B.E. COMPUTER SCIENCE AND ENGINEERING

CURRICULUM FOR

CHOICE BASED CREDIT SYSTEM

Regulations 2022

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MAHENDRA ENGINEERING COLLEGE

(AUTONOMOUS)

MALLASAMUDRAM WEST, TAMIL NADU 637503

MAHENDRA ENGINEERING COLLEGE,

(AUTONOMOUS)

MALLASAMUDRAM WEST, TAMIL NADU 637503

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Institute Vision

To be an internationally recognized institute for engineering education research with ethical values

Institute Mission

- To ensure the effective use of resources to mould the students as professionals and entrepreneurs
- To enhance industry institute interaction for innovative technology practice
- To encourage the faculty members and students for advanced research
- To inculcate ethical values among the faculty members and students

Department Vision

To produce competent computer engineers proficient with state of the art technologies

Department Mission

- To impart technical education through effective teaching-learning process
- To enhance the students employability through mentoring and skill development
- To promote research activities with analytical skills to face global challenges
- To enable students imbibe ethical and enterprising characteristics to become socially responsible engineers

Programme educational objectives

- PEO1 – Good communication, leadership and entrepreneurship skills
- PEO2 – Expertise on advanced computer technologies to become competitive
- PEO3 – The habit of learning and nurture the research attitude
- PEO4 – The ability to work in a team with professional ethics

Programme Specific Outcomes

1. PSO1 - Ability to comprehend the underlying principles and systematic methods for the development, operation and maintenance of software, using professional engineering practices
2. PSO2 - Ability to develop socially acceptable technical solutions to real world problems with various strategies for sustainable development
3. PSO3 - Ability to apply the skills in the areas related to Algorithms, Networking, Web Designing, Artificial Intelligence, Internet of Things and Data Analytics of various complexities towards successful employment

MAHENDRA ENGINEERING COLLEGE
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Regulations 2022

V Semester

Sl. No.	Course Code	Course Title	L	T	P	C	Category
		THEORY					
1	22CS14501	Data Analytics	3	0	0	3	PC
2	22CS14502	Computer Networks	3	0	0	3	PC
3	22CS14503	Object Oriented Analysis and Software Engineering	3	0	0	3	PC
4		Program Elective – II	3	0	0	3	PE
5		Open Elective – III	2	1	0	3	OE
6		Open Elective – IV	3	0	0	3	OE
7	22MC60001	Constitution of India	3	0	0	-	MC
		PRACTICAL					
8	22CS24501	Object Oriented Analysis and Software Engineering Lab	0	0	3	1.5	PC
9	22CS24502	Network Programming Lab	0	0	3	1.5	PC
10	22EN60002	Interview Skills and Soft Skills	0	1	2	2	HS
		TOTAL	**20**	**2**	**8**	**23**	

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MAHENDRA ENGINEERING COLLEGE (Autonomous)						
Syllabus						
Department	**Computer Science and Engineering**	**Programme Code**			**1031**	
V Semester						
Course code	**Course Name**	**Hours/week**			**Credit**	**Maximum marks**
		L	**T**	**P**	**C**	
22CS14501	**DATA ANALYTICS**	3	0	0	3	**100**
Objective(s)	The student should be made: ● To Understand different types of data using Python. ● To Learn data processing and visualization ● To prepare data for analysis and perform simple statistical analysis ● To Know how to analyzing web data ● To Learn Model Development and Evaluation of machine learning algorithms.					
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Explain the data, performing preprocessing, processing and data visualization. ● Use different python packages for mathematical, scientific applications for web data analysis. ● Develop the model for data analysis and evaluate the model performance. ● Create methods for analyzing web data. ● Explain Model Development and Evaluation algorithms					
UNIT-I	**Introduction to Data Understanding and Preprocessing**					**9**
Knowledge domains of Data Analysis, Understanding structured and unstructured data, Data Analysis process, Dataset generation, Importing Dataset: Importing and Exporting Data, Basic Insights from Datasets, Cleaning and Preparing the Data: Identify and Handle Missing Values.						
UNIT-II	**Data Processing and Visualization**					**9**
Data Formatting, Exploratory Data Analysis, Filtering and hierarchical indexing using Pandas. Data Visualization: Basic Visualization Tools, Specialized Visualization Tools, Seaborn Creating and Plotting Maps.						
UNIT-III	**Mathematical and Scientific applications for Data Analysis**					**9**
Numpy and Scipy Package, Understanding and creating N-dimensional arrays, Basic indexing and slicing, Boolean indexing, Fancy indexing, Universal functions, Data processing using arrays, File input and output with arrays.						
UNIT-IV	**Analysing Web Data**					**9**
Data wrangling, Web scrapping, Combing and merging data sets, Reshaping and pivoting, Data transformation, String Manipulation, case study for web scrapping.						
UNIT-V	**Model Development and Evaluation**					**9**

