course Type	Course Title	Total Marks	Major		Minor		Sessional ***		L	T	P	Subject wise Distribution
				Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks				
Practical Group				Term End Practical Exam				Sessional					
6TMSE-401	Dissertation-II	Dissertation Part-II	500	300	150			200	100	-	-	17	17
Grand Total			500									17	17

Minimum Passing Marks are equivalent to Grade D

L- Lectures T- Tutorials P- Practical

Major- Term End Theory / Practical Exam

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SEMESTER- 1ST
Course: M. Tech (SE)
SUBJECT: ADVANCED COMPUTATIONAL MATHEMATICS

SUBJECT CODE: 6TMSE101
Theory Max. Marks: 50
Theory Min. marks 17

COURSE OBJECTIVE:

* Apply critical thinking and communication skills to solve applied problems.
* Use knowledge and skills necessary for immediate employment or acceptance into a graduate program.
* Maintain a core of mathematical and technical knowledge that is adaptable to changing technologies and provides a solid foundation for future learning.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Linear Algebra: Linear transformation, vector spaces, hash function, Hermite polynomial, Heavisite's unit function and error function. Elementary concepts of Modular mathematics	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Solution of Partial Differential Equation (PDE) by separation of variable method, numerical solution of PDE (Laplace, Poisson's, Parabolic) using finite difference methods, Elementary properties of FT, DFT, WFT, Wavelet transform, Haar transform.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Probability, compound probability and discrete random variable. Binomial, Normal and Poisson's distributions, Sampling distribution, elementary concept of estimation and theory of hypothesis, recurred relations.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Stochastic process, Markov process transition probability transition probability matrix, just and higher order Markov process, Application of Eigen value problems in Markov Process, Markov chain. Queuing system, transient and steady state, traffic intensity, distribution queuing system, concepts of queuing models (M/M/1: Infinity/ Infinity/ FC FS), (M/M/1: N/ Infinity/ FC FS), (M/M/S: Infinity/ Infinity/ FC FS)	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relation equations, fuzzy logics. MATLAB introduction, programming in MATLAB scripts, functions and their application.	Usage of ICT like PPT, Video Lectures,Black board

Course Objectives:

On completion of this course you should be able to:

1. Analyse and solve problems relating to a wide range of applications.
2. Demonstrate high level knowledge, skills and their application in the selected fields in the course description.
3. Apply research methods that are particularly relevant in Computational Mathematics.

Reference Books:

* Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson P

- Data Structures and Algorithms, Aho, Hopcroft, Ullman, Pearson Education P
- Data Structures and algorithm in Java, Drozdek, Cengage (Thomson)
- Data structures Using C++, Gilberg, Cengage
- Computer Algorithms, Horowitz, Sahni, Rajasekaran,   Galgotia,
- Data Structures using C & C++, Tanenbaum A.S., Langram Y, Augestien M.J.Prentice Hall of India, 2002

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Scientist at various research centers	Able to understand concept of mathematics	Goal no 04	

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SEMESTER- 1st
Course: M. Tech (SE)
SUBJECT: MACHINE LEARNING

Subject Code: 6TMSE102
Theory Max. Marks: 50
Theory Min. marks 17

COURSE OBJECTIVE:

- Understand the concepts of machine learning.
- Understand the clustering techniques and their utilization in machine learning.
- Study the neural network systems for machine learning.
- Learn and understand the linear learning models in machine learning.
- Study the tree based machine learning techniques and to appreciate their capability.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction Machine learning: What and why?, Types of Machine Learning - Supervised Learning - Unsupervised Learning – reinforcement, The Curse of dimensionality , Over fitting and linear regression, Bias and Variance, Learning Curve, Classification, Error and noise, Parametric vs. non-parametric models-Linear models	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Clustering Approaches Measuring dis-similarity - Evaluating the output of clustering method, Spectral clustering - Graph Laplacian - Normalized graph Laplacian, Hierarchical clustering -Agglomerative clustering – Divisive clustering - Choosing the number of clusters, Bayesian hierarchical clustering, Clustering datapoints and features, Bi-clustering, Multi-view clustering, K-Means clustering, K-meloids clustering	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Neural Networks Biological motivation for Neural Network : Neural network Representation, Perceptrons, Feed forward networks, Multilayer Networks and Back Propagation Algorithms, 2onvergence and local minima and Hidden layer representation in back propagation, Recurrent networks, Application of neural network- Face recognition using neural network, Biological motivation for Neural Network : Neural network Representation, Perceptrons	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Linear Models Linear Regression, Logistic Regression, Maximum Likelihood estimation (least squares), Robust linear regression, Ridge Regression, Principal Component Analysis, Bayesian Classifier, Support Vector Machines	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Tree Learning Directed and Undirected trees, Decision tree representation, Basic decision tree learning algorithm, Inductive bias in decision tree, Issues in decision tree, classification and regression trees(CART), Random forest, Multivariate adaptive regression trees(MART), Junction tree algorithm	Usage of ICT like PPT, Video Lectures,Black board

Course Outcome:

On completion of the course students will be expected to:

- Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
- Have an understanding of the strengths and weaknesses of many popular machine learning approaches.

Text Books:

- Genetic Algorithms : In Search Optimization and Machine Learning David E. Goldberg New Delhi Pearson Education
- Artificial Intelligence and Machine Learning Vinod Chandra S.S. & Anand Hareendran S. New Delhi PHI Learning

Reference Books:

- Machine Learning Anuradha Srinivasaraghavan, Vincy Joseph Wiley
- Machine Learning Saikat Dutt , Subramanian Chandramouli, Amit Kumar Das Pearson Education
- Machine Intelligence Suresh Samudrala Notion Press

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Research associate, research analyst	Able to understand concept of research	Goal no 04	Research services

SEMESTER- 1st

Course: M. Tech (SE)

SUBJECT: SOFTWARE ARCHITECTURE & DESIGN PATTERN

Subject Code: 6TMSE103

Theory Max. Marks: 50

Theory Min. Marks: 17

COURSE OBJECTIVE:

- The students get basic knowledge of patterns and description of patterns
- To understand basic architectural patterns
- To get an insight on the design patterns and mining.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	**Introduction to Software Architecture** Introduction – Software architecture – An engineering discipline for software - Architectural Styles – Pipes and filters – Layered Systems - Black board – Repositories - Process control - Distributed system – Interactive system – Adaptive system	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	**Design Patterns & Pattern System** Introduction to patterns – Pattern category – Relationship between patterns – Pattern Description – Patterns software architecture -Structural decomposition – Organization of work – Access control – Management and Communication – Idioms, Pattern system – Pattern Classification – Pattern Selection – implementation – Evolution – Patterns in Software architecture – Non – functional properties – Techniques of Software architecture.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	**Community, Mining, Concurrent & Networked** (9 hours) Roots – Community – Pattern Mining - Organizing and Indexing – Methods and tools – Algorithm – Data Structures and Patterns – Formalizing Patterns, Concurrent and Networked Objects, Service Access and Configuration Patterns	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	**Event Handling & Synchronization Patterns** Event Handling Patterns – Reactor, Proactor, Asyn Completion Tokens, AcceptorConnector, Synchronization Patterns – Locking – Scoped, Strategized, Thread - safe Interface, Double-Checked Locking Optimization.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	**Concurrency & Weaving Patterns** Objects – Active, Monitor, Half- Sync, Async, Leader/ Followers, Threads, Weaving – Individual Patterns, Middleware, Concurrency and Networking, Patterns Language Vs Pattern System. Past, Present and Future of Patterns.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

At the end of the course the student will be able to 1.Understand the architecture, creating it and moving from one to any, different structural patterns. 2.Analyze the architecture and build the system from the components. 3.Design creational and structural patterns. 4.Learn about behavioral patterns. 5.Do a case study in utilizing architectural structures.

