DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE STRUCTURE & SYLLABUS M.Tech CSE for

SOFTWARE ENGINEERING PROGRAMME

(Applicable for batches admitted from 2019-2020)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

I-SEMESTER

S.No	Course Code	Courses	Category	L	T	P	C
S.No	Course Code	Courses	Category	L	T	P	C
1	MTSE1101	**Program Core-1** Software Engineering	PC	3	0	0	3
2	MTSE1102	**Program Core-2** Advanced Data Structures	PC	3	0	0	3
3	MTSE1103	**Program Elective-1** 1. Software Project and Process Management 2. Machine Learning 3. E-Commerce	PE	3	0	0	3
4	MTSE1104	**Program Elective-2** 1. Software Quality Assurance and Testing 2. Cloud Computing 3. Internet of Things	PE	3	0	0	3
5	MTSE1105	**Research Methodology and IPR**	CC			0	2
6	MTSE1106	**Laboratory-1** Advanced Data Structures Lab	LB	0	0	4	2
7	MTSE1107	**Laboartory-2** SE LAB-I	LB	0	0	4	2
8	MTSE1108	**Audit Course-1***	AC	2	0	0	0
		Total Credits					18

*Student has to choose any one audit course listed below.

II-SEMESTER

S.No	Course Code	Courses	Category	L	T	P	C
1	MTSE1201	**Program Core-3** Service Oriented Architecture	PC	3	0	0	3
2	MTSE1202	**Program Core-4** Mathematical Foundations of Computer Science	PC	3	0	0	3
3	MTSE1203	**Program Elective-3** 1. Software Testing Methodologies 2. Agile Software Development 3. ERP & Supply Chain Management	PE	3	0	0	3
4	MTSE1204	**Program Elective-4** 1. Secure Software Engineering 2. Big Data Analytics 3. Design patterns	PE	3	0	0	3
5	MTSE1205	**Laboratory-3** Software Testing Lab	LB	0	0	4	2
6	MTSE1206	**Laboartory-4** SE LAB-II	LB	0	0	4	2
7	MTSE1207	**Mini Project with Seminar**	MP	2	0	0	2
8	MTSE1208	**Audit Course-2 ***	AC	2	0	0	0
		Total Credits					18

III-SEMESTER

1	MTSE2101	**Program Elective-5** 1. Object Oriented Software Engineering 2. Artificial Intelligence 3. User Interface Design 4. MOOCS-I(NPTEL/SWAYAM- 12 Week Program related to the programme which is not listed in the course structure	PE	3	0	0	3
2	MTSE2102	**Open Elective** 1. MOOCS-II (NPTEL/SWAYAM- Any 12 Weeks Program-Interdisciplinary Course but not from Parent Department) 2. Courses offered by other departments in the college	OE	3	0	0	3
3	MTSE2103	**Dissertation-I/ Industrial Project#**	PJ	0	0	20	10
		Total Credits					16

*Student has to choose any one audit course listed below.

Audit Course 1 & 2:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by Yoga
8. Personality Development through Life Enlightenment Skills

#*Students going for Industrial Project/Thesis will complete these courses through MOOCs*

IV-SEMESTER

S.No	Course Code	Courses	Category	L	T	P	C
1	MTSE2201	**Dissertation-II**	PJ	0	0	32	16
		Total Credits					16

Open Electives offered to Other Departments
1. Python Programming   3.Machine Learning
2. Artificial Intelligence   4.Deep Learning

I Year - I Semester		**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
Software Engineering (MTSE1101)					

Course Objectives:

In this course the student will be learn about

- The role of software, aim of the software system, different types of process models.

- How to use process models in project, software requirement specification, Requirement and analysis,planningof a software project, estimations, Riskmanagement.
- Role of software architecture, architecture views and Architecture styles for C&C view, evaluating architectures.
- Design concepts, function-oriented design, object oriented design, and metrics.
- Developing code for system, different types of testings' applying on developed system.

Course Outcomes:

By the end of course the student will be able
- Demonstrate knowledge on:
  - o Fundamental concepts of software engineering.
  - o Process models.
  - o Software development life cycle.
- Analyze software requirements and process models required to develop a software system.
- Design and develop a quality software product using design engineeringprinciples and Develop software product as per user and societal requirements.
- Follow standards for software development and quality management.
- Demonstrate skills in applying risk and quality management principles for effective management of software projects.

UNIT-I: Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps, Software Engineering, Software Process, Software Engineering Practice, Software Myths. **Process Models:** A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process.

UNIT-II: Requirements Analysis And Specification: Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification. **Software Design:** Overview of the Design Process, How to Characterise of a Design? , Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design

UNIT – III: Function-Oriented Software Design: Overview of SA/SD Methodology, Structured Analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, over view of Object Oriented design. **User Interface Design**: Characteristics of Good User Interface, Basic Concepts, Types of User Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

UNIT – IV:Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing

UNIT – V:Software Reliability And Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model. **Computer Aided Software Engineering:** Case and its Scope, Case Environment, Case Support in Software Life Cycle, Other Characteristics of Case Tools, Towards Second Generation CASE Tool, Architecture of a Case Environment

Text Books:
1. Software Engineering A practitioner's Approach, Roger S. Pressman, Seventh Edition McGraw Hill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Third Edition, PHI.
3. Software Engineering, Ian Sommerville, Ninth edition, Pearson education

Reference Books:
1. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
2. Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010.
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

I Year - I Semester		L	T	P	C
		3	0	0	3
Advanced Data Structures (MTSE1102)					

Course Objectives:
From the course the student will learn
- Single Linked, Double Linked Lists, Stacks, Queues, Searching and Sorting techniques, Trees, Binary trees, representation, traversal, Graphs- storage, traversal.
- Dictionaries, ADT for List, Stack, Queue, Hash table representation, Hash functions, Priority queues, Priority queues using heaps, Search trees.
- AVL trees, operations of AVL trees, Red- Black trees, Splay trees, comparison of search trees.