Introduction to machine learning- Supervised and Unsupervised Learning, Model development using Linear Regression, Model Visualization, Prediction and Decision Making, Model Evaluation: Over-fitting, Under-fitting and Model Selection.	
Total hours	**45**

TEXT BOOK :	
1	David Ascher and Mark Lutz, Learning Python, Publisher O'Reilly Media. YEAR
2	Reema Thareja, "Python Programming using Problem Solving approach",Oxford University press
3	Wes Mckinney "Python for Data Analysis", First edition, Publisher O'Reilly Media.
REFERENCES:	
1	Alex Berson and Stephen J.Smith, ―Data Warehousing, Data Mining & OLAP, Tata McGraw – Hill Edition, 35th Reprint 2016.
2	K.P. Soman, Shyam Diwakar and V. Ajay, ―Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006.
3	Ian H.Witten and Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition.
4	Nptel course, Data Mining, https://nptel.ac.in/downloads/106105174/
5	Nptel course, Introduction to Data Warehousing and OLAP, https://nptel.ac.in/courses/106106093/31

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Department	**Computer Science and Engineering**	**Programme Code**			**1031**	
V Semester						
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		L	**T**	**P**	**C**	
22CS14502	**COMPUTER NETWORKS**	3	0	0	3	**100**
Objective(s)	The student should be made: ● To Understand the fundamental concepts of computer networking, protocols and architectures. ● To Know the basics of how data flow from one node to another. ● To Learn the various components required to build different networks. ● To Familiarize the functions and protocols of the Transport layer. ● To Know the working of various application layer protocols					
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Describe the different building blocks of Communication network and its architecture. ● Contrast different types of switching networks and analyse the performance of network. ● Design subnetting and analyse the performance of network layer, Construct and examine various routing protocols. ● Explain the functions and protocols of the Transport layer ● Interpret the working of various application layer protocols.					
UNIT-I	**INTRODUCTION TO COMPUTER NETWORKS**					**9**
Introduction: Computer networks and distributed systems - Classifications of computer networks - Preliminaries of layered network structures. Data communication Components: Representation of data and its flow - various connection topology - Protocols and Standards - OSI model, Transmission Media.						
UNIT-II	**DATA-LINK LAYER & MEDIA ACCESS**					**9**
Introduction – Link-Layer Addressing – DLC Services – Data-Link Layer Protocols – HDLC – PPP - Media Access Control – LANs: Wired LAN, Wireless LANs - Connecting Devices.						
UNIT-III	**NETWORK LAYER**					**9**
Network Layer Services – Packet switching – Performance – IPV4 Addresses – Forwarding of IP Packets - Network Layer Protocols: IP, ICMP v4- Unicast Routing Protocols — IPV6 Addressing – IPV6 Protocol.						
UNIT-IV	**TRANSPORT LAYER**					**9**
Introduction – Transport Layer Protocols – Services – Port Numbers – User Datagram Protocol – Transmission Control Protocol – SCTP.						

UNIT-V	APPLICATION LAYER	9
WWW and HTTP – FTP – Email –Telnet –SSH – DNS-DDNS – SNMP-Firewall.		
	Total hours	**45**

TEXT BOOK :	
1	Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013. (Unit 1 to Unit 5)
REFERENCES:	
1	William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.
2	Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.
3	Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
4	James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013.
5	Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2011.