Practical:

The laboratory shall include development of systems by applying the Software Engineering principles and methods for specific applications (30 hours)

Text Books:

- Advance Computer Architecture parthsarthy, Cengage (Thomson)

Reference Books:

- Software Architect's Handbook Publishing Joseph Ingeno Packt
- The Process of Software Architecting Wesley Peter Eeles, Peter Cripps Addison
- Designing Software Architectures Cervantes Pearson India

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Software architect	Able to understand concept of software architecture	Goal no 04	

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SEMESTER- 1st

Course: M. Tech (SE)

SUBJECT: OBJECT ORIENTED TECHNOLOGY

Subject Code: 6TMSE104

Theory Max. Marks: 50

Theory Min. Marks 17

COURSE OBJECTIVE:

Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Overview of object oriented concepts: Need for object oriented programming, characterization of object oriented languages.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Object oriented Design: Object structure concepts, methodology for object oriented design (Booch, and chen and chen), Design modelling , system design life cycle.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Object oriented programming: An overview of C++ programming, loops and decisions, structures and functions, objects and classes, Array and pointers, Inheritance, virtual function, files and stream.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Object oriented Databases: Relational v/s object oriented databases, the architecture of 00 databases, Query languages for 00 databases, Gemstone/02/Orion.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Distributed object oriented systems: Object management group, CORBA.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

*   Understand the features of C++ supporting object oriented programming
*   Understand the relative merits of C++ as an object oriented programming language
*   Understand how to produce object-oriented software using C++
*   Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism
*   Understand advanced features of C++ specifically stream I/O, templates and operator overloading

PRACTICAL:

1. Write a C++ program that overloads the + operator and relational operators (suitable) to perform Concatenation of two strings.
2. Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.
3. Write a C++ program that illustrates the role of virtual base class in building class.
4. Write a C++ program that uses a function to delete all duplicate characters in the given.

5. Write C++ programs that illustrate how the following forms of inheritance are supported (a) Single inheritance (b) Multiple inheritance (c) Multi level inheritance (d) Hierarchical inheritance.
6. Consider a payroll system; construct its Class diagram, use-case diagram, sequence diagram and activity diagram.
7. Consider a calculator, Draw Class, State, sequence and DFD for this system.
8. Consider a railway reservation system, Draw Class, State, sequence and DFD for this.
9. Consider a Telephone system, Draw Class, State, sequence and DFD for this system.
10. Draw class, state, sequence diagram and DFD for online sales system.
11. Programs Using Functions (a) Functions with default arguments (b) Implementation of Call by Value, Call by Address and Call by Reference.
12. Compile time Polymorphism (a) Operator Overloading including Unary and Binary Operators (b) Function Overloading.
13. Runtime Polymorphism (a) Inheritance (b) Virtual functions (c) Virtual Base Classes (d) Templates.
14. File Handling Sequential access and Random access.

Text Books:

- Object Oriented Analysis and Design
- Object Oriented S/W Development Satzinger, Cengage Gregor & Sykes DA, (Thomson). Van Nostrand.
- OOP in C++ Lafore, Galgotia Pub.
- The C++ Programming Language Stroustrup B Addison Wesely.
- Introduction to OOP Witt KV Galgotia Pub.

Reference Books:
- Object Data Management Cartel R. Addison Wesely.
- Modern Data Base System Kim W, ACM Press Addison Wesely.
- OOP by Blaschek G, Springer Verlag.

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Software Developer	Able to understand the concept of coding and implementation	Goal no 04	Development company

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SEMESTER- 1st
Course: M. Tech (SE)
SUBJECT: ADVANCED COMPUTER NETWORKING

Subject Code: 6TMSE105
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

At the end of the course, the students will be able to:

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.
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Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Review of Networking and OS. fundamentals, ISO-OSI Model, different layers and their functions, LAN, MAN, WAN, Communication media & principles IEEE standards etc.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Internetworking with TCP/IP, Basic concepts, Principles, Protocols and Architecture, Address handling Internet protocols and protocol layering. DNS, Applications: TELNET, RLOGN , FTP, TFTP, NFS, SMTP, POPL, IMAP, MIME, HTTP,STTP,DHCP, VOIP, SNMP.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Introduction to Router, Configuring a Router, Interior & Exterior Routing, RIP, Distance Vector Routing, OSPF, BGP, Uni-cast, Multicast and Broadcast. Multicast routing protocols: DVMRP, MOSPF, CBT, PIM, MBONE, EIGRP, CIDR, Multicast Trees, Comparative study of IPv6 and IPv4.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	VPN addressing and routing, VPN Host management, ATM Concepts, Services Architecture, Equipments and Implementation	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Introduction to wireless transmission and medium access control, wireless LAN: IEEE 802.11, Hipher LAN, Bluetooth Mobile Network and Transport layer, WAP GSM and CDMA: Network architecture and management	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:
After completing this course the student must demonstrate the knowledge and ability to:

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer. 5. Identify the different types of network devices and their functions within a network
- Understand and building the skills of subnetting and routing mechanisms.

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- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Text Books:

- Computer Networks: Tanenbaum.
- Internetworking with TCP/IP Comer.
- Data Communications Stalling.

Reference Books:

- Mobile Communication Schiller Pearson Education
- Computer Communications and network Technology, Gallo Cengage (Thomson)
- Wireless and Mobile Network Architecture: Yi Bing Lin, Wiley
- ATM Network: Kasara, TMH
- TCP/IP protocol Suite Forouzan TMH

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Network Engineer, Network Analyst, Network Violation Support	Able to understand all network concept	Goal no 04	Hardware sales and services

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SEMESTER- 1st
Course: M. Tech (SE)
SUBJECT: Audit Course-I
ENGLISH FOR RESEARCH PAPER WRITING

Subject Code: 6TMSE106
Theory Max. Marks:
Theory Min. marks

AUDIT 1 and 2: ENGLISH FOR RESEARCH PAPER WRITING

COURSE OBJECTIVE:

Students will be able to:
1. Understand that how to improve your writing skills and level of readability
2. Learn about what to write in each section
3. Understand the skills needed when writing a Title
   Ensure the good quality of paper at very first-time submission

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature,	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions	Usage of ICT like PPT, Video Lectures,Black board
Unit - VI	Useful phrases, how to ensure paper is as good as it could possibly be the first-time submission	Usage of ICT like PPT, Video Lectures,Black board

Reference Books:
- A Manual for Writers of Research Papers, Theses, and Dissertations Kate L. Turabian , Wayne C. Booth , Gregory G. Colomb , Joseph M. Williams University of Chicago Press
- PhraseBook for Writing Papers and Research in English Stephen Howe (Author), Kristina Henriksson (Author)The Whole World Company

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Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Content writer, script writer	Have best writing skills	Goal no 04	

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KARGI ROAD, KOTA, BILASPUR (C.G.)

SEMESTER- 1st
Course: M. Tech (CSE)
SUBJECT: Audit Course-I

Subject Code: 6TMSE106
Theory Max. Marks:
Theory Min. marks

PEDAGOGY STUDIES

COURSE OBJECTIVE:

Students will be able to:
1. Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
2. Identify critical evidence gaps to guide the development.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and terminology, Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and Searching.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Evidence on the effectiveness of pedagogical practices, Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Professional development: alignment with classroom practices and follow-up support Peer support Support from the head teacher and the community, Curriculum and assessment Barriers to learning: limited resources and large class sizes	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Research gaps and future directions: Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

Students will be able to understand:
1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

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Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Teacher	Able to understand teaching	Goal no 04	

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SEMESTER- 1st
Course: M. Tech (SE)
SUBJECT: Audit Course-I
STRESS MANAGEMENT BY YOGA

Subject Code: 6TMSE106
Theory Max. Marks:
Theory Min. marks

COURSE OBJECTIVE:

1. To achieve overall health of body and mind
2. To overcome stress

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Definitions of Eight parts of yog. (Ashtanga)	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Yam and Niyam, Do`s and Don't's in life, i) Ahinsa, satya, astheya, bramhacharya and aparigraha ii) Shaucha, santosh, tapa, swadhyay, ishwarpranidhan	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Asan and Pranayam i) Various yog poses and their benefits for mind & body ii) Regularization of breathing techniques and its effects-Types of pranayam	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

Students will be able to:
1. Develop healthy mind in a healthy body thus improving social health also
2. Improve efficiency

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Yoga teacher	Able to understand all aasan	Goal no 04	Yoga centre

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SEMESTER- 2nd

Course: M. Tech (SE)

SUBJECT: SOFTWARE DESIGN & TESTING

Subject Code: 6TMSE201

Theory Max. Marks: 50

Theory Min. marks 17

COURSE OBJECTIVE:

- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
- To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
- To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
- To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.
- To understand software test automation problems and solutions.
- To learn how to write software testing documents, and communicate with engineers in various forms.
- To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction to software testing, concepts, issues and techniques, test activities, management and automation, Coverage and usage testing based on checklist, input domain portioning and boundary testing.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Object oriented testing: testing OOA and OOD models, object oriented testing strategies, test case design for OO software, testing methods applicable at the class level, interclass test case design, Web application testing, debugging, security & reliability.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Programming style and program quality: simple style rules, comment statements, program quality, quantifying program quality.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Software quality and quality Assurance: Principle of Software Quality Assurance (SQA), Applying SQA to software project, proven factors for SQA success, SQA during software requirements, SQA during software design phase, SQA during software code and test, Advance quality engineering topics.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Human factors in software engineering: Human factors history, HCL requirements and design process, HCL testing.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

At the end of this course attendees will be able to:

- Understand quality management processes
- Distinguish between the various activities of quality assurance, quality planning and quality control.
- Understand the importance of standards in the quality management process and their impact on the final product.