Course Outcomes:
- Ability to write and analyze algorithms for algorithm correctness and efficiency.
- Master a variety of advanced abstract data type (ADT) and data structures and their Implementation.
- Demonstrate various searching, sorting and hash techniques and be able to apply and solve problems of real life.
- Design and implement variety of data structures including linked lists, binary trees, heaps, graphs and search trees.
- Ability to compare various search trees and find solutions for IT related problems.

UNIT–I: Introduction to Data Structures- Singly Linked Lists, Doubly Linked Lists, Circular Lists-Algorithms, **Stacks and Queues-** Algorithm Implementation using Linked Lists.

UNIT–II: Searching- Linear and Binary, Search Methods, **Sorting-** Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, **Trees-** Binary trees, Operations- Insertion, Deletion, Properties, Representation and Traversals (DFT, BFT), Expression Trees (Infix, prefix, postfix), **Graphs-** Basic Concepts, Storage structures and Traversals.

UNIT–III: Dictionaries, ADT, The List ADT, Stack ADT, Queue ADT, Hash Table Representation, Hash Functions, Collision Resolution-Separate Chaining, **Open Addressing-** Linear Probing, Double Hashing.

UNIT–IV: Priority queues- Definition, ADT, Realising a Priority Queue Using Heaps, Definition, Insertion, Deletion, **Search Trees-** Binary Search Trees, Definition, ADT, Implementation, **Operations-** Searching, Insertion, Deletion.

UNIT–V: Search Trees- AVL Trees, Definition, Height of AVL Tree, Operations- Insertion, Deletion and Searching. Introduction to Red-Black and Splay Trees, B-Trees, Height of B-Tree, Insertion, Deletion and Searching, Comparison of Search Trees.

Text Books:
1. Data Structures: A Pseudocode Approach, 2/e, Richard F.Gilberg, Behrouz A. Forouzon, Cengage
2. Data Structures, Algorithms and Applications in java, 2/e, SartajSahni, University Press

Reference Books:
1. Data Structures And Algorithm Analysis, 2/e, Mark Allen Weiss, Pearson
2. Data Structures And Algorithms, 3/e, Adam Drozdek, Cenage
3. C and Data Structures: A Snap Shot Oriented Treatise Using Live Engineering Examples, N. B. Venkateswarulu, E.V. Prasad, S Chand & Co, 2009
4. Classic Data Structures, Second Edition, Debasis Samantha ,PHI

I Year - I Semester		L	T	P	C
		3	0	0	3

Software Project and Process Management (MTSE11XX)

Course Objectives:
At the end of the course, the student shall be able to:
- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- To compare and differentiate organization structures and project structures.
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

Course outcomes:
Upon the completion of the course students will be able to:-
- Apply the process to be followed in the software development life-cycle models.
- Implement communication, modeling, and construction & deployment practices in software development.
- Analyze & design the software models using unified modeling language (UML) and the concepts of various software testing methods.
- Apply appropriate testing approaches for development of software and use the quality management metrics in software development.
- Apply the concepts of project management & planning.

UNIT-I : Software Process Maturity Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process. Process Reference Models Capability Maturity Model (CMM), CMMi, PCMM, PSP, TSP.

UNIT-II: Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.

UNIT-III: Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures. Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments.

UNIT-IV: Process Planning and Project Organizations Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning, line-of- business organizations, project organizations, evolution of organizations, process automation.

UNIT-V: Project Control and process instrumentation The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation. CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions

Text Books:
1. Managing the Software Process, Watts S. Humphrey, Pearson Education, 1999
2. Software Project Management, Walker Royce, Pearson Education,1998

Reference Books:

1. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education,2000
2. Process Improvement essentials, James R. Persse, O'Reilly,2006
3. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, Tata Mc-Graw Hill,2006
4. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
5. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly,2007

I Year - I Semester		L	T	P	C
		3	0	0	3

Machine Learning (MTSE11XX)

Course Objectives:
- Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
- Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
- Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
- Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.

Course Outcomes:
After the completion of the course, student will be able to
- Explain the definition and usage of the term 'the internet of things' in different contexts.
- Demonstrate on various network protocols used in IoT.
- Analyze on various key wireless technologies used in IoT systems, such as WiFi, 6LoWPAN, Bluetooth and ZigBee.
- Illustrate on the role of big data, cloud computing and data analytics in IoT system.
- Design a simple IoT system made up of sensors, wireless network connection, data analytics and display/actuators, and write the necessary control software.

Unit-I: Introduction-Towards Intelligent Machines, Well posed Problems, Example of Applications in diverse fields, Data Representation, Domain Knowledge for Productive use of Machine Learning, Diversity of Data: Structured / Unstructured, Forms of Learning, Machine Learning and Data Mining, Basic Linear Algebra in Machine Learning Techniques.

Unit-II: Supervised Learning- Rationale and Basics: Learning from Observations, Bias and Why Learning Works: Computational Learning Theory, Occam's Razor Principle and Overfitting Avoidance Heuristic Search in inductive Learning, Estimating Generalization Errors, Metrics for assessing regression, Metris for assessing classification.

Unit-III: Statistical Learning- Machine Learning and Inferential Statistical Analysis, Descriptive Statistics in learning techniques, Bayesian Reasoning: A probabilistic approach to inference, K-Nearest Neighbor Classifier. Discriminant functions and regression functions, Linear Regression with Least Square Error Criterion, Logistic Regression for Classification Tasks, Fisher's Linear Discriminant and Thresholding for Classification, Minimum Description Length Principle.

