

II M.TECH. III SEMESTER SYLLABUS

PROFESSIONAL ELECTIVE - V
SOCIAL MEDIA MINING

M.TECH II YEAR – III SEM							
Course Code	Hours / Week			Credits	Maximum Marks		
B45823	L	T	P	C	CIE	SEE	Total
	3	-	-	3	25	75	100
<p>COURSE OBJECTIVES: The course should enable the students to:</p> <ol style="list-style-type: none"> 1. Understand sources and limitations of web-based data 2. Process the collected data - primarily structured - using methods involving correlation, regression, and classification to derive insights about the sources and people who generated that data 3. Learn new methods in mining streaming data, web data, etc., <p>COURSE OUTCOMES: After completion of this course, you will be able to:</p> <ol style="list-style-type: none"> 1. Utilize various Application Programming Interface (API) services to collect data from different social media sources such as YouTube, Twitter,. 2. Apply ethical principles to the use of web and social media data 3. Analyze unstructured data - primarily textual comments - for sentiments expressed in them. 4. Use different tools for collecting, analyzing, and exploring social media data for research and development purposes 							
UNIT-I	FUNDAMENTALS						
<p>FUNDAMENTALS OF SOCIAL MEDIA : Key concepts of social media mining - Good data versus bad data - Understanding sentiments- Scherer's typology of emotions - Sentiment polarity - data and classification - Supervised social media mining - lexicon-based sentiment - Supervised social media mining - Naive Bayes classifiers - Unsupervised social media mining - Item Response Theory for text scaling - Social Computing Tasks - Importance of Nodes - Strengths of Ties - Influence Modeling</p>							
UNIT-II	SOCIAL MEDIA DATA						
<p>SOCIAL MEDIA DATA : The nature of social media data - Traditional versus nontraditional social data - Measurement and inferential challenges - Opinion mining made difficult - Sentiment and its measurement - Big Data - Human Sensor and Honest Signals - Quantitative approaches - Challenges.</p>							
UNIT-III	COMMUNITIES AND SOCIAL MEDIA						
<p>COMMUNITIES AND SOCIAL MEDIA: Types of Communities - Node-Centric Community Detection - Group-Centric Community Detection - Network-Centric Community Detection - Hierarchy Centric Community Detection.</p>							
UNIT-IV	COMMUNITIES AND SOCIAL MEDIA						
<p>PATTERNS AND CLASSIFICATION IN SOCIAL MEDIA :Pattern Evolution - A Naïve Approach to Studying Community Evolution - Community Evolution in Smoothly Evolving Networks - Segment-based Clustering with Evolving Networks - Classification with Network Data - Collective Classification - Community-based Learning.</p>							
UNIT-V	R FUNDAMENTALS & CASE STUDY						

R FUNDAMENTALS: Introduction to R - Assignment and arithmetic basics - Functions - Arguments - Vectors, sequences, and combining vectors - Creating data frames and importing files - Visualization in R - Style and workflow.

CASE STUDY: MINING TWITTER DATA: Twitter API - Search and Extraction of Tweets, Retweets - Graph Visualization of Tweets , Retweets - Tag Clouds - Harvesting Friends and Followers - Analysis of Relationships, Cliques - Geodata.

Text Books:

1. John Sammons, The Basics of Digital Forensics, Elsevier
2. John Vacca, Computer Forensics: Computer Crime Scene Investigation, Laxmi Publications.

Reference Books:

1. Richard Heimann, Nathan Danneman, "Social Media Mining with R", Packt Publishing, March 2014.
2. Mining the Social Web, 2nd Edition Data Mining Face book, Twitter, LinkedIn, Google+, GitHub, and More By Matthew A. Russell Publisher: O'Reilly Media.