Text Books:

- Software Testing Foundations A. Spillner & T. Linz & Schaefer H. "Mumbai Shroff Pub.and Distributers"
- Software Testing: Principles and Practieces Srinivasan Desikan and Gopalaswamy Ramesh "New Delhi Pearson Education"

Reference Books:

- Software Engineering Fundamentals, Ali Behforooz and Frederick J. Hudson, "Oxford University Press "
- Software Quality Engineering: Testing, Quality Assurance and Quantifiable improvement, JeffTain "Willy Pub. "
- Foundation of Software Testing, Aditya Mathur, "Pearson Education"
- Software Testing, A Craftsman's Approach, Paul C. Jorgensen, "Second Edition, CRC Press"

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Software test engineer, software quality engineer, software quality manager	Able to understand concept of software testing	Goal no 04	Software testing company

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SEMESTER- 2nd   Subject Code: 6TMSE202
Course: M. Tech (SE)   Theory Max. Marks: 50
SUBJECT: SOFTWARE PROJECT MANAGEMENT   Theory Min. marks 17

COURSE OBJECTIVE:

- To outline the need for Software Project Management
- To highlight different techniques for software cost estimation and activity planning.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	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.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Project Life Cycle and Effort Estimation Software process and Process Models – Choice of Process models – mental delivery – Rapid Application development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points – COCOMO II A Parametric Productivity Model – Staffing Pattern.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Activity Planning and Risk Management Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Monitoring – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical patterns – Cost schedules.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Project Management and Control Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Staffing in Software Projects Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

- At the end of the course the students will be able to practice Project Management principles while developing a software.

Text Books:

- Software Project Management Bob Hughes & Mike Cotterell & Rajib Mall New york. MC Graw Hill Co.
- Software Engineering Sajan Mathew New Delhi S. Chand Group
- An Integrated Approach to Software Engineering Pankaj Jalote New Delhi: Narosa Publishing.,
- Software Engineering K.K. Aggarwal & Yogesh Singh New Delhi New Age International

References Books:

- Effective Software Project Management   Robert K. Wysocki "Wiley Publication"
- Software Project Management Walker Royce "Addison-Wesley"
- Managing Global Software Projects Gopalaswamy Ramesh " McGraw Hill Education

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Software manager, Business analyst, System Analyst, Process manager	Able to understand the concept of software management	Goal no 04	Software company

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SEMESTER- 2nd

Course: M. Tech (SE)

SUBJECT: ADVANCED CONCEPTS IN DATABASE

Subject Code: 6TMSE203

Theory Max. Marks: 50

Theory Min. marks 17

COURSE OBJECTIVE:

* Learning state-of-art techniques in database systems and information management that students can apply to your future research and/or your practical work.
* Learning how the prepare and present technical papers which is an essential skill for students and researchers.
* Reviewing technical and scientific papers is a skill that you need to develop.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	DBMS Concept Introduction, Data Model, Entity & Attributes, Relationship, E-R Model, Relational Data Model, Domain Tuples, Attributes, Key, Schema, Integrity Constraints, Relational Algebra & Relational Calculus, Normalization & Normal Form.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Query Processing and Optimization Introduction, Query Processing, Syntax Analyzer, Query Decomposition: - Query Analysis, Query Normalization, Semantic Analyzer, Query Simplifier, Query Restructuring. Query Optimization, Cost Estimation in Query Optimization, Structure of Query Evaluation Plans, Pipelining and Materialization.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Distributed Databases Introduction, Architecture of Distributed Databases, Distributed Database System Design, Distributed Query Processing, Concurrency Control in Distributed Databases, Recovery Control in Distributed Databases. Web Databases, Multimedia Databases, Spatial Databases, Clustering-based Disaster-proof Databases, Mobile Databases.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Object-Oriented Databases Introduction, Concept of Object Oriented Database, Object Oriented Data Model (OODM), Object-Oriented DBMS(OODBMS), Object Data Management Group and Object- Oriented Languages. Object-Relational DBMS, ORDBMS Design, ORDBMS Query Language.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Design of Data Warehouse, Dimension and Measures, Data Marts and Distributed Data Marts, Conceptual Modeling of Data Warehouses:-Star Schema, Snowflake Schema, Fact Constellations. Multidimensional Data Model & Aggregates. Data Mining: Data, Information and Knowledge Discovery, Data Mining Functionalities, Data Mining System categorization and its Issues. Data Processing, Data Reduction, Data Mining Statistics. Data Mining Techniques.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

By the end of this module, students should be able to:

* explain and evaluate the fundamental theories and requirements that influence the design of modern database systems
* assess and apply database functions and packages suitable for enterprise database development and database management
* critically evaluate alternative designs and architectures for databases and data warehouses
* discuss and evaluate methods of storing, managing and interrogating complex data
* explain and critically evaluate database solutions for data exchange
* analyse the background processes involved in queries and transactions, and explain how these impact on database operation and design

Practical List

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1. To perform basic PL/SQL blocks
a) Display square of given no from 1 to 10 using loop, for and while.
b) Write a PL-SQL block for checking weather a given year is a Leap year or not.
c) Write a PL-SQL block to fine total no of odd and even (from 1 to 20)
d) Write a PL-SQL block for reverse the string

2. To perform the concept of cursor
a) Display all the information of employee using %ROWTYPE
b) Get Employee Number as input and check whether the employee exists. If it exists display name and department no otherwise print "Employee Not Found"
c) Create a copy of Emp table. Write a PL/SQL block that will transfer all the records from Emp table to newly created table. If there is any existing record then the new value should be updated in the existing record.
d) Write a PL/SQL block that will assign 2 hrs of workload to employee with lowest workload from the employee with highest workload
e) Display employee-name, dept-name, basic salary, total experience of all the employees whose area of interest is 'C Programming' using record type.

3. To perform the concept of loop
a) Display Employee Names, Joining Date (Monday 24th of May, 2004 format) of all the employees using a) Loop – End Loop b) While Loop and c) For Loop
b) The manager has decided to raise the salary for all the employees in the department number 10 by 0.7. Whenever any such raise is given to employees, a record for the same is maintained in the empraise table. Write a PL/SQL block to update the salary of each employee and insert a record in the empraise table. Use for loop.

4. To perform the concept of locking
a) Write a PL/SQL block that will accept the employee code, department no, amount and operation. Based on specified operation amount is added or deducted from salary of said employee. Use locking concept at appropriate place.

5. To perform the concept of exception handler
a) Write a PL/SQL block that will increase the salary of the employee by 0.7 who is working as 'manager'. Handle the exception using oracle named exception handler
b) Write a PL/SQL block that will accept the employee code, amount and operation. Based on specified operation amount is added or deducted from salary of said employee. Use user defined exception handler for handling the exception.

6. To perform the concept of function
a) Write a PL/SQL block to update the salary of employee specified by emp_code. If record exist then update the salary otherwise display appropriate message. Write a function for updating salary.
b)   List the department names, and, for each department, list the names of the employees in that department.

7. To perform the concept of package
a) Write a PL/SQL block to update the current stock of the item specified by item_id. If specified record not found then insert the new record into table item_record. Use package for function and procedure used
b) Write a PL/SQL block that will accept the employee code, amount and operation. Based on specified operation amount is added or deducted from salary of said employee. Use package for used procedures.