Unit-IV: Support Vector Machines (SVM)- Introduction, Linear Discriminant Functions for Binary Classification, Perceptron Algorithm, Large Margin Classifier for linearly seperable data, Linear Soft Margin Classifier for Overlapping Classes, Kernel Induced Feature Spaces, Nonlinear Classifier, Regression by Support vector Machines.

Learning with Neural Networks: Towards Cognitive Machine, Neuron Models, Network Architectures, Perceptrons, Linear neuron and the Widrow-Hoff Learning Rule, The error correction delta rule.

Unit -V: Multilayer Perceptron Networks and error back propagation algorithm, Radial Basis Functions Networks. **Decision Tree Learning**: Introduction, Example of classification decision tree, measures of impurity for evaluating splits in decision trees, ID3, C4.5, and CART decision trees, pruning the tree, strengths and weakness of decision tree approach.

Textbooks:
1. Applied Machine Learning, M.Gopal, McGraw Hill Education
2. Machine Learning: A Probabilistic Perspective, Kevin Murphy, MIT Press,2012
3. The Elements of Statistical Learning, Trevor Hastie, Robert Tibshirani, Jerome Friedman, Springer 2009 (freely available online)

Reference Books:
1. Pattern Recognition and Machine Learning, Christopher Bishop, Springer,2007
2. Programming Collective Intelligence: Building Smart Web 2.0 Applications - Toby Segaran
3. Building Machine Learning Systems with Python - WilliRichert, Luis Pedro Coelho

I Year - I Semester		L	T	P	C
		3	0	0	3

E-Commerce (MTSE11XX)

Course Objectives:

This course provides
- An introduction to information systems for business and management.
- It is designed to familiarize students with organizational and managerial foundations of systems.
- Technical foundation for understanding information systems.

Course Outcomes:

- Demonstrate an understanding of the foundations and importance of E-commerce
- Analyze the impact of E-commerce on business models and strategyDiscuss legal issues and privacy in E-Commerce
- Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational.
- Describe the infrastructure for E-commerce and describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.
- Assess electronic payment systems and Recognize and discuss global E-commerce issues

UNIT-I: Electronic Commerce, Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications. Consumer Oriented Electronic commerce, Mercantile Process models.

UNIT-II: Electronic payment systems-Digital Token Based, SmartCards, CreditCards, Risks in Electronic Payment systems.

UNIT-III: Inter Organizational Commerce-EDI, EDI Implementation, Value added networks. Intra Organizational Commerce-work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT-IV: Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing, Information based marketing, Advertising on Internet, on-line marketing process, market research.

UNIT-V: Consumer Search and Resource Discovery, Information search and Retrieval, Commerce Catalogues, Information Filtering. Multimedia –key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing.

Text Book:
1. Frontiers of ElectronicCommerce, Kalakata, Whinston, PEA,2006.

Reference Books:
1. E-Commerce Fundamentals and Applications, Hendry Chan, Raymond Lee, Dillon, Chang, John Wiley.
2. E-Commerce, A Managerial Perspective, Turban E, LeeJ, King, ChungH.M.,PEA, 2001.
3. E-Commerce An Indian Perspective,S/e,P.T. Joseph, PHI, 2009.

4. E-Commerce, S.Jaiswal, Galgotia.
5. Electronic Commerce, Gary P.Schneider, Thomson.

I Year - I Semester		L	T	P	C
		3	0	0	3

Software Quality Assurance and Testing (MTSE11XX)

Course Objectives:

The student should be able to:

- Demonstration of software quality assurance and testing as a fundamental component of software lifecycle.
- Define the scope of software projects.
- Apply software quality assurance and testing activities using modern software tools.
- Estimate cost of a project and manage budgets and prepare test plans and schedules for a software quality assurance and testing project.
- Develop software quality assurance and testing project staffing requirements and effectively manage a project.

Course Outcomes:

- Apply modern software testing processes in relation to software development and project management.
- Create test strategies and plans, design test cases, prioritize and execute them.
- Manage incidents and risks within a project.
- Contribute to efficient delivery of software solutions and implement improvements in the software development processes.
- Gain expertise in designing, implementation and development of computer based systems and IT processes.

UNIT–I: Software quality assurance Framework and Standards SQA Frame work: What is Quality? Software Quality Assurance. Components of Software quality Assurance. **Software Quality Assurance Plan:** Steps to develop and implement a Software quality Assurance Plan. **Standards:** ISO9000, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma .

UNIT-II: **Software Quality Assurance Metrics and Measurement Software Quality Assurance Metrics:** Product Quality metrics, In- Process Quality metrics, Metrics for Software Maintenance. Examples of Metric Programs, Software quality indicators Fundamentals in Measurement Theory

UNIT–III: **Building Software Testing Environment:** Writing Policy for software testing, Economics of testing, Building a structured approach to software testing . **Software Testing process:** Defects Hard to find, Functional and structured testing, Workbench concept, customizing the software testing process, testing tactics check list

UNIT–IV: **Software Testing Techniques :** Black-Box testing, Boundary value analysis, Bottom-up, Branch Coverage, Cause- Effect graphing, CRUD, Database, exception, Gray_box, Histogram, Inspections, JADs, Pareto Analysis, prototyping, random Testing, Risk based Testing, Regression Testing, Structured Walkthrough, Thread testing, Performance Testing, White Box Testing . **Software Testing Tools:** Taxonomy of Testing tools, Methodology to evaluate automated testing tools, Load Runner, Win Runner and Rational Testing Tools, Java testing Tools, JMetra, JUNIT and Cactus

UNIT–V: **Testing Process:** Advantages of following a process, Cost of computer testing, Seven step software Testing Process, Define the scope of testing, Developing the test plan, Verification Testing. Validation Testing, Analysing and reporting test results, Acceptance and operational Testing, Post Implementation Analysis . **Testing Specialised Systems and Applications:** Testing Client/Server System, Testing COTS and Contracted Software, Testing security, Testing Data Warehouse .