Web References:

1. Lei Tang, Huan Liu "Community Detection and Mining in Social Media", Morgan and Claypool Publishers, 1st Edition, 2010.
2. Matthew A. Russell, "21 Recipes for Mining Twitter", O'Reilly Media, January 2011.
3. Yangchang Zhao, "R and Data Mining, Examples and Case Studies", Academic Press; 1st Edition , 2012

**PROFESSIONAL ELECTIVE - V
ADVANCED OPERATING SYSTEMS**

M.TECH II YEAR – III SEM							
Course Code	Hours / Week			Credits	Maximum Marks		
B45824	L	T	P	C	CIE	SEE	Total
	3	-	-	3	25	75	100
<p>COURSE OBJECTIVES: The course should enable the students to:</p> <ol style="list-style-type: none"> To discuss limitations of widely-used operating systems, introduce new design approaches to address challenges of security, robustness, and concurrency To give an understanding of practical engineering issues in real-time and concurrent systems. Be proficient in details of operating systems and be sensitive to implementation and performance tuning of operating systems in preparation to entering the industry or in pursuit of graduate studies. <p>COURSE OUTCOMES: Upon successful completion of this course, students are expected to have the ability to:</p> <ol style="list-style-type: none"> Describe and explain the advanced components of a computer operating system Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems. Understand new design approaches to address challenges of security, robustness, and concurrency. implement and performance tuning of operating systems in preparation to entering the industry or in pursuit of graduate studies. 							
UNIT-I	REAL-TIME OPERATING SYSTEMS						
Real-time operating systems: Modeling Timing constraints, Handling Resource sharing among real-time tasks, Scheduling Real-Time Tasks in Multiprocessor and Distributed systems Real-Time Databases and case study.							
UNIT-II	DISTRIBUTED OPERATING SYSTEM						
Distributed operating system: Design issues, Communication in Distributed System, Distributed File Systems and case study.							
UNIT-III	NETWORK OPERATING SYSTEM						
Network operating system: Standards & Protocols; Addressing							
UNIT-IV	KERNEL DEVELOPMENT						
Kernel development: Issues and development principles, case study.							
UNIT-V	SECURITY						
Protection, privacy, access control and security issues, solutions.							
Text Books:							

1. A. Silberschatz - Applied Operating System Concepts, Wiley, 2000
2. Lubemir F Bic and Alan C. Shaw - Operating System Principles, Pearson Education, 2003
3. Rajib Mall, "Real-Time Systems: Theory and Practice," Pearson, 2008. Andrew Tanenbaum, Maarten Van Steen "Distributed Systems: Principles and Paradigms

Reference Books:

1. Jane W. Liu, "Real-Time Systems" Pearson Education, 2001.
2. Operating Systems: Internal and Design Principles - Stallings, 6th ed., PE
3. Modern Operating Systems, Andrew S Tanenbaum 3rd ed., PE.
4. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 7th ed., John Wiley
5. UNIX User Guide – Ritchie & Yates.
6. UNIX Network Programming - W.Richard Stevens ,1998, PHI. 6. The UNIX Programming Environment – Kernighan & Pike, PE.

PROFESSIONAL ELECTIVE - V
DEEP LEARNING

M.TECH II YEAR III SEM							
Course Code	Hours / Week			Credits	Maximum Marks		
B45825	L	T	P	C	CIE	SEE	Total
	3	-	-	3	25	75	100
<p>Course Description: Machine learning is a rapidly growing field in Computer science, to the extent that it became a very popular buzz word. It seems it is everywhere today - from self driving cars to automatic cancerous tumours detection. Deep learning is a sub field in the world of Machine learning mainly based around neural networks - a conceptual model of the human brain that has been around for decades but is getting more and more attention in the last several years. Using this model we are capable of achieving wonderful results in solving complex problems that were once out of our reach. In this course we will start our journey in the world of deep learning - we will start by getting familiar with basic concepts and theory, all the way down to actual hands-on practice. We will cover important topics such as Convolutional neural networks (Convolution, Correlation, and Filtering), Generative Adversarial Networks, Deep reinforcement learning, common tools and much more.</p> <p>Prerequisites: Basic knowledge in the following topics is required:</p> <ul style="list-style-type: none"> • Linear algebra • Calculus • Statistics • Basic programming in Python • Machine learning <p>Course Objectives By the end of the course, students will be able to</p> <ul style="list-style-type: none"> • understand complexity of Deep Learning algorithms and their limitations • understand modern notions in data analysis oriented computing; • be capable of confidently applying common Deep Learning algorithms in practice • and implementing their own; • be capable of performing distributed computations; • be capable of performing experiments in Deep Learning using real-world data. <p>Course Outcomes By the end of this course, the student will be able to</p> <ul style="list-style-type: none"> <input type="checkbox"/> Understand the concepts of TensorFlow, its main functions, operations and the execution pipeline <input type="checkbox"/> Implement deep learning algorithms, understand neural networks and traverse the layers of data abstraction which will empower the student to understand data more precisely. <input type="checkbox"/> Apply the concepts of convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces in problem solving. <input type="checkbox"/> Build deep learning models in TensorFlow and interpret the results <input type="checkbox"/> Build own deep learning project <input type="checkbox"/> Differentiate between machine learning, deep learning and artificial intelligence 							
UNIT-I	INTRODUCTION TO DEEP LEARNING						