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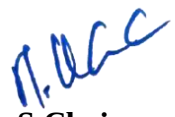
MAHENDRA ENGINEERING COLLEGE (Autonomous)							
Syllabus							
Department	**Computer Science and Engineering**	**Programme Code**			**1031**		
V Semester							
Course code	**Course Name**	**Hours/week**			**Credit**	**Maximum marks**	
22CS14503	**OBJECT ORIENTED ANALYSIS AND SOFTWARE ENGINEERING**	**L**	**T**	**P**	**C**	**100**	
		3	0	0	3		
Objective(s)	The student should be made: ● To learn about software engineering concepts and object modeling. ● To perceive knowledge on requirement analysis ● To acquire knowledge on system design. ● To study and learn how to reuse Design Patterns and specify interfaces. ● To learn various levels of testing						
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Explain software development activities. ● Analyze user's requirements for the given product ● Identify and apply appropriate system design. ● Apply Design Patterns and Interfaces. ● Formulate different testing strategies						
UNIT-I	**INTRODUCTION**						**9**
Introduction – Software Engineering Concepts – Development Activities – Managing Software Development – Modeling with UML.							
UNIT-II	**ANALYSIS**						**9**
Requirements Elicitation – Concepts – Activities – Management – Analysis concepts – Analysis Activities – managing analysis.							
UNIT-III	**SYSTEM DESIGN**						**9**
Decomposing the system – Overview of System Design – System Design Concepts – System Design Activities –Addressing Design Goals – Managing System Design.							
UNIT-IV	**OBJECT DESIGN**						**9**
Reusing Pattern Solutions – Overview of object design – reuse concepts – reuse activities – managing Reuse – Specifying Interfaces – Overview – Interface Specification concepts – Interface Specification activities.							
UNIT-V	**MAPPING MODELS TO CODE AND TESTING**						**9**
Overview of Mapping - Mapping concepts – mapping activities – Manage implementation – Overview of Testing –Testing concepts – Testing activities – Managing testing.							
						Total hours	**45**

TEXT BOOK :	
1	Bernd Bruegge & Allen H. Dutoit, "Object-Oriented Software Engineering", 3nd ed., Pearson Education, 2014. (Unit I to Unit V)
REFERENCES:	
1	Timothy C. Lethbridge, Robert Laganiere, Object Oriented Software Engineering, Tata McGraw-Hill, 6 th ed., reprint, 2008.
2	Stephen Schach, "Object Oriented and Classical Software Engineering 6th ed., McGraw-Hill, 2005.



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MAHENDRA ENGINEERING COLLEGE (Autonomous)						
Syllabus						
Department	**Computer Science and Engineering**	**Programme Code**				**1031**
V Semester						
Course code	**Course Name**	**Hours/week**			**Credit**	**Maximum marks**
22MC60001	**CONSTITUTION OF INDIA**	**L**	**T**	**P**	**C**	**100**
		3	0	0	-	
Objectives	The student should be made: ● To know about the salient features of the Constitution of India. ● To gain knowledge about structure and functions of Union Government. ● To learn about the structure and functions of State Government. ● To understand about amendments in Indian Constitution, Judicial review. ● To study in detail about the Indian society.					
Outcomes	Upon completion of this course, the Learners will be able to : ● Summarize the features of the Indian Constitution and observe the fundamental duties, rights and responsibilities. ● Explain the functioning of Indian parliamentary system at the Center and the responsibilities of important functionaries. ● Describe the functioning of State Government and important functionaries. ● Recognize Amendments in Indian Constitution and Judicial review. ● Illustrate the composition and features of Indian society.					
UNIT-I	**INTRODUCTION ABOUT INDIAN CONSTITUTION**					9
Historical Background – Constituent Assembly of India – Role and salient features - Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.						
UNIT-II	**STRUCTURE AND FUNCTION OF UNION GOVERNMENT**					9
Parliamentary system – Legislature, Executive. Union Government – Structures of the Union Government. Functions and Responsibilities of President – Vice President – Prime Minister – Cabinet – Council of Ministers, Union Territories.						