Text Books:
1. William E.Perry: Effective Methods for Software Testing, 3rd Edition, Wiley Publication

Reference Books:
1. Testing and Quality Assurance for Component-based Software, by Gao, Tsao and Wu, Artech House Publishers
2. Software Testing Techniques, by Bories Beizer, Second Edition, Dreamtech Press
3. Managing the Testing Process, by Rex Black, Wiley

I Year - I Semester		L	T	P	C
		3	0	0	3

Cloud Computing (MTSE11XX)

Course Objectives:

The student will learn about

- The cloud environment, building software systems and components that scale to millions of users in modern internet,
- Cloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas.
- Developing cloud based software applications on top of cloud platforms.

Course Outcomes:

By the end of the course student will be able to

- Ability to understand various service delivery models of a cloud computing architecture.
- The concept of Map-Reduce and how Map-Reduce works in analysis of data in parallel computing.
- Apply various Cloud Technologies, web services and software involved in cloud computing to design enterprise applications.
- Understand the challenges involved in cloud computing security and how VMs can be secured in Virtualization security management.

UNIT-I: Introduction: Network centric computing, Network centric content, peer-to –peer systems, cloud computing delivery models and services, Ethical issues, Vulnerabilities, Major challenges for cloud computing. **Parallel and Distributed Systems:** introduction, architecture, distributed systems, communication protocols, logical clocks, message delivery rules, concurrency, model concurrency with Petri Nets.

UNIT-II: Cloud Infrastructure: At Amazon, The Google Perspective, Microsoft Windows Azure, Open Source Software Platforms, Cloud storage diversity, Intercloud, energy use and ecological impact, responsibility sharing, user experience, Software licensing. **Cloud Computing :** Applications and Paradigms: Challenges for cloud, existing cloud applications and new opportunities, architectural styles, workflows, The Zookeeper, The Map Reduce Program model, HPC on cloud, biological research

UNIT-III: Cloud Resource virtualization: Virtualization, layering and virtualization, virtual machine monitors, virtual machines, virtualization- full and para, performance and security isolation, hardware support for virtualization, Case Study: Xen, vBlades. **Cloud Resource Management and Scheduling**: Policies and Mechanisms, Applications of control theory to task scheduling, Stability of a two-level resource allocation architecture, feed back control based on dynamic thresholds, coordination, resource bundling, scheduling algorithms, fair queuing, start time fair queuing, cloud scheduling subject to deadlines, Scheduling Map Reduce applications, Resource management and dynamic application scaling

UNIT-IV: Storage Systems: Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system., Apache Hadoop, BigTable, Megastore (text book 1), Amazon Simple Storage Service(S3) (Text book 2). **Cloud Security:** Cloud security risks, security – atop concern for cloud users, privacy and privacy impact assessment, trust, OS security, Virtual machine security, Security risks

UNIT-V: Cloud Application Development: Amazon Web Services : EC2 – instances, connecting clients, security rules, launching, usage of S3 in Java, Installing Simple Notification Service on Ubuntu 10.04, Installing Hadoop on Eclipse, Cloud based simulation of a Distributed trust algorithm, Cloud service for adaptive data streaming (Text Book 1). **Google:** Google App Engine, Google Web Toolkit   (Text Book 2). **MicroSoft:**   Azure Services Platform, Windows live, Exchange Online, Share Point Services, Microsoft Dynamics CRM (Text Book 2)

Text Books:
1. Cloud Computing, Theory and Practice, Dan C Marinescu,MK Elsevier
2. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH

Refernce Book:
1. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH

I Year - I Semester		L	T	P	C
		3	0	0	3

Internet of Things (MTSE11XX)

Course Objectives:
- This course will give the knowledge about technology of Interne of Things.
- Develop models and protocols IoT along with the storage mechanisms.

Course Outcomes:
By the end of the course, the student will be able to
- Grasp the idea behind Internet of Things (IoT).
- Understand various business models relevant to IoT.
- Understand designs for web connectivity.
- Identify sources of data acquisition related to IoT, integrate to enterprise systems.
- Understand IoT with Cloud technologies.

Unit I: The Internet of Things: An Overview of Internet of things, Internet of Things Technology, behind IoTs Sources of the IoTs, M2M Communication, Examples OF IoTs, Design Principles For Connected Devices. Internet Connectivity Principles, Internet connectivity, Application Layer Protocols: HTTP, HTTPS, FTP, Telnet.

Unit II: Business Models for Business Processes in the Internet of Things ,IoT/M2M systems LAYERS AND designs standardizations ,Modified OSI Stack for the IoT/M2M Systems ,ETSI M2M domains and High-level capabilities ,Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway Ease of designing and affordability

Unit III: Design Principles for the Web Connectivity for connected-Devices, Web Communication protocols for Connected Devices, Message Communication protocols for Connected Devices, Web Connectivity for connected-Devices.

Unit IV: Data Acquiring, Organizing and Analytics in IoT/M2M, Applications/Services/Business Processes, IOT/M2M Data Acquiring and Storage, Business Models for Business Processes in the Internet Of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.