Text Books:

* Professional ASP. Net 2.0 Databases T. Thangarathinam New Delhi Wiley India Ltd
* Oracle Database 10g. DBA Handbook Kevin loney and Bob Bryla and Experts at TUSC Noida Tata Mc Graw Hill Education
* Introduction to Database Management Systems Kahate Atul Noida Pearson
* Teach Yourself Database Programming with JDBC in 21 Days Ashton Hobbs New Delhi: Techmedia ,
* Database Management Systems Alexis Leon & Mathews Leon Chennai : Leon Vikas ,

References Books:

* Database System Concepts Peter Rob and Carlos Coronel Andover: Cengage Learning ,
* Database System Concepts Abraham Silberschatz and Henry F. Korth and S. Sudarshan New York : Mc graw Hill,
* Introduction to Database Management C.J. Date & A. Kanna & Swamynathans New Delhi Pearson Education
* Introduction to Database Systems B.C. Desai New Delhi Galgotia Publishing

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Data analyst, DBA, database manager	Able to understand concept of data base	Goal no 04	

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SEMESTER- 2nd
Course: M. Tech (SE)
SUBJECT: WEB TECHNOLOGY AND E-COMMERCE

Subject Code: 6TMSE204
Theory Max. Marks: 50
Theory Min. marks 17

COURSE OBJECTIVE:

- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms
- To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
- To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, research, design and implementation skills.
- The objective of this subject is to develop an ability to design and implement static and dynamic website

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction to building blocks of electronic commerce: Internet and networking. Technologies, IP addressing, ARP, RARP, BOOTP, DHCP, ICMP, DNS, TFTP, TELNET.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Static and dynamic web pages, tiers, plug-ins, frames and forms. Exposure to Markup languages, HTML, DHTML, VRML, SGML, XML etc. CGI, Applets & Serve-lets, JSP & JAVA Beans, active X control, ASP cookies creating and reading cookies, semantic web, semantic web service ontology Comparative case study of Microsoft and JAVA technologies, web server scalability, Distributed objects, object request brokers, component technology, Web services, Web application architectures, Browsers, Search engines.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Electronic Commerce and physical Commerce, Different type of e-commerce, e-commerce scenarios, advantages of e-commerce. Business models: Feature of B2B e-commerce, Business models, Integration. E-Services: category of e-services, Web- enabled services, Matchmaking services, and information- selling on the web.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Internet payment system: Characteristics of payment system, 4C payments methods, SET Protocol for credit card payment, E-cash, E-check, Micro payment system, Overview of smart card, overview of Mondex. E-Governance: E-Governance architecture, Public private partnership, Readiness, Security, Cyber Crime and Law, IT Act	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Advanced technologies for e-commerce: Introduction to mobile agents. WAP: the enabling technology: The WAP model, WAP Architecture, Benefit of WAP to e-commerce. Web Security, Encryption Schemes, Secure Web documents, Digital signatures and firewalls.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

After successful completion of the course students will be able to:

- At the end of the course, students should be able to:
- Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
- Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.

- Get introduced in the area of Online Game programming.

Text Book:

- Web Technology Tcp / Ip Architecture and Java Programming A.S. Godbole & A. Kahate New Delhi Tata Mc Graw Hill
- WEB Technology : A Developers Perspective N.P. Gopalan New Delhi PHI Learning
- E-Commerce the Cutting Edge of Business K.K. Bajaj & D. Nag New Delhi Tata Mc Graw Hill Publishing

Reference Book:

- Web Technology & Design C. Xavier New Delhi New Age International
- E-Commerce : Fundamentals and Applications   Henry Chan & Raymond Lee & Tharam Dillon & Elizabeth Chang New Delhi Wiley India Ltd
- Essentials of E-Commerce Technology V. Rajaraman New Delhi PHI Learning

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Data Scientist, e-commerce developer, technical support, help desk	Able to understand concept of online shopping payment and other services	Goal no 04	Online store

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SEMESTER- 2nd
Course: M. Tech (CSE)
SUBJECT: Elective-1
(Data structure and Algorithm using Python)

Subject Code: 1TMSE205(A)
Theory Max. Marks: 50
Theory Min. marks: 17

COURSE OBJECTIVES:

- The course is designed to provide Basic knowledge of Python.
- Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	**Introduction:** Basic syntax, Literal Constants, Numbers, Variable and Basic data types, String, Escape Sequences, Operators and Expressions, Evaluation Order, Indentation, Input Output, Functions, Comments.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	**Data Structure:** List, Tuples, Dictionary and Sets. Control Flow: Conditional Statements - If, If-else, Nested If-else. Iterative Statement - For, While, Nested Loops. Control statements - Break, Continue, Pass.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	**Object oriented programming:** Class and Object, Attributes, Methods, Scopes and Namespaces, Inheritance, Overloading, Overriding, Data hiding.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	**Exception:** Exception Handling, Except clause, Try finally clause, User Defined Exceptions.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	**Modules and Packages Standard Libraries:** File I/0, Sys, logging, Regular expression, Date and Time, Network programming, multi-processing and multi-threading.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:
- Problem solving and programming capability.
- Master an understanding of scripting and the contributions of scripting languages.
- Master an understanding of Python especially the object-oriented concepts,
- Master an understanding of the built-in objects of Python,

Text Book:
- Data Structures: A Pseudocode Approach with C Richard F. Gilberg & Behrouz A. Forouzan New Delhi Cengage Learning
- Fundamentals of Data Structures Ellis Horowitz & Sartaj Sahni "New Delhi Galgotia Publishing"
- Data Structures Seymour Lipschutz "New Delhi Tata Mc Graw Hill Publishing"

Reference Book:
- The Fundamentals of Python: Kenneth A. Lambert, First Programs, 2011, Cengage Learning,

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Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Data Scientist and Python Programmer	Able to understand python developer	Goal no 04, Goal no 09	

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SEMESTER- 2nd	

SEMESTER- 2nd
Course: M. Tech (CSE)
SUBJECT: Elective-1
(Information theory coding and Cryptography)

Subject Code: 6TMSE205(B)
Theory Max. Marks: 50
Theory Min. marks: 17

COURSE OBJECTIVES:

This course aims to address the efficient error free and secure delivery of information using binary data streams. For efficiency, the information source is coded to reduce redundancy. To minimise the effects of errors, channel coding is employed and, finally, cryptographic techniques are required to make the data secure. The aim is to present the basic theory and objectives of each of these steps, together with the basics of information theory.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	**Information Theory, Probability and Channel:** Introduction, Information Measures, Review probability theory, Random variables, Processes, Mutual Information, Entropy, Uncertainty, Shannon's theorem, redundancy, Huffman Coding, Discrete random Variable. Gaussian random variables, Bounds on tail probabilities.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	**Stochastic Processes:** Statistical independence, Bernoulli Process, Poisson Process, Renewal Process, Random Incidence, Markov Modulated Bernoulli Process, Irreducible Finite Chains with Aperiodic States, Discrete-Time Birth-Death Processes, Markov property, Finite Markov Chains, Continuous time Markov chain, Hidden Markov Model.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	**Error Control Coding:** Channel Coding: Linear Block Codes: Introduction, Matrix description, Decoding, Equivalent codes, Parity check matrix, Syndrome decoding, Perfect codes Hamming Codes .Optimal linear codes. Maximum distance separable (MDS) codes. Cyclic Codes: Introduction, generation, Polynomials, division algorithm, Matrix description of cyclic codes, burst error correction, Fire Codes, Golay Codes, and CRC Codes. BCH Codes: Introduction, Primitive elements, Minimal polynomials, Generator Polynomials in terms of Minimal Polynomials, Decoding of BCH codes.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	**Coding for Secure Communications:** Review of Cryptography, Introduction, Encryption techniques and algorithms, DES, IDEA , RC Ciphers ,RSA Algorithm ,Diffi-Hellman, PGP, Chaos Functions, Cryptanalysis, Perfect security, Unicity distance, Diffusion and confusion, McEliece Cryptosystem	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	**Advance Coding Techniques:** Reed-Solomon codes, space time codes, concatenated codes, turbo coding and LDPC codes (In details), Nested Codes, block (in Details), Convolution channel coding: Introduction, Linear convolution codes, Transfer function representation & distance properties, Decoding convolution codes(Soft-decision MLSE, Hard-decision MLSE),The Viterbi algorithm for MLSE, Performance of convolution code decoders, Soft & Hard decision decoding performance, Viterbi algorithm implementation issues: RSSE, trellis truncation, cost normalization, Sequential decoding: Stack, Fano, feedback decision decoding, Techniques for constructing more complex convolution codes with both soft and hard decoding.	Usage of ICT like PPT, Video Lectures,Black board

Course outcomes:

After successful completion of the course students will be able to:
- Apply the basics of information theory to calculate channel capacity and other measures
- Design specific data compression techniques and calculate the compression achieved
- Apply and control specific coding methods and be able to calculate the rate and error probabilities achieved
- Understand the basic concepts and complexity of cryptographic security methods and their practical applications.