UNIT-III	STRUCTURE AND FUNCTION OF STATE GOVERNMENT	9
State Legislature - State Government – Structure and Functions – Governor – Chief Minister – Cabinet – Special Provisions (Article 370. 371, 371J) for some States. Judicial System in States – High Courts and other Subordinate Courts, Judicial review.		
UNIT-IV	**CONSTITUTION FUNCTIONS, AMENDMENTS AND REVIEW**	9
Indian Federal System – Centre-State Relations – President's Rule – Assessment of working of the Parliamentary System in India - Constitutional Amendments – Methods in Constitutional		
Amendments (How and Why) and Important Constitutional Amendments. Amendments – 7,9,10,12,42,44, 61, 73, 74, 75, 86, and 91, 94, 95, 100, 101, 118. Savior of the Constitution – The Supreme Court of India – The Hon'ble Chief Justice of India and Hon'ble Judges of the Supreme Court. Judicial Review of Parliamentary and Executive functions.		
UNIT-V	**INDIAN SOCIETY**	9
Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections - Special Constitutional Provisions for SC & ST, OBC, Special Provision for Women, Children & Backward Classes.		
	Total Hours	**45**

TEXTBOOKS:

1	Durga Das Basu, "Introduction to the Constitution of India ", Prentice Hall of India, New Delhi
2	R.C.Agarwal, (1997) "Indian Political System", S.Chand and Company, New Delhi.

REFERENCES:

1	Sharma, Brij Kishore, "Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.
2	Maciver and Page, " Society: An Introduction Analysis ", Mac Milan India Ltd., New Delhi.
3	K.L.Sharma, (1997) "Social Stratification in India: Issues and Themes", Jawaharlal Nehru University, New Delhi.
4	U.R.Gahai, "Indian Political System ", New Academic Publishing House, Jalaendhar
5	R.N. Sharma, "Indian Social Problems ", Media Promoters and Publishers Pvt. Ltd.

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MAHENDRA ENGINEERING COLLEGE
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Syllabus

Department	Computer Science and Engineering	Programme Code	1031

Semester-V

Course Code	Course Name	Hours/Week			Credit	Maximum marks
		L	T	P	C	
22CS24501	Object Oriented Analysis and Software Engineering Lab	0	0	3	1.5	100

Objective(s)	The student should be made: ● To Learn complex software solutions using state of the art software solutions using state of art software Engineering Techniques. ● To Provide working knowledge of UML (Unified Modeling Languages) Sources control and project Management. ● To Understand the technologies essentially for incorporating in the project. ● To Familiarize in testing and document software. ● To Learn and excel working capabilities as part of software projects under a tight deadline time / schedules
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Identify the requirements specification for an intended software system. ● Model the Use case and Class diagrams for the given application. ● Develop the sequence and collaboration diagrams for the given application. ● Build Activity diagram and State Chart diagrams for the given application ● Design Component and Deployment diagrams for the given application.

LIST OF EXERCISES

1	Introduction and Project Definition
2	Software Requirements Specification
3	Introduction to Unified Modeling Languages (UML) and Use case Diagram
4	System Modeling (DFD or ER or Both)
5	Flow of Events and Activity Diagrams
6	OO Analysis: Discovering classes
7	Interaction Diagrams: Sequence and Collaboration Diagrams
8	Software Design: Software Architecture and Object Oriented Design
9	State Chart Diagram
10	Component and Deployment Diagrams
11	Software Testing
	Total hours: **30**

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MAHENDRA ENGINEERING COLLEGE (Autonomous)						
Syllabus						
Department	**Computer Science and Engineering**		**Programme Code**			**1031**
Semester-V						
Course Code	**Course Name**	**Hours/Week**			**Credit**	**Maximum marks**
		L	**T**	**P**	**C**	
22CS24502	**NETWORK PROGRAMMING LAB**	**0**	**0**	**4**	**2**	**100**
Objective(s)	The student should be made: ● To learn basics of hardware and networking ● To provide open source tools for Error detection and correction ● To know network routing protocols ● To Understand how to use TCP and UDP based sockets ● To familiarize DNS client server algorithm using security protocols					
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Explain basic networking commands ● Describe about Error detection and correction ● Interpret basic networking protocols ● Develop programs using different types of sockets ● Implement DNS client server algorithm using security protocols					