Unit V: Data Collection, Storage and Computing Using a Cloud Platform for IoT/M2M Applications/Services, Data Collection, Storage and Computing Using cloud platform Everything as a service and Cloud Service Models, IOT cloud-based services using the Xively (Pachube/COSM), Nimbits and other platforms Sensor, Participatory Sensing, Actuator, Radio Frequency Identification, and Wireless, Sensor Network Technology, Sensors Technology ,Sensing the World.

Text Books:
1. Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw Hill Higher Education
2. Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

Reference Books:
1. Designing the Internet of Things, Adrian McEwen and Hakim Cassimally, Wiley
2. Getting Started with the Internet of Things CunoPfister , Oreilly.

I Year - I Semester		L	T	P	C
		2	0	0	2
RESEARCH METHODOLOGY AND IPR (MTSE1105)					

UNIT 1:

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

UNIT 2:

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

UNIT 3:

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.

UNIT 4:

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

UNIT 5:

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

REFERENCES:

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

		L	T	P	C
I Year - I Semester		0	0	4	2

Advanced Data Structures Lab (MTSE1106)

Course Objectives:
From the course the student will learn

- Knowing about oops concepts for a specific problem.
- Various advanced data structures concepts like arrays, stacks, queues, linked lists, graphs and trees.

Course Outcomes:

- Identify classes, objects, members of a class and relationships among them needed for a specific problem.
- Examine algorithms performance using Prior analysis and asymptotic notations.
- Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked lists, graphs and trees.)
- Applyand analyze functions of Dictionary

List of Experiments

Experiment 1:
Implement Multi stacks.

Experiment 2:
Implement Double Ended Queue (Dequeues) & Circular Queues.

Experiment 3:
Implement various Recursive operations on Binary Search Tree.

Experiment 4:
Implement various Non-Recursive operations on Binary Search Tree.

Experiment 5:
Implement BFS for a Graph

Experiment 6:
Implement DFS for a Graph.

Experiment 7:
Implement Merge & Heap Sort of given elements.

Experiment 8:
Implement Quick Sort of given elements.

Experiment 9:
Implement various operations on AVL trees.

Experiment 10:
Implement B Tree operations.

Experiment 11:
Implementation of Binary trees Traversals.

Experiment 12:
Implement Krushkal's algorithm to generate a min-cost spanning tree.

Experiment 13:
Implement Prim's algorithm to generate a min-cost spanning tree.

Experiment 14:
Implement functions of Dictionary using Hashing.

I Year - I Semester		L	T	P	C
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SE LAB-I (MTSE1107)

Course Objectives:
- Demonstrate the software engineering methodologies involved in the phases for project development.
- Organize about open source tools used for implementing software engineering methods.
- Develop product-start-ups implementing software engineering methods.

Course Outcomes:
- Make use of UML to develop the software project
- Select Structural Modeling.
- Utilize Behavioural and Architectural Modeling.
- Examine estimation about schedule and cost for project development.
- Select project development tool.

Open source Tools: StarUML / UMLGraph /Topcased

Prepare the following documents and develop the software project startup, prototype model, using software engineering methodology for at least two real time scenarios or for the sample experiments.
1. Problem Analysis and Project Planning -Thorough study of the problem – Identify Project scope, Objectives and Infrastructure.
2. Software Requirement Analysis – Describe the individual Phases/modules of the project and Identify deliverables. Identify functional and non-functional requirements.
3. Data Modeling – Use work products – data dictionary.
4. Software Designing - Develop use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
5. Prototype model – Develop the prototype of the product.

The SRS and prototype model should be submitted for end semester examination. List of Sample Experiments:
1. Student Enrolment System.
> A University has contracted you to develop their new student records system. The normal tasks that the system performs are as follows:
> ➢ **Enrol a student at the university:** A student provides his or her personal details (name, address, sex, date of birth), along with the code of the course (e.g. Bachelor of Computer Science) in which he or she wishes to enrol. A student record is created, and a unique student ID number is assigned to the student. The system automatically enrols the student in any core first- year subjects for the course.
> ➢ **Enrol a student in a subject:** A student provides his or her student ID number and the subject code of the subject in which he or she wish to enrol. The system checks that the subject requested by the student is allowed for the course in which the student is enrolled. If not, the enrolment request is rejected. The system checks what subjects (if any) are specified as prerequisites for the subject in which the student wishes to enrol. If the student has passed all the prerequisite subjects, he or she is enrolled in the desired subject.

Otherwise, the enrolment request is rejected.

- ➤ **Record a mark for a student:** A staff member accesses the system by giving a subject code and a password for that subject. If the password is correct, the system displays the list of students enrolled in the subject to the staff member. The staff member can then specify a mark for any student on the list.

- ➤ **Create a new subject:** An administrator accesses the system using a password. The administrator then chooses a subject code for the new subject. The system checks that this code is not already in use in the system, and if not, creates a new subject record. The administrator then gives the subject name, the course to which it belongs, the year of the course in which it may first be taken, a flag indicating whether or not it is a core subject and the codes of any prerequisite subjects.

- ➤ **Print a transcript of a student's results:** An administrator accesses the system using a password. The administrator then gives the student ID number of the student for whom the transcript is to be generated. The system contacts the finance system to check whether or not the student has paid all fees. If fees have been paid, the system creates a transcript showing all the subjects in which the student has been enrolled in each year, and the mark for that subject. The header of the transcript shows the student's personal details and the course in which he or she is enrolled.

- ➤ **Assign a staff member to a subject:** An administrator accesses the system using a password. The administrator then gives the subject code for the subject to which the staff member is to be assigned and the staff ID number of the staff member.