Text Books:

- Cryptography & Network Security Atul Kahate "NoidaTata Mc Graw Hill Education"
- Applied Cryptography B. Schneier "U.K John Wiley & Sons"
- Information Theory Coding and Cryptography, Ranjan Bose "New Delhi Tata Mc Graw Hill "

References Books:

- Cryptography and Network Security : Principles and Practice, William Stallings "New Delhi Pearson Education"
- Cryptography and Network Security, Behrouz A. Forouzan & Deebdeep Mukhopadhyay "New Delhi Tata Mc Graw Hill Publishing"

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Data analyst, network analyst	Able to understand information processing	Goal no 04	

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SEMESTER- 2nd
Course: M. Tech (CSE)
SUBJECT: Elective-1(Data Analytic using R-Programming)

Subject Code: 6TMSE205(C)
Theory Max. Marks: 50
Theory Min. marks : 17

COURSE OBJECTIVES:

- To study the usage and applications of Object Oriented database
- To acquire knowledge on variety of NoSQL databases
- To attain inquisitive attitude towards research topics in NoSQL databases

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Definition of NOSQL, History of NOSQL and Different NOSQL products, Exploring MondoDB Java/Ruby/Python, Interfacing and Interacting with NOSQL.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	NOSQL Basics NOSQL Storage Architecture, CRUD operations with MongoDB, Querying, Modifying and Managing NOSQL Data stores, Indexing and ordering datasets (MongoDB/CouchDB/Cassandra)	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Advanced NOSQL NOSQL in CLOUD, Parallel Processing with Map Reduce, Big Data with Hive Working with NOSQL Surveying Database Internals, Migrating from RDBMS to NOSQL, Web Frameworksand NOSQL, using MySQL as a NOSQL .	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Developing Web Application with NOSQL and NOSQL Administration Php and MongoDB, Python and MongoDB, Creating Blog Application with PHP, NOSQL Database Administration.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Introduction to R: Overview of R programming, Evolution of R, Applications of R programming, Basic syntax Basic Concepts of R: Reserved Words, Variables & Constants Operators, Operator Precedence, Data Types , Input and Output Data structures in R: Vectors, Matrix, List in R programming Data Frame, Factor Control flow: If...else, If else() Function, Programming for loop While Loop, Break & next, Repeat Loop Functions: R Functions, Function Return Value, Environment & Scope, R Re Unit IV cursive Function, R Infix Operator, R Switch Function. Strings: String construction rules, String Manipulation functions R packages: Study of different packages in R R Data Reshaping: Joining Columns and Rows in a Data Frame Merging Data Frames, Melting and Casting Working with files: Read and writing into different types of files R object and Class Object and Class: R S3 Class, R S4 Class R Reference Class, R Inheritance Data visualization in R and Data Management: Bar Chart, Dot Plot, Scatter Plot (3D), Spinning Scatter Plots, Pie Chart Histogram (3D). [including colorful ones], Overlapping Histograms, Boxplot, Plotting with Base and Lattice Graphics Missing Value Treatment, Outlier Treatment, Sorting Datasets Merging Datasets, Binning variables Statistical modelling and Databases in R: Mean, mode, median Linear regression, Decision tree, K-means Clustering, RODBC and DBI Package, Performing queries	Usage of ICT like PPT, Video Lectures,Black board

Course outcomes:

After successful completion of the course students will be able to:
- Recognize and make appropriate use of different types of data structures
- Use R to create sophisticated figures and graphs
- Identify and implement appropriate control structures to solve a particular programming problem 4. Design and write functions in R and implement simple iterative algorithms.

References Books:

- Data Analytics Using R Seema Acharya "McGraw Hill Education"
- Beginning R: The Statistical Programming Language Mark Gardener "Wiley"
- Data Analytics with R, Bharti Motwani "Wiley"

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Research developer	Able to understand concept of research development	Goal no 04	

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SEMESTER- 2nd
Course: M. Tech (CSE)
SUBJECT: Elective-1(Ad-hoc Network)

Subject Code: 6TMSE205(D)
Theory Max. Marks: 50
Theory Min. marks : 17

COURSE OBJECTIVES:

- Explains the constraints of physical layer that affect the design and performance of ad hoc network.
- The Concept of protocols required for wired network may not work for wired network at MAC, Network and Transport Layer.
- Explains the operations and performance of various MAC layer protocols, unicast routing protocols and transport layer protocols proposed for ad hoc networks.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	**Ad Hoc Networking:** An introduction, Model of operation, symmetric Links, Layer-2 Ad Hoc solutions, Proactive versus reactive protocols, multicast, commercial replications of Ad Hoc networking, conferencing, Home Networking, Emergency services, personal Area Networks and Bluetooth, Embedded Computing Applications, Sensor Dust, Automotive/PC Interaction. Factors Affecting Ad Hoc Networks, Scalability, Wireless Data Rates, DARPA packet Radio network, Survivable Radio Networks.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	**Ad Hoc Wireless Media Access Protocols:** Issues in Designing a MAC protocol for Ad Hoc Wireless networks. Design Goals of a MAC Protocol for Ad Hoc Wireless Networks. Classifications of MAC Protocols. Contention-Based Protocols, Contention- Based Protocols with reservation Mechanisms. Contention – Based MAC Protocols with Scheduling Mechanisms. MAC protocols that use Directional Antennas. Other MAC Protocols.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	**Overview of Ad Hoc Routing Protocols:** Table-Driven Approaches, Destination Sequenced Distance Vector (DSDV), Wireless Routing Protocol (WRP), Cluster Switch Gateway Routing (CSGR) , Source-Initiated On – Demand Approaches . Ad Hoc On-Demand Distance Vector Routing (AODV) , Dynamic Source Routing (DSR), Temporally Ordered Routing Algorithm (TORA), Signal Stability Routing (SSR) , Location-Aided Routing (LAR) , Power – Aware Routing (PAR), Zone Routing Protocol (ZRP), Source Tree Adaptive Routing (STAR) , Relative Distance Microdiversity Routing (RDMAR) , Multicast Routing in Mobile Ad Hoc Networks, Existing Ad Hoc Multicast Routing Protocols, ABAM : Associativity-Based Ad Hoc Multicast.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	**Transport Layer for Ad Hoc Wireless Network:** Introduction , Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocols for Ad Hoc Wireless Networks.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	**Sensor Network:** Sensor Network Architecture, Network Protocols, Data Storage and Manipulation, Localization and Management, Data Dissemination, Data Gathering, MAC protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards. Security issues in Ad Hoc Network: Security in Ad Hoc Wireless Network, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks,	Usage of ICT like PPT, Video Lectures,Black board

	Key Management, and Secure Routing in Ad HocWireless Networks.	board

Course outcomes:

After successful completion of the course students will be able to:

- Understand the challenges in design of wireless ad hoc networks.
- Understand and analyze proposed protocols at MAC and routing layers of ad hoc networks.
- Understand and analyze attacks pertaining to network layer.

Text Book:

- Data Communication and computer Networks, Prakash Gupta .C "New Delhi: PHI Learning"
- Introduction to data Communication & Networking Wayne Tomasi "Noida: Pearson"
- Cryptography & Network Security Atul Kahate "Noida Tata Mc Graw Hill Education"
- Telecommunication Switching Systems and Networks, Thiagarajan Viswanathan"New Delhi : Phi Learning"
- Data Communications and Networks Behrouz A Forouzan "Noida Tata Mc Graw Hill Education"

References Book:
- Troubleshooting, Maintaining & Repairing:Windows, Netware & Linux Networks, Stephen J. Bigelow New Delhi: Dreamtech .,
- Computer Networks Andrew S. Tanenbaum "Delhi: Pearson Education"
- Network ANalysis an Synthesis B.R. Gupta"New Delhi S. Chand Group"

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Network engineer	Able to understand concept of network	Goal no 04	

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SEMESTER- 2nd
Course: M. Tech (CSE)
SUBJECT: Elective-1(Image Processing)

Subject Code: 6TMSE205(E)
Theory Max. Marks: 50
Theory Min. marks :17

COURSE OBJECTIVES:

- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms
- To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
- To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, research, design and implementation skills
- To prepare graduates who will thrive to pursue life-long reflective learning to fulfil their goals