Deep learning basics: Intro, History, capabilities, the perceptron. Introduction to TensorFlow :Computational Graph, Key highlights, Creating a Graph, Regression example, Gradient Descent, TensorBoard, Modularity, Sharing Variables, Keras Perceptrons: What is a Perceptron, XOR Gate	
UNIT-II	ARTIFICIAL NEURAL NETWORKS
Artificial Neural Networks: Introduction, Activation Functions: Sigmoid, ReLU, Hyperbolic Functions, Softmax, Single layer feed forward, multilayer feed forward and backward networks, Perceptron Training Rule, Gradient Descent Rule	
UNIT-III	GRADIENT DESCENT AND BACKPROPAGATION
Gradient Descent and Backpropagation: Gradient Descent, Stochastic Gradient Descent, Backpropagation, Some problems in ANN Optimization and Regularization: Overfitting and Capacity, Cross Validation, Feature Selection, Regularization, Hyperparameters	
UNIT-IV	CNN AND RNN
Introduction to Convolutional Neural Networks: Introduction to CNNs, Kernel filter, Principles behind CNNs, Multiple Filters, CNN applications Introduction to Recurrent Neural Networks: Introduction to RNNs, Unfolded RNNs, Seq2Seq RNNs, LSTM, RNN applications	
UNIT-V	APPLICATIONS OF DEEP LEARNING
Deep Learning applications: Image Processing, Natural Language Processing, Speech Recognition, Video Analytics	
Text Books:	
1. Goodfellow, I., Bengio, Y., and Courville, A., Deep Learning, MIT Press, 2016.	
Reference Books:	
1. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006. 2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009. 3. Golub, G.,H., and Van Loan,C.,F., Matrix Computations, JHU Press,2013. 4. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004.	

**OPEN ELECTIVE
SOFTWARE PROJECT MANAGEMENT**

M.TECH II YEAR – III SEM							
Course Code	Hours / Week			Credits	Maximum Marks		
	L	T	P		C	CIE	SEE
B45826	3	-	-	3	25	75	100
<p>COURSE OBJECTIVES:</p> <ol style="list-style-type: none"> To provide fundamental concepts of Service Oriented Architecture. To inculcate knowledge about SOAP, UDDI and XML to create web services. To teach Cloud Computing architecture and services with respect to SOA <p>COURSE OUTCOMES:</p> <p>At the end of this course students will be able to:</p> <ol style="list-style-type: none"> Apply the principles of service oriented architecture Adopt the standards and technologies of modern web services implementations Effectively use market-leading development tools to create and consume web services Identify and select the appropriate framework components in the creation of web service solutions Apply object-oriented programming principles to the creation of web service solutions Analyze the requirements of a medium-difficulty programming task, and create software that meets the requirements. 							
UNIT-I	CONVENTIONAL SOFTWARE MANAGEMENT						
<p>Conventional Software Management: The waterfall model, conventional software Management performance.</p> <p>Evolution of Software Economics: Software Economics, pragmatic software cost estimation.</p>							
UNIT-II	SOFTWARE ECONOMICS						
<p>Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections. The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.</p>							
UNIT-III	LIFE CYCLE PHASES, ARTIFACTS OF THE PROCESS & MODEL BASED SOFTWARE ARCHITECTURES						
<p>Life cycle phases: Engineering and production stages, inception, Elaboration, construction, Transition phases.</p> <p>Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, Programmatic artifacts.</p> <p>Model based software architectures: A Management perspective and technical perspective. WorkFlows of the process: Software process workflows, Iteration workflows.</p>							
UNIT-IV	CHECKPOINTS OF THE PROCESS & PROJECT ORGANIZATIONS AND RESPONSIBILITIES						
<p>Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: work breakdown structures, planning guidelines, cost and schedule Estimating, Iteration planning process, Pragmatic planning.</p> <p>Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation Building blocks, The Project Environment.</p>							
UNIT-V	PROJECT CONTROL AND PROCESS INSTRUMENTATION, FUTURE SOFTWARE PROJECT MANAGEMENT & CASE STUDY						

Project Control and Process instrumentation: The seven core Metrics, Management Indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates.