2. Online Bookshop.

A major book retailer is planning to develop a computer system to handle their new online bookshop: Booky.com. You have been chosen to do the analysis and design. The following requirements have been identified:

- ➤ Customers can search for books on the Booky.com website, either by author name, or words in the title. A list of all matching books is returned to the customer. A customer does not need to be logged-in in order to search. The system records all the customers of the Booky.com who have ever logged in. A customer may be an individual customer or a business customer. Each customer has a username and password. Business customers may have several usernames and passwords, corresponding to different divisions within the business.

- ➤ **When a customer has selected a book to buy at the Booky.com website.** The system prompts for the customer's username and password. The customer enters these details. The system verifies the customer's identity and retrieves the customer's name and address, then prompts for credit card details. The customer enters these details. The system checks the credit card details. The system shows the customer the book and delivery price. The customer confirms the transaction. The system records all books available at Booky.com. For each book, the author, title and ISBN number are recorded. The number of each book in stock is also stored, along with the number on order by customers and the number on order from publishers. Books may be temporarily unavailable. All books are stored in the Booky.com warehouse. The warehouse can be contacted via a secure internet connection.

- ➤ For each customer, a permanent record of books bought by that customer is maintained. Likewise, for each book, a record of customers who have bought that book is kept.

- ➤ A customer order consists of one or more order lines, each corresponding to a particular book. A customer may choose to defer the shipment of an order until all the order lines have been filled.

- ➢ When the warehouse fills all or part of customer order, an email is sent to the customer informing them of what has been shipped.
- ➢ If a book ordered by a customer turns out to be unavailable, the corresponding order line is flagged and an email is sent to the customer informing them of the problem. At this stage the customer can cancel this order line.
- ➢ When a book corresponding to a previously-unavailable order line becomes available, an email is sent to the customer and a copy of the book is held for seven days, after which it is returned to normal stock if the customer has not confirmed the order.
- ➢ The shop keeps track of which publishers produce particular book titles. Some books may be available from more than one publisher.
- ➢ Although Booky.com will initially sell only books, it is envisaged that in future it will offer further products, such as CDs. The list of possible future products has not yet been finalized.

3. Course management system (CMS)

A **course management system** (CMS) is a collection of software tools providing an online environment for course interactions. A CMS typically includes a variety of online tools and environments, such as:

- An area for faculty posting of class materials such as course syllabus and handouts
- An area for student posting of papers and other assignments
- A gradebook where faculty can record grades and each student can view his or her grades
- An integrated email tool allowing participants to send announcement email messages to the entire class or to a subset of the entire class
- A chat tool allowing synchronous communication among class participants
- A threaded discussion board allowing asynchronous communication among participants

In addition, a CMS is typically integrated with other databases in the university so that students enrolled in a particular course are automatically registered in the CMS as participants in that course.

The Course Management System (CMS) is a web application for department personnel, Academic Senate, and Registrar staff to view, enter, and manage course information formerly submitted via paper.

Departments can use CMS to create new course proposals, submit changes for existing courses, and track the progress of proposals as they move through the stages of online approval.

4. Easy Leave

This project is aimed at developing a web based Leave Management Tool, which is of importance to either an organization or a college.

The **Easy Leave** is an Intranet based application that can be accessed throughout the organization or a specified group/Dept. This system can be used to automate the workflow of leave applications and their approvals. The periodic crediting of leave is also automated. There are features like notifications, cancellation of leave, automatic approval of leave, report generators etc in this Tool.

Functional components of the project:

There are registered people in the system. Some are approvers. An approver can also be a requestor. In an organization, the hierarchy could be Engineers/Managers/Business Managers/Managing Director etc. In a college, it could be Lecturer/Professor/Head of the Department/Dean/Principal etc.

Following is a list of functionalities of the system:

1. A person should be able to
   - o login to the system through the first page of the application

- o change the password after logging into the system
- o see his/her eligibility details (like how many days of leave he/she is eligible for etc)
- o query the leave balance
- o see his/her leave history since the time he/she joined the company/college
- o apply for leave, specifying the form and to dates, reason for taking leave, address for communication while on leave and his/her superior's email id
- o see his/her current leave applications and the leave applications that are submitted to him/her for approval or cancellation
- o approve/reject the leave applications that are submitted to him/her
- o withdraw his/her leave application (which has not been approved yet)
- o Cancel his/her leave (which has been already approved). This will need to be approved by his/her Superior
- o get help about the leave system on how to use the different features of the system

2. As soon as a leave application /cancellation request /withdrawal /approval/rejection/password-change is made by the person, an automatic email should be sent to the person and his superior giving details about the action

3. The number of days of leave (as per the assumed leave policy) should be automatically credited to everybody and a notification regarding the same be sent to them automatically

An automatic leave-approval facility for leave applications which are older than 2 weeks should be there. Notification about the automatic leave approval should be sent to the person as well as his superior

5. E-Bidding

Auctions are among the latest economic institutions in place. They have been used since antiquity to sell a wide variety of goods, and their basic form has remained unchanged. In this dissertation, we explore the efficiency of common auctions when values are interdependent- the value to a particular bidder may depend on information available only to others-and asymmetric. In this setting, it is well known that sealed-bid auctions do not achieve efficient allocations in general since they do not allow the information held by different bidders to be shared.

Typically, in an auction, say of the kind used to sell art, the auctioneer sets a relatively low initial price. This price is then increased until only one bidder is willing to buy the object, and the exact manner in which this is done varies. In my model a bidder who drops out at some price can "reenter" at a higher price.

With the invention of E-commerce technologies over the Internet the opportunity to bid from the comfort of one's own home has seen a change like never seen before. Within the span of a few short years, what may have began as an experimental idea has grown to an immensely popular hobby, and in some cases, a means of livelihood, the Auction Patrol gathers tremendous response every day, all day. With the point and click of the mouse, one may bid on an item they may need or just want, and in moments they find that either they are the top bidder or someone else wants it more, and you're outbid! The excitement of an auction all from the comfort of home is a completely different experience.