LISTOF EXERCISES	
1	Demo session of all networking hardware and Functionalities
2	Use of Wireshark network tool
3	Use of Packet tracer network tool
4	Error detection and correction mechanisms
5	Flow control mechanisms
6	Simulation of unicast routing protocols
7	Observing Packets across the network and Performance Analysis of Routing protocols
8	Socket programming (TCP and UDP) – Multi client chatting
9	Develop a DNS client server to resolve the given host name or IP address
10	Implementation of Layers for security protocols - SSL/TLS
	Total hours **30**

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MAHENDRA ENGINEERING COLLEGE (Autonomous)						
Syllabus						
Department	**Computer Science and Engineering**		**Programme Code**			**1031**
Semester – V (Common to all B.E./B.Tech. Programmes)						
Course code	**Course Name**	**Hours/week**			**Credit**	**Maximum marks**
		L	**T**	**P**	**C**	
22EN60002	**INTERVIEW SKILLS AND SOFT SKILLS**	0	1	2	2	**100**
Objectives	The student should be made: ● To improve the learners reading fluency skills through extensive reading ● To help the learners obtain speaking skills in both formal and informal situation. ● To make them acquire presentation skills and interview skills to face challenges in the career aspects					
Outcomes	Upon completion of this course, the Learners will be able to : ● Analyse the content and apply knowledge and skills efficiently wherever necessary. ● Create profile and other essential documents. ● Demonstrate soft skills effectively at the time of interview and workplace.					

LIST OF EXERCISES	
1.	Introduction to Employability Skills
2.	Reading Comprehension
3.	Listening Comprehension
4.	Professional Email Writing
5.	Preparing One Page Resume
6.	Interview Skills (Mock Interview & Interview Etiquette)
7.	Corporate Skills (Polite Expressions, Telephone Etiquette, Online Etiquette & PPT Presentation)
8.	Group Discussion
9.	Soft Skills (Interpersonal, Intrapersonal, Leadership, Decision Making and Problem Solving)
10.	Public Speaking
	Total Hours : 30

Textbook:	
1	Joshi, Manmohan, *Soft Skills*, 1st Edition. Bookboon, 2017
References:	
1	Raman, Meenakshi & Sangeeta Sharma, *Technical Communication: Principles and Practice*, Ed.III, Oxford University Press, New Delhi. 2015.
2	Barun K. Mitra, Personality Development and Soft Skills, Oxford University Press, New Delhi, 2011
Online Websites:	
https:// www.ted.com/talks	
https://www.joshtalks.com	
https://quizziz.com	
www.pdfdrive.com	
www.talking books.com	

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MAHENDRA ENGINEERING COLLEGE
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Regulations 2022

VI Semester

Sl. No.	Course Code	Course Title	L	T	P	C	Category
		THEORY					
1	22ME15501	Managerial Skills, Project and Quality Management	3	0	0	3	HS
2	22CS14601	Compiler Design	3	1	0	4	PC
3	22CS14602	Machine Learning	3	0	0	3	PC
4	22CS34603	Web Technologies	2	0	2	3	PC
5		Program Elective – III	3	0	0	3	PE
6		Open Elective - V	3	0	0	3	OE
		PRACTICAL					
7	22CS24601	Machine Learning Lab	0	0	3	1.5	PC
8	22CS36601	Mini Project	0	0	6	3	EEC
		TOTAL	**17**	**1**	**11**	**23.5**	