Future Software Project Management: modern Project Profiles, Next generation Software economics, modern process transitions.

Case Study: The command Center Processing and Display system- Replacement (CCPDS- R).

Text Books:

1. Software Project Management, Walker Royce: Pearson Education, 2005.
2. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.

Reference Books:

1. Software Project Management, Joel Henry, Pearson Education
2. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

OPEN ELECTIVE
INTERNET OF THINGS

M.TECH II YEAR – III SEM							
Course Code	Hours / Week			Credits	Maximum Marks		
B45827	L	T	P	C	CIE	SEE	Total
	3	-	-	3	25	75	100
<p>COURSE OBJECTIVES: The course should enable the students to:</p> <ol style="list-style-type: none"> To understand the fundamentals of Internet of Things. To learn about the basics of IOT protocols. To build a small low cost embedded system using Raspberry Pi and Adriano board. To apply the concept of Internet of Things in the real world scenario. <p>COURSE OUTCOMES:</p> <ol style="list-style-type: none"> 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. To classify Real World IoT Design Constraints, Industrial Automation in IoT. 							
UNIT-I	INTRODUCTION TO IoT						
Internet of Things - Physical Design- Logical Design- IoT Enabling Technologies - IoT Levels & Deployment Templates - Domain Specific IOTs - IoT and M2M - IoT System Management with NETCONF-YANG- IoT Platforms Design Methodology.							
UNIT-II	IoT ARCHITECTURE						
M2M high-level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model - Domain model - information model - functional model - communication model - IoT reference architecture.							
UNIT-III	IoT PROTOCOLS & BUILDING IoT WITH ARDUINO						
Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus– Zigbee Architecture – Network layer – 6LowPAN - CoAP – Security. Introduction to microcontroller and microprocessor, Arduino Board Layout and architecture, Programming with Arduino IDE, Reading data from analog or digital sensors, writing data to analog PWM or Digital actuators.							
UNIT-IV	BUILDING IoT WITH RASPBERRY PI						
Building IOT with RASPBERRY PI- IoT Systems - Logical Design using Python – IoT Physical Devices & Endpoints - IoT Device -Building blocks -Raspberry Pi -Board - Linux on Raspberry Pi - Raspberry Pi Interfaces - Programming Raspberry Pi with Python.							
UNIT-V	CASE STUDIES AND REAL – WORLD APPLICATIONS						

Functions: Need for user defined functions, function declaration, function prototype, category of functions, inter function communication, function calls, parameter passing mechanisms, recursion, passing arrays to functions, passing strings to functions, storage classes, preprocessor directive.

Text Books:

1. Arshdeep Bahga, Vijay Madiseti, —Internet of Things – A hands-on approach, Universities Press, 2015.

Reference Books:

1. Arshdeep Bahga, Vijay Madiseti, —Internet of Things – A hands-on approach, Universities Press, 2015.
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), —Architecting the Internet of Things, Springer, 2011.
3. Honbo Zhou, —The Internet of Things in the Cloud: A Middleware Perspective, CRC Press, 2012.
4. Jan Ho" Iler, Vlasios Tsiatsis , Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand. David Boyle, "From Machine-to-Machine to the Internet of Things - Introduction to a New Age of Intelligence", Elsevier, 2014.
5. Stephen G. Kochan, "Programming in C", Addison-Wesley Professional, 4th Edition, 2014.
6. B. A. Forouzan, R. F. Gillberg, "C Programming and Data Structures", Cengage Learning, India, 3rd Edition, 2014.