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Light, Brightness adaption and discrimination, Pixels, coordinate conventions, Imaging Geometry, Perspective Projection, Spatial Domain Filtering, sampling and quantization. Spatial Domain Filtering Intensity transformations, contrast stretching, histogram equalization, Correlation and convolution, Smoothing filters, sharpening filters, gradient and Laplacian.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Filtering in the Frequency domain Hotelling Transform, Fourier Transforms and properties, FFT (Decimation in Frequency and Decimation in Time Techniques), Convolution, Correlation, 2-D sampling, Discrete Cosine Transform, Frequency domain filtering. Basic Framework, Interactive Restoration, Image deformation and geometric transformations, image morphing, Restoration techniques, Noise characterization, Noise restoration filters, Adaptive filters, Linear, Position invariant degradations, Estimation of Degradation functions, Restoration from projections.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Image Compression Encoder-Decoder model, Types of redundancies, Lossy and Lossless compression. Entropy of an information source, Shannon's 1st Theorem, Huffman Coding, Arithmetic Coding, Golomb Coding, LZW coding, Transform Coding, Sub-image size selection, blocking artifacts, DCT implementation using FFT, Run length coding, FAX compression (CCITT Group-3 and Group-4), Symbol-based coding, JBIG-2, Bit-plane encoding, Bit-allocation, Zonal Coding, Threshold Coding, JPEG,Lossless predictive coding, Lossy predictive coding, Motion Compensation .Wavelet based Image Compression Expansion of functions, Multi-resolution analysis, Scaling functions, MRA refinement equation, Wavelet series expansion, Discrete Wavelet Transform (DWT), Continuous Wavelet Transform, Fast Wavelet Transform, 2-D wavelet Transform, JPEG-2000 encoding, Digital Image Watermarking.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Morphological Image Processing:Basics, SE, Erosion, Dilation, Opening, Closing, Hit-or-Miss Transform, Boundary Detection, Hole filling, Connected components, convex hull, thinning, thickening, skeletons, pruning, Geodesic Dilation, Erosion, Reconstruction by dilation and erosion.	Usage of ICT like PPT, Video Lectures,Black board
Unit – V	Image Segmentation, Boundary detection based techniques, Point, line detection, Edge detection, Edge linking, local processing, regional processing, Hough transform, Thresholding, Iterative thresholding, Otsu's method, Moving averages, Multivariable thresholding, Region-based segmentation, Watershed algorithm, Use of motion in	Usage of ICT like PPT, Video Lectures,Black

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	segmentation	board

Course outcomes:

After successful completion of the course students will be able to:
- An understanding of the theoretical foundations and the limits of computing.
- An ability to adapt existing models, techniques, algorithms, data structures, etc. for efficiently solving problems.
- An ability to design, develop and evaluate new computer based systems for novel applications which meet the desired needs of industry and society.
- The course will cover techniques and tools for digital image processing, and finally also introduce image analysis techniques in the form of image segmentation.
- The course is primarily meant to develop on-hand experience in applying these tools to process these images. Hence the programming assignments form a key component of this course.
- The students would be encouraged to develop the image processing tools from scratch, rather than using any image processing library functions.

Text Books:

- Introduction To Digital Image Processing Alasdair Mcandrew "New Delhi: Cengage Learning"
- Digital Image Processing Rafael C. Gonzalez & Richard E. Woods "New Delhi Pearson Education"
- Fundamentlas of Digital Image Processing Anil Kumar Jain "New Delhi Prentice Hall of India"
- Digital Image Processing S Jayaraman & S Esakkirajan & T Veerakumar "New york. MC Graw Hill Co."

References Books:

- Digital Image Processing : PIKS Scientific Inside (With CD), William K. Pratt "New Delhi Wiley India Ltd"
- Fundamentals of Digital Image Processing S. Annadurai & R.Shanmugalakshmi "New Delhi Pearson Education"
- MATLAB: with Control System, Signals Processing & Image Processing Toolboxes with CD S.N. Sivanandam & S.N. Deepa "New Delhi Wiley India Ltd"

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Research Associate	Able to understand research concept	Goal no 04	

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SEMESTER- 2nd
Course: M. Tech (CSE)
SUBJECT: Audit Course-II DISASTER MANAGEMENT

Subject Code: 6TMSE206
Theory Max. Marks: 50
Theory Min. marks :17

COURSE OBJECTIVES:

Students will be able to:
1. Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
2. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
3. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction: Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude. Repercussions Of Disasters And Hazards: Economic Damage, Loss Of Human And Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Disaster Prone Areas In India: Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Disaster Preparedness And Management Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Risk Assessment Disaster Risk: Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co-Operation In Risk Assessment And Warning, People's Participation In Risk Assessment. Strategies for Survival.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Disaster Mitigation Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India.	Usage of ICT like PPT, Video Lectures,Black board

Course Objectives

1. To get a working knowledge in illustrious Sanskrit, the scientific language in the world
2. Learning of Sanskrit to improve brain functioning

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3. Learning of Sanskrit to develop the logic in mathematics, science & other subjects
4. Enhancing the memory power
5. The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Disaster manager	Able to understand concept of disaster	Goal no 04	

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SEMESTER- 2nd
Course: M. Tech (CSE)
SUBJECT: PERSONALITY DEVELOPMENT THROUGH LIFE
ENLIGHTENMENT SKILLS

Subject Code: 6TMSE206
Theory Max. Marks: 50
Theory Min. marks: 17

COURSE OBJECTIVES:

1. To learn to achieve the highest goal happily
2. To become a person with stable mind, pleasing personality and determination
3. To awaken wisdom in students

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Neetisatakam-Holistic development of personality, Verses- 19,20,21,22 (wisdom), Verses- 29,31,32 (pride & heroism), Verses- 26,28,63,65 (virtue), Verses- 52,53,59 (dont's), Verses- 71,73,75,78 (do's)	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Approach to day to day work and duties. Shrimad BhagwadGeeta : Chapter 2-Verses 41, 47,48, Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5,13,17, 23, 35, Chapter 18-Verses 45, 46, 48. Statements of basic knowledge: Shrimad BhagwadGeeta: Chapter2-Verses 56, 62, 68, Chapter 12 -Verses 13, 14, 15, 16,17, 18	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Personality of Role model. Shrimad BhagwadGeeta: Chapter2-Verses 17, Chapter 3-Verses 36,37,42, Chapter 4-Verses 18, 38,39 Chapter18 – Verses 37,38,63	Usage of ICT like PPT, Video Lectures,Black board

Students will be able to

1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity
3. Study of Neetishatakam will help in developing versatile personality of students

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Motivational Speaker	Able to understand concept of speaking and writing skills	Goal no 04	

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SEMESTER- 2nd
Course: M. Tech (CSE)
SUBJECT: VALUE EDUCATION

Subject Code: 6TMSE206
Theory Max. Marks: 50
Theory Min. marks: 17

COURSE OBJECTIVES:

Students will be able to:
1. Understand value of education and self- development
2. Imbibe good values in students
3. Let the should know about the importance of character

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Values and self-development –Social values and individual, attitudes. Work ethics, Indian vision of humanism. Moral and non- moral valuation. Standards and principles. Value judgements	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism.Love for nature,Discipline	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking. Free from anger, Dignity of labour. Universal brotherhood and religious tolerance. True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation. Doing best for saving nature	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Character and Competence –Holy books vs Blind faith. Self-management and Good health. Science of reincarnation. Equality, Nonviolence,Humility, Role of Women. All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively	Usage of ICT like PPT, Video Lectures,Black board
Unit - V		

Course outcomes

Students will be able to
1. .Knowledge of self-development
2. Learn the importance of Human values
3. Developing the overall personality

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Motivational Speaker	Able to understand concept of speaking and writing skills		

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SEMESTER- 2nd
Course: M. Tech (SE)
SUBJECT: INTERNET OF THINGS

Subject Code: 6TMSE206
Theory Max. Marks: 25
Theory Min. marks: 12

COURSE OBJECTIVE:

- To assess the vision and introduction of IoT.
- To Understand IoT Market perspective.
- To Implement Data and Knowledge Management and use of Devices in IoT Technology.
- To Understand State of the Art - IoT Architecture.
- To classify Real World IoT Design Constraints, Industrial Automation in IoT.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction: Definition, Characteristics of IOT, IOT Conceptual framework, IOT Architectural view, Physical design of IOT, Logical design of IOT, Application of IOT.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Machine-to-machine (M2M), SDN (software defined networking) and NFV(network function virtualization) for IOT, data storage in IOT, IOT Cloud Based Services.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, REST, HTTP Restful and Web Sockets. Internet Connectivity Principles: Internet Connectivity, Internet based communication, IP addressing in IOT, Media Access control.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Sensor Technology , Participatory Sensing, Industrial IOT and Automotive IOT , Actuator, Sensor data Communication Protocols ,Radio Frequency Identification Technology, Wireless Sensor Network Technology.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	IOT Design methodology: Specification -Requirement, process, model, service, functional & operational view.IOT Privacy and security solutions, Raspberry Pi & arduino devices. IOT Case studies: smart city streetlights control & monitoring.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

After successful completion of the course students will be able to:
- Able to understand the application areas of IOT •
- Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
- Able to understand building blocks of Internet of Things and characteristics

Reference Book:

- Internet of Things: A Hands-On Approach Arsheep Bahga Orient Blackswan Private Limited
- Internet of Things (IoT) BK Tripathy CRC Pres
- Internet of Things for Architects Perry Lea Packt Publishing

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Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Developer	Able to understand concept of IOT	Goal no 04	

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SEMESTER- 2nd

Course: M. Tech (SE)

SUBJECT: BIG DATA

Subject Code: 6TMSE207

Theory Max. Marks: 25

Theory Min. marks: 12

COURSE OBJECTIVE:

- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms
- To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
- To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, research, design and implementation skills
- To prepare graduates who will thrive to pursue life-long reflective learning to fulfill their goals

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	**Introduction to Big Data** Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	**Introduction Hadoop** Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	**Hadoop Architecture** Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	**Hadoop Ecosystem and Yarn** Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New FeaturesNameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	**Hive and Hiveql, Hbase** Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries, HBase conceptsAdvanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

After successful completion of the course students will be able to:

- apply the basics of information theory to calculate channel capacity and other measures
- design specific data compression techniques and calculate the compression achieved
- apply and control specific coding methods and be able to calculate the rate and error probabilities achieved
- understand the basic concepts and complexity of cryptographic security methods and their practical applications.