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<tr><td colspan="7">Syllabus</td></tr>
<tr><td>Department</td><td colspan="3">Computer Science and Engineering</td><td colspan="2">Programme Code</td><td>1031</td></tr>
<tr><td colspan="7">Semester-VI</td></tr>
<tr><td>Course Code</td><td>Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td>Maximum Marks</td></tr>
<tr><td rowspan="2">22ME15501</td><td rowspan="2">Managerial Skills, Project and Quality Management</td><td>L</td><td>T</td><td>P</td><td>C</td><td rowspan="2">100</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>3</td></tr>
<tr><td>Objectives</td><td colspan="6">The student should be made:
● Develop knowledge and skills needed for the successful managerial performance.
● Develop team building and communication skills in learners for working in multi-disciplinary teams.
● Enable the learners to plan, schedule and manage projects.
● Facilitate budgeting and finance, and evaluate projects
● Understand the importance of quality concepts and principles.</td></tr>
<tr><td>Outcomes</td><td colspan="6">Upon completion of this course, the Learners will be able to :
● Demonstrate applicable knowledge and skills needed for managerial effectiveness.
● Demonstrate team building and communication skills for working in multi-disciplinary teams.
● Plan, schedule and manage projects
● Plan budgeting, manage finance and evaluate projects
● Summarize the quality concepts and principles.</td></tr>
<tr><td>UNIT-I</td><td colspan="5">INTRODUCTION TO MANAGERIAL SKILLS</td><td>9</td></tr>
<tr><td colspan="7">Introduction to Self Awareness – Self Portrait – Self Assessment – Life-long learning. Definition of Life Skills and Managerial Skills – Need and Importance of Skills. Decision Making and Problem Solving: Problem Analysis –Techniques – Steps; Problem solving: Characteristics of Complex problems – Problem Solving Strategies – Barriers.; Lateral thinking Need and Importance of Lateral Thinking; Logic and Rationality – Functions – Personal and Work ethics-Case study</td></tr>
<tr><td>UNIT-II</td><td colspan="5">TEAM BUILDING AND EFFECTIVE COMMUNICATION</td><td>9</td></tr>
<tr><td colspan="7">Team Building: Developing teams and team work, advantages of team, leading team, team membership, traits of working in multi-disciplinary teams. Effective Communication: Need and Importance – Techniques and Types - Verbal and Non-Verbal Communication - Barriers to communication – Overcoming barriers – Multiple Intelligences – 360 degree evaluation, Case Study.</td></tr>
<tr><td>UNIT-III</td><td colspan="5">PROJECT MANAGEMENT</td><td>9</td></tr>
</table>

Project: Meaning and Importance of terms 'Event', Activity'. 'Time". Identification of project opportunities, Screening of Project Ideas. Criteria for project selection, Project planning and scheduling – Application of CPM and PERT – Examples and case studies.		
UNIT-IV	**BUDGETING AND FINANCE**	**9**
Introduction to Budgeting and Finance, kinds of Project Evaluation, Evaluation Techniques – Non-discounted cash flow methods, Discounted cash flow Methods, Evaluation of Project cost, Capital budgeting and its methods. Financial management of Projects. Project Risk and its mitigation – Examples and case studies.		
UNIT-V	**QUALITY CONCEPTS AND PRINCIPLES**	**9**
Introduction - Need for Quality - Evolution of Quality - Definition of Quality - Dimensions of Manufacturing Quality and Service Quality. TQM culture, Leadership – quality council, employee involvement, motivation, empowerment, recognition and reward Performance appraisal - Continuous process improvement, 6σ, 5s, Kaizen - Case Study.		
	Total Hours	**45**

TEXTBOOKS:	
1	David A.Whetten and Kim S.Cameron, Developing Management Skills, – PHI, 2011.
2	Harper, Nancy Life Skills: Essential for Personal Growth on the Ever Changing Road of Life. Bloomington, IN: Author House, 2011.
3	Adair, J. Decision Making and Problem Solving. UK: Kogan Page Publishers.2013.
4	James R Evans, Quality Management, Cengage Learning India Private Limited 2010.
5	Janakiraman. B and Gopal .R.K., "Total Quality Management – Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.
6	Prasanna Chandra "ProjectPlanning, Analysis, Selection, Financing, Implementation and Review, Tata Mcgraw-Hill, 2002
REFERENCES:	
1	Kallet, Michael Think Smarter: Critical Thinking to Improve Problem-Solving and Decision Making Skills. New Jersey: John Wiley & Sons, 2014.
2	Adair, J. & Allen, M. Time Management and Personal Development. London: Hawksmere, 1999.
3	Hattie, John Self-Concept. New York: Psychology Press, 2014.
4	Mcgrath E.H., S.J., Basic Managerial Skills for all, 9th Edition, PHI, 2012
5	Amitava Mitra, Fundamentals of Quality Control & Improvement, Wiley Publications, 2012.