Web References:

1. <https://wso2.com/whitepapers/a-reference-architecture-for-the-internet-of-things/>
2. http://www.ti.com/ww/en/internet_of_things/iot-applications.html

E-Text Books:

1. https://cloud.oracle.com/en_US/opc/iot/ebooks
2. <https://www.vitalsource.com/en-uk/products/analytics-for-the-internet-of-things-iot-andrew-minteer-v9781787127579>

MOOC Course

1. <https://www.coursera.org/specializations/internet-of-things>
2. <https://www.mooc-list.com/tags/iot>

OPEN ELECTIVE
ADHOC AND SENSOR NETWORKS

M.TECH II YEAR – III SEM							
Course Code	Hours / Week			Credits	Maximum Marks		
	L	T	P		C	CIE	SEE
B45828	3	-	-	3	25	75	100
<p>COURSE OBJECTIVES: The course should enable the students to:</p> <ol style="list-style-type: none"> 1. Describe the concepts of adhoc wireless networks. 2. Analyze different routing protocols of mobile adhoc networks. 3. Apply the energy management policies in routing algorithms. 4. Implement protocols for location based QoS. 5. Design and simulate sensor networks and evaluate performance. <p>COURSE OUTCOMES:</p> <ol style="list-style-type: none"> 1. Students will be able to describe an adhoc network and analyze various technologies associated with it. 2. Students will be able to analyze various transport layer and analyze various protocols associated with it. 3. Students will apply this knowledge to analyze adhoc & sensor based networks and compute various parameters associated with it. 4. Students will Discuss the challenges in designing routing and transport protocols for wireless Ad-hoc/sensor networks 							
UNIT-I	AD HOC WIRELESS NETWORKS AND MAC INTRODUCTION						
<p>Ad Hoc Wireless Networks and MAC Introduction: Issues in ad Hoc wireless networks, issues in designing a MAC protocol for ad hoc wireless networks, design goals of a MAC protocols for ad hoc networks, classifications of MAC protocols.</p>							
UNIT-II	ROUTING PROTOCOLS IN AD HOC NETWORKS						
<p>Routing Protocols in Ad Hoc Networks: Issues in designing a routing protocol for ad hoc wireless networks, classifications of routing protocols, table driven routing protocol, on-demand routing protocols, hybrid routing protocols, hierarchical routing protocols, and power aware routing protocols.</p>							
UNIT-III	ENERGY MANAGEMENT IN AD HOC WIRELESS NETWORKS						
<p>Energy Management in Ad hoc Wireless Networks: Energy-Efficient Communication in Ad Hoc Wireless Networks, Ad Hoc Networks Security, Self-Organized and Cooperative Ad Hoc Networking, Simulation and Modeling of Wireless, Mobile, and Ad Hoc Networks, Modeling Cross-Layering Interaction Using Inverse Optimization, Algorithmic Challenges in Ad Hoc Networks.</p> <p>Energy Management in Ad hoc Wireless Networks: Introduction, need for energy management in ad hoc networks, battery management schemes-overview of battery characteristic, device dependent schemes.</p>							
UNIT-IV	QUALITY OF SERVICE IN AD HOC WIRELESS NETWORKS						

Quality of Service in Ad Hoc Wireless Networks: Introduction, issues and challenges in providing QoS in ad hoc networks, classification of QoS solutions, MAC layer solutions, QoS routing protocols, ticket based, predictive location based QoS routing protocols.	
UNIT-V	WIRELESS SENSOR NETWORKS
Wireless Sensor Networks: Introduction, sensor network architecture, data dissemination, gathering, MAC protocols for sensor networks—self organizing, hybrid TDMA/FDMA, CSMA based MAC, location Discovery.	
Text Books:	
<ol style="list-style-type: none"> 1. C. Siva Ram Murthy and B. S. Manoj, Ad Hoc Wireless Networks-Architectures and Protocols, New Delhi: Pearson Education, 2013. 2. “Adhoc and Sensor Networks” by Stefano Basagni, Silvia Giordano, Ivan Stojmenvic. IEEE Press, A John Wiley & Sons, Inc., Publication 2004. 	
Reference Books:	
<ol style="list-style-type: none"> 1. Feng Zhao and Leonidas Guibas, Wireless Sensor Networks. Noida: Morgan Kaufman Publishers, 2004. 2. C. K. Toh, Ad Hoc Mobile Wireless Networks. New Delhi: Pearson Education, 2002. 3. Thomas Krag and SebastinBuettrich, Wireless Mesh Networking. Mumbai: O'Reilly Publishers,2007 	
Web References:	
<ol style="list-style-type: none"> 1. https://www.elsevier.com/journals/ad-hoc-networks/1570-8705/guide-for-authors 2. https://en.wikipedia.org/wiki/Wireless_ad_hoc_network 3. www.oldcitypublishing.com/journals/ahswn-home/ 	
E-Text Books:	
<ol style="list-style-type: none"> 1. https://ebooks.benthamscience.com/book/9781608050185/ 2. https://books.google.co.in › Computers › Networking › General 	
MOOC Course	
<ol style="list-style-type: none"> 1. nptel.ac.in/courses/106105160/ 2. https://onlinecourses.nptel.ac.in/noc18_cs09/ 3. https://swayam.gov.in/course/4408-wireless-adhoc-and-sensor-networks 	