Reference Book:

- Big Data and Hadoop Mayank Bhushan BPB Publications
- Big Data, Black Book DT Editorial Services Dreamtech Press
- Big Data Analytics Kim H. Pries Auerbach Publications

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
DBA	Able to understand concept of database	Goal no 04	

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SEMESTER- 3rd
Course: M. Tech (SE)
SUBJECT: DATA SCIENCE

Subject Code: 6TMSE301 (A)
Theory Max. Marks: 50
Theory Min. marks: 17

COURSE OBJECTIVE:

Aim to provide general overview of the principles, concepts, techniques, tools and services for managing, harmonizing, aggregating, preprocessing, modeling, analyzing and interpreting large, multi-source, incomplete, incongruent, and heterogeneous data (Big Data). The focus will be to expose students to common challenges related to handling Big Data and present the enormous opportunities and power associated with our ability to interrogate

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Understanding Data: Data Wrangling and Exploratory Analysis, Data Transformation & Cleaning, Feature Extraction, Data Visualization. Introduction to contemporary tools and programming languages for data analysis like R and Python.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Introduction to machine learning: Supervised & unsupervised learning, classification & clustering Algorithms, Dimensionality reduction: PCA & SVD, Correlation & Regression analysis, Training & testing data: Overfitting & Under fitting.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Introduction to machine learning: Supervised & unsupervised learning, classification & clustering Algorithms, Dimensionality reduction: PCA & SVD, Correlation & Regression analysis, Training & testing data: Overfitting & Under fitting.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Introduction to Information Retrieval:Boolean Model, Vector model, Probabilistic Model, Text based search: Tokenization,TF-IDF, stop words and n-grams, synonyms and parts of speech tagging.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Introduction to Web Search& Big data: Crawling and Indexes, Search Engine architectures, Link Analysis and ranking algorithms such as HITS and PageRank, Hadoop File system & MapReduce Paradigm.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:
After competition of upon course students will be able:-
* To understand the concept of data mining and data science.
* To implement methods to retrieve information from different different web sources.
* To understand the architecture of various search engine.
* To analytics big data using Phython and Hadoop.

Reference Books:

* Practical Statistics for Data Scientists: 50 Essential Concepts, Peter Bruce, Shroff/O'Reilly; First edition
* Introduction to Data Mining Pang-Ning Tan, Pearson Edu.
* Modern Information Retrieval, Ricardo Baeza-Yates and Berthier Ribeiro-Neto,Pearson Education

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Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Data analyst	Able to understand concept of next generation data	Goal no 04	

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DR. C.V.RAMAN UNIVERSITY

KARGI ROAD, KOTA, BILASPUR (C.G.)

SEMESTER- 3rd

SEMESTER- 3rd
Course: M. Tech (SE)
SUBJECT: PARALLEL ALGORITHMS

Subject Code: 6TMSE301 (B)
Theory Max. Marks: 50
Theory Min. marks: 17

COURSE OBJECTIVE:

* To understand different parallel architectures and models of computation.
* To introduce the various classes of parallel algorithms.
* To study parallel algorithms for basic problems.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Sequential model, need of alternative model, parallel computational 8 models such as PRAM, LMCC, Hypercube, Cube Connected Cycle, Butterfly, Perfect Shuffle Computers, Tree model, Pyramid model, Fully Connected model, PRAM-CREW, EREW models, simulation of one model from another one.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Performance Measures of Parallel Algorithms, speed-up and 8 efficiency of PA, Cost- optimality, An example of illustrate Cost- optimal algorithms- such as summation, Min/Max on various models.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Parallel Sorting Networks, Parallel Merging Algorithms on on 8 CREW/EREW/MCC, Parallel Sorting Networks CREW/EREW/MCC/, linear array.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Parallel Searching Algorithm, Kth element, Kth element in X+Y on 8 PRAM, Parallel Matrix Transportation and Multiplication Algorithm on PRAM, MCC, Vector-Matrix Multiplication, Solution of Linear Equation, Root finding.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Graph Algorithms - Connected Graphs, search and traversal, 8 Combinatorial Algorithms-Permutation, Combinations, Derrangements.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

Upon completion of this course, the students should be able to

* Develop parallel algorithms for standard problems and applications.
* Analyse efficiency of different parallel algorithms.

Reference Books:

* Design Efficient Algorithm For Parallel Computer Michael J. Quinn McGraw-hill
* An Introduction to Parallel Computing Education India GRAMA Pearson
* Fully Parallel Algorithm for Implementing Path Expressions Anne Dinning, B Mishra Palala Press

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunit

Scientist	Able to understand parallelism	Goal no 04	

DR. C.V.RAMAN UNIVERSITY

KARGI ROAD, KOTA, BILASPUR (C.G.)

SEMESTER- 3rd
Course: M. Tech (SE)
SUBJECT: REAL TIME OPERATION SYSTEM

Subject Code: 6TMSE301 (C)
Theory Max. Marks: 50
Theory Min. marks: 17

COURSE OBJECTIVE:

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management
- To learn programmatically to implement simple OS mechanisms

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction: Introduction to Operating System: Computer Hardware Organization, BIOS and Boot Process, Multi- threading concepts, Processes, Threads, Scheduling	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Basics of Real-Time Concepts: Terminology: RTOS concepts and definitions, real-time design issues, examples, Hardware Considerations: logic states, CPU, memory, I/O, Architectures, RTOS building blocks, Real-Time Kernel	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Process Management: Concepts, scheduling, IPC, RPC, CPU Scheduling, scheduling criteria, scheduling algorithms Threads: Multi-threading models, threading issues, thread libraries, synchronization Mutex: creating, deleting, prioritizing mutex, mutex internals	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Inter-Process Communication: Messages, Buffers, mailboxes, queues, semaphores, deadlock, priority inversion, PIPES MEMORY MANAGEMENT:- Process stack management, run-time buffer size, swapping, overlays, block/page management, replacement algorithms, real-time garbage collection	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Case Studies: Case study Linux POSIX system, RTLinux / RTAI, Windows system, Vxworks, uItron Kernel Design Issues: structure, process states, data structures, inter-task communication mechanism, Linux Scheduling	Usage of ICT like PPT, Video Lectures,Black board

Course Outcome:

At the end of this course attendees will be able to:

- Student will be able to summarize the issues in real time computing
- Student will be able to explain and give examples of real time operating systems.
- Student will be able to solve scheduling problems and can apply them in real time applications in industry.

Text Books:

- Operating System Principles Abraham Silberschatz and Peter Baer Galvin and Greg Gagne New Delhi: Wiley India.,
- Operating Systems:Design and Implementation Andrew S. Tanenbaum & Albert S. Woodhull Delhi :Pearson Education .,
- Distributed Operating Systems:Concepts and Design Pradeep K. Sinha New Delhi: Prentice Hall .,
- Advanced Concepts in Operating Systems Mukesh Singhal & N.G. Shivaratri New Delhi Tata Mc Graw Hill

Reference Books:

- Operating Systems Achyut S Godbole New Delhi Tata Mc Graw Hill Publishing
- Modern Operating Systems Andrew S. Tanenbaum New Delhi: Phi Learning ,
- Operating Systems a Practical Approach Er Rajiv ChopraNew Delhi S. Chand Group

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
System engineer	Able to understand concept of OS	Goal no 04	

DR. C.V.RAMAN UNIVERSITY

KARGI ROAD, KOTA, BILASPUR (C.G.)