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<table>
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<tr><td>Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code</td><td colspan="2">1031</td></tr>
<tr><td colspan="7">VI Semester</td></tr>
<tr><td>Course code</td><td>Course Name</td><td colspan="3">Hours/week</td><td>Credit</td><td>Maximum marks</td></tr>
<tr><td rowspan="2">22CS14601</td><td rowspan="2">COMPILER DESIGN</td><td>L</td><td>T</td><td>P</td><td>C</td><td rowspan="2">100</td></tr>
<tr><td>3</td><td>1</td><td>0</td><td>4</td></tr>
<tr><td>Objective(s)</td><td colspan="6">The student should be made:
● To Provide foundation for study of high performance compiler design.
● To Familiarize with lexical analysis and parsing techniques.
● To Understand the various actions carried out in semantic analysis.
● To get Familiar how the intermediate code is generated.
● To understand the principles of code optimization techniques and various language translators.</td></tr>
<tr><td>Outcome(s)</td><td colspan="6">Upon completion of this course, the Learners will be able to :
● Demonstrate the functioning of a Compiler and to develop a firm and enlightened grasp of concepts such as higher level programming, assemblers, automata theory, and formal languages, language specifications.
● Develop language specifications using context free grammars (CFG).
● Apply the ideas, the techniques, and the knowledge acquired for the purpose of developing software systems.
● Constructing symbol tables and generating intermediate code.
● Obtain insights on compiler optimization and apply the skills on devising, selecting and using tools and techniques towards compiler design.</td></tr>
<tr><td>UNIT-I</td><td colspan="5">INTRODUCTION TO COMPILATION AND LEXICAL ANALYSIS</td><td>9+3</td></tr>
<tr><td colspan="7">Introduction to programming language translators-Compilation and Interpretation-Structure and Phases of a Compiler-Design Issues. The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens -Extended Regular Expression- Regular expression to Deterministic Finite Automata (Direct method).</td></tr>
<tr><td>UNIT-II</td><td colspan="5">SYNTAX ANALYSIS</td><td>9+3</td></tr>
<tr><td colspan="7">Role of Parser- Parse Tree - Context-free grammars-Elimination of Ambiguity - Top Down Parsing - Recursive Descent Parsing - Non Recursive Descent Parsing - Predictive Parsing - LL(1) Grammars. Shift Reduce Parsers- Operator Precedence Parsing -LR Parsers, Construction of SLR Parser Tables and Parsing, CLR Parsing, LALR Parsing.</td></tr>
<tr><td>UNIT-III</td><td colspan="5">SEMANTICS ANALYSIS</td><td>9+3</td></tr>
</table>

Syntax Directed Definition – Evaluation Order - Applications of Syntax Directed Translation-Syntax Directed Translation Schemes - Implementation of L attributed Syntax Directed Definition.		
UNIT-IV	**INTERMEDIATE CODE GENERATION**	**9+3**
Variants of Syntax trees - Three Address Code- Types – Declarations - Procedures - Assignment Statements - Translation of Expressions - Control Flow - Back Patching- Switch Case Statements.		
UNIT-V	**CODE OPTIMIZATION and CODE GENERATION**	**9+3**
Principal Sources of Optimization -Introduction to Data Flow Analysis-Basic Blocks - Optimization of Basic Blocks - Peephole Optimization- The DAG Representation of Basic Blocks -Loops in Flow Graphs. Issues in the design of a code generator- Target Machine- Next-Use Information - Register Allocation and Assignment, Runtime Organization, Activation Records.		
	Total hours	**60**