Society cannot seem to escape the criminal element in the physical world, and so it is the same with Auction Patrols. This is one area where in a question can be raised as to how safe Auction Patrols.

Proposed system
1. To generate the quick reports
2. To make accuracy and efficient calculations
3. To provide proper information briefly
4. To provide data security
5. To provide huge maintenance of records

6. Flexibility of transactions can be completed in time

6. Electronic Cash counter

This project is mainly developed for the Account Division of a Banking sector to provide better interface of the entire banking transactions. This system is aimed to give a better out look to the user interfaces and to implement all the banking transactions like:

- Supply of Account Information
- New Account Creations
- Deposits
- Withdraws
- Cheque book issues
- Stop payments
- Transfer of accounts
- Report Generations.

Proposed System: The development of the new system contains the following activities, which try to automate the entire process keeping in view of the database integration approach.

- User friendliness is provided in the application with various controls.
- The system makes the overall project management much easier and flexible.
- Readily upload the latest updates, allows user to download the alerts by clicking the URL.
- There is no risk of data mismanagement at any level while the project development is under process.

It provides high level of security with different level of authentication

7. Enterprise Security Services

Verification and Validation is a part of S/W Quality Assurance. Verification refers to the set of activities that ensure correctly implements a specific function. Validation refers to a different set of activities that ensure that the software that has been built is traceable to customer requirements.

Verification:" Are we building the product right"

Validation: "Are we building the right product"

The project entitled Independent Project Metrics is an effort, to develop a tool to manage the Verification and Validation process.

The specific purpose of the Independent Verification and Validation Process o f Project Metrics Tool is to bring out the various Verification and validation tasks to be performed. The scope of the Project Metrics is to cover the developed for system.

The goals of the V&V effort is to ensure that the software and the documents are developed are of high quality as expected from any mission critical software. This project generates the plan for Verification and validation process. This project maintain the document names, source code module names, version number, released date, receiving date size of document and source code modules of receiving projects for Verification and validation.

Using this application we assign the tasks/activities to different persons and also calculate the expected efforts and actual efforts. The V&V co-coordinator does this work.

Proposed System:

The general description gives an "executive overview" and is very client-oriented. It expounds on the functional and data requirements of the application. It also lists the limitations, assumptions and dependencies of the application. It also touches on the performance and quality requirements of the application and provides a solid definition of theinterface

The computerization of this system would avoid the wrong interpretation and bad calculation of data .The system help the user to see any documents, source code, tasks, activities, team information with details at the click of a button. The record data

is maintained and backed up such a way that data is not loss. The speed of the system could also increased

8. ERP

ERP is a powerful human resource tool for maintaining employee and company information. More than a data storage program, ERP helps you manage your employees. ERP offers a wide variety of reports that give you exactly the information you need. View payroll information by department, or find everyone who is receiving company

Module Description:

1. Payroll
2. Employee
3. Employee payslip
4. Selection process
5. Reports
6. Mailing System
7. Training
8. Add Company Information

PROPOSED SYSTEM

The proposed system is designed to eliminate all the drawbacks of the existing system. The system is part of a large HRMS Application and shall be responsible for maintaining information about employees,

- positions,
- company benefits,
- departments,
- new recruit checklists,
- employee achievements,
- warnings,
- evaluation reports,
- education &training,
- administration,
- Work changes and several ad hocreports.

The major advantage of the proposed system is,

- It's online, so that information is available anytime.
- High integrity and security.
- Ability to incorporate newly available data.
- It is user friendly
- Speed and accuracy is increased
- Fully automated.
- Security is associated with user authentication
- Duplication of information is curbed

9.Examination Branch System

The project **"Examination Branch System"** is developed to reduce the overhead involved in the process of maintains the data and the transaction in the Examination branch. Examination branch is an intranet application for an organization. It is software which is used to perform all the examination activities like adding employees, search employees, delete employees and assign examination duties etc.

The basic framework of the project is developed in .NET. Making use of this application the administrator can perform their activities through it.

Proposed System:

- Now we can extend our project to assign duties to faculty. We can implement edit, update operations now. We can develop our project as a user friendly type

10. Exam Experts

The system would be providing a number of services, automating the processes that are being done manually. The services include communication services such as mailing facility, chat service, electronic file transfer etc and office automation packages such as leave letter processing, admission management, teaching evaluation, counselling automation etc.

The aim of the project is to design a comprehensive web enabled application for management of the Examination Process. Examination system is categorized into various sections. Among those sections, this system concentrates on the work being done in section (E-X).

The section (E-X) deals with the confidential work, i.e., Coding-Decoding of answer scripts, Processing of results, Computerization of certificates etc. This is an automated section and it plays a pivotal role in the Examination Process starting from the Application Processing to the final announcement of results

This project is aimed to solve many of the problems that are in the existing system and also provide a hassle free system that is efficient and easy to use. This project concentrates mainly on Application Processing, Marks Processing and Results Processing with an easy to use interface. The system also provides a means to generate and print various types of reports.

This project can include an **Application Processing System:**

This phase involves the storing of the application information and generating the required reports.