SEMESTER- 3rd
Course: M. Tech (SE)
SUBJECT: DEEP LEARNING

Subject Code: 6TMSE302 (A)
Theory Max. Marks:
Theory Min. marks

COURSE OBJECTIVE:

- This course covers the basics of machine learning, neural networks and deep learning. Model for
- deep learning technique and the various optimization and generalization mechanisms are included.
- Major topics in deep learning and dimensionality reduction techniques are covered. The objective of
- this course is:
- To present the mathematical, statistical and computational challenges of building neural Networks.
- To study the concepts of deep learning
- To introduce dimensionality reduction techniques
- To enable the students to know deep learning techniques to support real-time applications
- To examine the case studies of deep learning techniques

Syllabus:

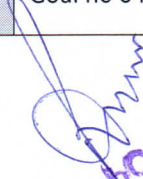| Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction Introduction to machine learning- Linear models (SVMs and Perceptions, logistic regression)- Intro to Neural Nets: What a shallow network computes- Training a network: loss functions, back propagation and stochastic gradient descent- Neural networks as universal function approximates	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Deep Networks History of Deep Learning- A Probabilistic Theory of Deep Learning- Back propagation and regularization, batch normalization- VC Dimension and Neural Nets-Deep Vs Shallow Networks Convolution Networks- Generative Adversarial Networks (GAN), Semi-supervised Learning .	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Dimensionality Reduction Linear (PCA, LDA) and manifolds, metric learning - Auto encoders and dimensionality reduction in networks - Introduction to Convent -Architectures – Alex Net, VGG, Inception, Res Net - Training a Convent: weights initialization, batch normalization, hyper parameter optimization.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Optimization and Generalization Optimization in deep learning– Non-convex optimization for deep networks-Stochastic Optimization Generalization in neural networks- Spatial Transformer Networks- Recurrent networks, LSTM - Recurrent Neural Network Language Models- Word-Level RNNs & Deep Reinforcement Learning - Computational & Artificial Neuroscience	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Case Study and Applications Image net- Detection-Audio Wave Net-Natural Language Processing Word2Vec - Joint Detection Bio Informatics- Face Recognition- Scene Understanding-Gathering Image Captions.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

Upon completion of the course, the students will be able:-
- To Understand basics of deep learning
- Implement various deep learning models
- Realign high dimensional data using reduction techniques
- Analyze optimization and generalization in deep learning
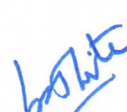- Explore the deep learning applications

Reference Books:

- Deep Learning Rajiv Chopra Khanna Book Publishing
- Introduction to Deep Learning Eugene Charniak MIT Press
- Deep Learning Ian Goodfellow MIT Press

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Research Associate	Able to understand to research	Goal no-04	

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KARGI ROAD, KOTA, BILASPUR (C.G.)

SEMESTER- 3rd
Course: M. Tech (SE)
SUBJECT: PRIVACY & SECURITY IN ONLINE SOCIAL MEDIA

Subject Code: 6TMSE302 (B)
Theory Max. Marks: 50
Theory Min. marks: 17

COURSE OBJECTIVE:

Privacy and security in online social media are one of the hottest and most serious issues these days. This course will cover a wide range of topics to prepare you for the privacy and security issues and concerns you will face in social professional environments. The goal of this course is not to teach you how to encrypt a message using any particular encryption method, but to teach you to think analytically when you make privacy and security when you are working on social media.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Understanding Privacy and security: Public-key and symmetric-key cryptography, Secure hash function, Public-key infrastructure, Digital signature, Web authentication, Wireless security, Spam filtering.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	What is Online Social Networks, data collection from social networks, challenges, opportunities, and pitfalls in online social networks, APIs .	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Collecting data from Online Social Media. Trust, credibility, and reputations in social systems ,Online social Media and Policing.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Information privacy disclosure, revelation and its effects in OSM and online social networks ,Phishing in OSM & Identifying fraudulent entities in online social networks.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Case study of privacy & security in social media.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:
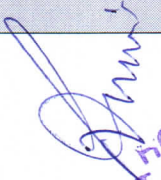
After competition of this course students are able:
- To understand how to achieve privacy in online social media.
- To prevent forgury in social media.
- To implement various technique to secure data on social media.

Reference Books:

- Security and Privacy in Social Networks yaniv altshuler, yuval elovici, armin b. cremers, nadav aharony, alex pentland Springer
- The Art of Social Media Guy Kawasaki Portfolio
- Profit with Social Media Benita Bhatia Dua & Deepa Jayaraman TV18 BROADCAST LTD

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity

Data security expert	Able to understand security concept	Goal no 04	

SEMESTER- 3rd
Course: M. Tech (SE)
SUBJECT: GRID COMPUTING

Subject Code: 6TMSE302 (C)
Theory Max. Marks: 50
Theory Min. marks: 17

COURSE OBJECTIVE:

The course will provide an insight for achieving cost efficient high performance system. The course will deal with design and architecture of grid and cluster computing.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	The Grid - The Evolution of the Grid - Grids and Grid Technologies, Overview of Grid systems, Grid activities, Grid Business Areas, Applications, Programming models -A Look at a Grid Enabled Server and Parallelization Techniques – Grid applications.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	The concept of virtual organizations – Grid architecture – Grid architecture and relationship to other Distributed Technologies – computational and data Grids, semantic grids.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Grid Management systems, Grid security, Grid-Enabling software and Grid enabling network services, Data Grid - Virtualization Services for Data Grids, Peer-to-Peer Grids - Peer-to-Peer Grid Databases for Web Service Discovery, Merging the Grid service Architecture with Web service Architecture, Relationship between Web services & Grid services.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Open Grid Services Infrastructure (OGSI):Introduction-Grid services- High-level introduction to OGSI- Technical details- Introduction to service data components- Grid service: Naming & change management recommendations, Open Grid Service Architecture (OGSA):OGSA Basic Services: Common Management model (CMM)-service domains- policy architecture- security architecture- Mastering & Accounting- common distributed Logging	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Grid Middleware, Resource management and scheduling, setting up Grid, deployment of Grid software and tools, and application execution, Compilers, Languages and Libraries for the Grid, Grid Application Description Languages, Application Partitioning, Grid Portals.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcome:

At the end of the course student will have knowledge of Grid Computing, Web Services, and Service-oriented architecture, Architecture for grid computing, Cluster Computing, process scheduling and load balancing

Text Books:

- Grid Computing: A Research Monograph D Janakiram New Delhi Tata Mc Graw Hill Publishing
- Grid Computing: Making the Global Infrastructure A Reality Fran Berman, Geoffrey C. Fox & Anthony J.G. Hey New Delhi Wiley India Ltd
- A Networking Approach to Grid Computing Daniel Minoli New Delhi Wiley India Ltd

Reference Books:

- Grid Computing: A Practical Guide to Technology and Applications Ahmar Abbas Laxmi Publications
- Grid Computing JOSEPH Pearson Education India
- Grid Computing: Techniques and Applications Barry Wilkinson Chapman and Hall/CRC

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Developer	Able to understand concept of grid computing	Goal no 04	

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SEMESTER- 3rd   Subject Code:
Course: M. Tech (SE)   Theory Max. Marks:
SUBJECT: RESEARCH METHODOLOGY AND IPR   Theory Min. marks

COURSE OBJECTIVE:

The course has been developed with orientation towards research related activities and recognizing the ensuing knowledge as property. It will create consciousness for Intellectual Property Rights and its constituents. Learners will be able to perform documentation and administrative procedures relating to IPR in India as well as abroad.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations.	Usage of ICT like PPT, Video Lectures,Black board
Unit – II	Effective literature studies approaches, analysis Plagiarism, Research ethics. New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge, Case Studies.	Usage of ICT like PPT, Video Lectures,Black board
Unit – III	Effective technical writing, how to write report, Developing a Research Proposal, Format of research proposal, presentation and assessment by a review committee.	Usage of ICT like PPT, Video Lectures,Black board
Unit – IV	Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.	Usage of ICT like PPT, Video Lectures,Black board
Unit - V	Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.	Usage of ICT like PPT, Video Lectures,Black board

Course Outcomes:

At the end of the course, students will demonstrate their ability to:
1. Understanding and formulation of research problem.
2. Analyze research related information.
3. Understand plagiarism and follow research ethics
4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.

Reference Books:

• RESEARCH METHODOLOGY: CONCEPTS AND CASES Deepak Chawla , Neena Sodhi Vikas
• Legal Research Methodology Dr. S.R. Myneni Allahabad Law Agency
• Architectural Research Methods Groat Wiley India Exclusive

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Research analyst	Able to understand concept of research	Goal no 04	