OPEN ELECTIVE
INFORMATION RETRIEVAL SYSTEM

M.TECH II YEAR – III SEM							
Course Code	Hours / Week			Credits	Maximum Marks		
B45829	L	T	P	C	CIE	SEE	Total
	3	-	-	3	25	75	100
COURSE OBJECTIVES:							
<ol style="list-style-type: none"> 1. To learn the different models for information storage and retrieval 2. To learn about the various retrieval utilities 3. To understand indexing and querying in information retrieval systems 4. To expose the students to the notions of structured and semi structured data 5. To learn about web search 							
COURSE OUTCOMES:							
On completion of this Course the student will be able to							
<ol style="list-style-type: none"> 1. Understand the information retrieval strategies. 2. Analyze and use the various retrieval utilities for improving searching concepts. 3. Apply various retrieval utilities on crossing language barrier. 4. Understand the indexing and compressing documents to improve the space and time efficiency. 5. Understand the integrated structured data and distributed information retrieval applies on web search. 							
UNIT-I	INTRODUCTION TO INFORMATION RETRIEVAL						
Retrieval Strategies: Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model, Language Models.							
UNIT-II	RETRIEVAL UTILITIES						
Retrieval Utilities: Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.							
UNIT-III	CROSS-LANGUAGE INFORMATION RETRIEVAL						
Retrieval Utilities: Semantic networks, parsing.							
Cross-Language Information Retrieval: Introduction, Crossing the language barrier.							
UNIT-IV	EFFICIENCY						
Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection.							
UNIT-V	DISTRIBUTED INFORMATION RETRIEVAL						
Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema.							
Distributed Information Retrieval: A Theoretical model of distributed retrieval, Web search							

Text Books:

1. Information Retrieval: Algorithms and Heuristics By David A Grossman and Ophir Frieder, 2nd Edition, Springer.
2. Gerald J. Kowalski, Mark T. Maybury (2000), Information Storage and Retrieval Systems: Theory and Implementation, 2nd edition, Springer International Edition, USA.

Reference Books:

1. Information retrieval datastructures and algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education, 2007
2. Information storage & retrieval By Robert Korfhage-John Wiley&sons
3. Natural language processing and information nretrieval ByU.S. Tiwary, Oxford University.

AUDIT COURSE-I

ENGLISH FOR RESEARCH PAPER WRITING

M.TECH I YEAR – I SEM							
Course Code	Hours / Week			Credits	Maximum Marks		
	L	T	P	C	CIE	SEE	Total
B4AC01	2	-	-	0	25	75	100
<p>COURSE OBJECTIVES: Students will be able to:</p> <ol style="list-style-type: none"> 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. 							
UNIT-I	PLANNING AND PREPARATION						
Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness							
UNIT-II	PARAPHRASING AND PLAGIARISM						
Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts, Introduction.							
UNIT-III	REVIEW OF THE LITERATURE						
Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Checkkey 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.							
UNIT-IV	METHODS& CONCLUSIONS						
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.							
UNIT-V	SUBMISSIONS						
Useful phrases, how to ensure paper is as good as it could possibly be the first- time submission.							
<p>Suggested Studies:</p> <ol style="list-style-type: none"> 1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books) 2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press 3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook. 4. Adrian Wallwork, English for Writing Research Papers, Springer New York DordrechtHeidelberg London, 2011 							

AUDIT COURSE-I

RESEARCH METHODOLOGY AND IPR

M.TECH I YEAR – I SEM							
Course Code	Hours / Week			Credits	Maximum Marks		
	L	T	P		C	CIE	SEE
B4AC02	2	-	-	0	25	75	100
COURSE OUTCOMES:							
<p>The course should enable the students to:</p> <ol style="list-style-type: none"> 1. Understand research problem formulation. 2. Analyze research related information 3. 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. 5. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. 6. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.. 							
UNIT-I	INTRODUCTION TO RESEARCH METHODOLOGY						
<p>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</p>							
UNIT-II	RESEARCH PROPOSAL						
<p>Effective literature studies approaches, analysis Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee</p>							
UNIT-III	NATURE OF INTELLECTUAL PROPERTY, INTERNATIONAL SCENARIO						
<p>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.</p>							
UNIT-IV	PATENT RIGHTS						
<p>Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.</p>							
UNIT-V	NEW DEVELOPMENTS IN IPR						

New Developments in IPR: Administration of Patent System. New developments in IPR; IP of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

Text Books:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students"
2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
3. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners"
4. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd, 2007.