- Entry of Application forms according to center ,course order and batch
- Generating Application Id for further transactions
- Capturing of photographs of students for hall ticket processing
- Reports involving the information about students who are appearing for supplementary exams
- Generating nominal roles

Reports describing the college, course, subjects and the students appearing

AUDIT 1 and 2: ENGLISH FOR RESEARCH PAPER WRITING

Course objectives:

Students will be able to:

 Understand that how to improve your writing skills and level of readability

 Learn about what to write in each section

 Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission

Syllabus		
Units	**CONTENTS**	**Hours**
1	Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness	4
2	Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction	4
3	Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.	4
4	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,	4
5	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	4
6	useful phrases, how to ensure paper is as good as it could possibly be the first- time submission	4

Suggested Studies:

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 Dordrecht Heidelberg London, 2011

AUDIT 1 and 2: DISASTER MANAGEMENT

Course Objectives: -Students will be able to:

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

Syllabus		
Units	CONTENTS	Hours
1	**Introduction** Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.	4
2	**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.	4
3	**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	4
4	**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.	4
5	**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.	4
6	**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.	4

Suggested Readings:

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "'New Royal book Company.

2. Sahni, PardeepEt.Al. (Eds.)," Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi.
3. Goel S. L. , Disaster Administration And Management Text And Case Studies" ,Deep &Deep Publication Pvt. Ltd., New Delhi.

AUDIT 1 and 2: SANSKRIT FOR TECHNICAL KNOWLEDGE

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

Syllabus

Unit	Content	Hours
1	Alphabets in Sanskrit, Past/Present/Future Tense, Simple Sentences	4
2	Order Introduction of roots Technical information about Sanskrit Literature	4
3	Technical concepts of Engineering-Electrical,	4
4	Technical concepts of Engineering - Mechanical.	4
5	Technical concepts of Engineering - Architecture.	4
6	Technical concepts of Engineering – Mathematics.	4

Suggested reading
1. "Abhyaspustakam" – Dr.Vishwas, Samskrita-Bharti Publication, New Delhi
2. "Teach Yourself Sanskrit" Prathama Deeksha-Vempati Kutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication
3. "India's Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., New Delhi.

Course Output
Students will be able to
1. Understanding basic Sanskrit language
2. Ancient Sanskrit literature about science & technology can be understood
3. Being a logical language will help to develop logic in students

AUDIT 1 and 2: VALUE EDUCATION

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	Content	Hours
1	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	4
2	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	4
3	Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking.	4
4	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	4
5	Character and Competence –Holy books vs Blind faith. Self-management and Good health. Science of reincarnation. Equality, Nonviolence ,Humility, Role of Women.	4
6	All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively	4

Suggested reading
1 Chakroborty, S.K. "Values and Ethics for organizations Theory and practice", Oxford University Press, New Delhi
Course outcomes
Students will be able to 1.Knowledge of self-development
2.Learn the importance of Human values 3.Developing the overall personality

AUDIT 1 and 2: CONSTITUTION OF INDIA

Course Objectives:
Students will be able to:
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.

Syllabus		
Units	**Content**	**Hours**
1	**History of Making of the Indian Constitution:** History Drafting Committee, (Composition & Working)	4
2	**Philosophy of the Indian Constitution:** Preamble Salient Features	4
3	**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 Duties.	4
4	**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	4
5	**Local Administration:** District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CE 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	4

6	**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.	4

Suggested reading

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.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

Course Outcomes:

Students will be able to:

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.

AUDIT 1 and 2: PEDAGOGY STUDIES

Course Objectives:

Students will be able to:

4. Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
5. Identify critical evidence gaps to guide the development.

Syllabus		
Units	**Content**	**Hours**
1	**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.	4
2	Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.	4
3	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?	4
4	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.	4
5	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	4
6	**Research gaps and future directions** Research design Contexts Pedagogy Teacher education Curriculum and assessment Dissemination and research impact.	4

Suggested reading

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.

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?

AUDIT 1 and 2: STRESS MANAGEMENT BY YOGA

Course Objectives

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

Syllabus

Unit	Content	Hours
1	Definitions of Eight parts of yog. (Ashtanga)	5
2	Yam and Niyam. Do`s and Don't's in life. Ahinsa, satya, astheya, bramhacharya and aparigraha	5
3	Yam and Niyam. Do`s and Don't's in life. Shaucha, santosh, tapa, swadhyay, ishwarpranidhan	5
4	Asan and Pranayam Various yog poses and their benefits for mind & body	5
5	Regularization of breathing techniques and its effects-Types of pranayam	4

Suggested reading

1. 'Yogic Asanas for Group Tarining-Part-I" : Janardan Swami YogabhyasiMandal, Nagpur
2. "Rajayoga or conquering the Internal Nature" by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata

Course Outcomes:

Students will be able to:

1. Develop healthy mind in a healthy body thus improving social health also

2. Improve efficiency

AUDIT 1 and 2: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

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	Content	Hours
1	Neetisatakam-Holistic development of personality Verses- 19,20,21,22 (wisdom) Verses- 29,31,32 (pride & heroism) Verses- 26,28,63,65 (virtue)	4
2	Neetisatakam-Holistic development of personality Verses- 52,53,59 (dont's) Verses- 71,73,75,78 (do's)	4
3	Approach to day to day work and duties. Shrimad Bhagwad Geeta : Chapter 2-Verses 41, 47,48,	4
4	Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5,13,17, 23, 35, Chapter 18-Verses 45, 46, 48.	4
5	Statements of basic knowledge. Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68 Chapter 12 -Verses 13, 14, 15, 16,17, 18	4
6	Personality of Role model. Shrimad Bhagwad Geeta: Chapter2-Verses 17, Chapter 3-Verses 36,37,42, Chapter 4-Verses 18, 38,39 Chapter18 – Verses 37,38,63	4

Suggested reading
1. "Srimad Bhagavad Gita" by Swami Swarupananda Advaita Ashram (Publication Department), Kolkata
2. Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P.Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi.

Course Outcomes
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

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