Reference Books:

1. Mayall, "Industrial Design", McGraw Hill, 1992.
2. Niebel, "Product Design", McGraw Hill, 1974.
3. Asimov, "Introduction to Design", Prentice Hall, 1962.
4. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
5. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

Web References:

1. https://www.goodreads.com/book/show/761696.Research_Methodology
2. <https://www.amazon.com/ResearchMethodology...WayneGoddard/dp/0702156>
3. https://www.goodreads.com/book/show/761695.Research_Methodology

E-Text Books:

1. swelanphar.yolasite.com/.../Wayne-Goddard-Stuart-MelvilleResearchMethodology
2. shodhganga.inflibnet.ac.in/bitstream/10603/4644/10/10_chapter%204.pdf
3. https://archive.org/.../RanjitKumarResearchMethodologyAStepByStepG/Ranjit_Kumar.

MOOC Course:

1. <https://swayam.gov.in/course/292-introduction-to-research>
2. <https://www.openlearning.com/courses/SPPP3042x>

**AUDIT COURSE-II
DISASTER MANAGEMENT**

M.TECH I YEAR – II SEM							
Course Code	Hours / Week			Credits	Maximum Marks		
	L	T	P		C	CIE	SEE
B4AC03	2	-	-	0	25	75	100
COURSE OUTCOMES:							
Students will be able to:							
<ol style="list-style-type: none"> Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. 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 in. 							
UNIT-I	INTRODUCTION						
Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.							
UNIT-II	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							
UNIT-III	DISASTER PRONE AREAS IN INDIA& DISASTER PREPAREDNESS						
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 Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing,							
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.							
UNIT-V	DISASTER MITIGATION						
Meaning, Concept And Strategies Of Disaster Mitigation, Emerging TrendsIn Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India.							
SUGGESTED STUDIES:							
<ol style="list-style-type: none"> R. Nishith, Singh AK, “Disaster Management in India: Perspectives, issues and strategies NewRoyal book Company. Sahni, PardeepEt.Al. (Eds.),” Disaster Mitigation Experiences And Reflections”, Prentice Hall Of India, New Delhi. Goel S. L., Disaster Administration And Management Text And Case Studies”, Deep &Deep publication Pvt. Ltd., New Delhi 							

AUDIT COURSE-II							
CONSTITUTION OF INDIA							
M.TECH I YEAR – II SEM							
Course Code	Hours / Week			Credits	Maximum Marks		
	L	T	P	C	CIE	SEE	Total
B4AC04	2	-	-	0	25	75	100
COURSE OBJECTIVES:							
Students will be able to:							
<ol style="list-style-type: none"> 1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective. 2. To address the growth of Indian opinion regarding modern Indian intellectuals’ constitutional role and entitlement to civil and economic rights as well as the Emergence of nationhood in the early years of Indian nationalism. 3. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution. 							
COURSE OUTCOMES:							
Students will be able to							
<ol style="list-style-type: none"> 1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. Discuss the intellectual origins of the framework of argument that informed the Conceptualization of social reforms leading to revolution in India. 3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. Discuss the passage of the Hindu Code Bill of 1956. 							
UNIT-I	HISTORY OF MAKING OF THE INDIAN CONSTITUTION& PHILOSOPHY						
History, Drafting Committee, (Composition & Working), Preamble, Salient Features.							
UNIT-II	CONTOURS OF CONSTITUTIONAL RIGHTS & DUTIES						
Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies Directive Principles of State Policy, Fundamental.							
UNIT-III	ORGANS OF GOVERNANCE						
Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.							
UNIT-IV	LOCAL ADMINISTRATION						
District’s Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI: ZilaPachayat, Elected officials and their roles, CEO ZilaPachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.							
UNIT-V	ELECTION COMMISSION						
Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.							

TEXTBOOKS:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.

REFERENCES:

1. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2015
2. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.