TEXT BOOK :	
1	A. V. Aho, Monica S. Lam, Ravi Sethi and Jeffrey D. Ullman, Compilers: Principles, techniques, &tools, Second Edition, Pearson Education, 2007.
REFERENCES:	
1	Andrew A.Appel , Modern Compiler Implementation in Java, Cambridge University Press; 2ndedition, 2002.
2	Torbengidius Mogensen, Basics of Compiler Design, Springer, 2011.
3	Charles N, Ron K Cytron, Richard J LeBlanc Jr., Crafting a Complier, Pearson Education, 2010.
4	Nptel course, Compiler Design, http://nptel.ac.in/courses/106108052/

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MAHENDRA ENGINEERING COLLEGE (Autonomous)						
Syllabus						
Department	**Computer Science and Engineering**	**Programme Code**			**1031**	
VI Semester						
Course code	**Course Name**	**Hours/week**			**Credit**	**Maximum marks**
		L	**T**	**P**	**C**	
22CS14602	**MACHINE LEARNING**	3	0	0	3	**100**
Objective(s)	The student should be made: ● To learn the theoretical foundations of various learning algorithms. ● To understand the context of supervised learning through real-life examples. ● To understand the context of unsupervised learning through real-life examples. ● To know the concepts of Ensemble Learning its Practices. ● To learn the need for Reinforcement learning in real – time problems.					
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Explain the theoretical foundations of various learning algorithms. ● Apply the context of supervised learning through real-life examples. ● Explain of unsupervised learning through real-life examples. ● Construct Ensemble Learning its Practices. ● Use of Reinforcement learning in real – time problems.					
UNIT-I	**Introduction to Machine Learning and Pre-requisites**					**9**
Introduction to Machine Learning – Learning Paradigms – PAC learning – Version Spaces – Role of Machine Learning in Artificial Intelligence applications.						
UNIT-II	**Supervised Learning**					**9**
Linear and Non-Linear examples – Multi–Class & Multi-Label classification – Linear Regression – Multiple Linear Regression – Naïve Bayes Classifier – Decision Trees – ID3 – CART - K-NN classifier – Logistic regression – Support Vector Machines						
UNIT-III	**Unsupervised Learning**					**9**
Clustering basics (Partitioned, Hierarchical and Density based) - K-Means clustering – K-Mode clustering – Self organizing maps – Expectation maximization – Principal Component Analysis – Kernel PCA.						
UNIT-IV	**Ensemble Learning and Machine Learning in Practice**					**9**

Bias – Variance Tradeoff – Bagging and Boosting (Random forests, Adaboost, XG boost inclusive) – Metrics & Error Correction. Class Imbalance – SMOTE – One Class SVM – Optimization of hyper parameters.		
UNIT-V	**Reinforcement Learning (RL)**	**9**
Basics of RL – RL Framework – Markov Decision Process – Exploration Vs Exploitation - Polices, Value Functions and Bellman Equations – Solution Methods – Q-learning		
	Total hours	**45**

TEXT BOOK :	
1	Ethem Alpaydin, Introduction to Machine Learning, MIT Press, Prentice Hall of India, Third Edition 2014.
2	Richard S. Sutton and Andrew G. Barto, Reinforcement Learning: An Introduction (Adaptive Computation and Machine Learning series) 2nd edition, A Bradford Book; 2018.
REFERENCES:	
1	Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar, Foundations of Machine Learning, MIT Press, 2012.
2	Tom Mitchell, Machine Learning, McGraw Hill, 3rd Edition, 1997.
3	Charu C. Aggarwal, Data Classification Algorithms and Applications, CRC Press, 2014

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<tr><td colspan="7">MAHENDRA ENGINEERING COLLEGE
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<tr><td colspan="7">Syllabus</td></tr>
<tr><td>Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code</td><td colspan="2">1031</td></tr>
<tr><td colspan="7">VI Semester</td></tr>
<tr><td>Course code</td><td>Course Name</td><td colspan="3">Hours/week</td><td>Credit</td><td>Maximum marks</td></tr>
<tr><td rowspan="2">22CS34603</td><td rowspan="2">WEB TECHNOLOGIES</td><td>L</td><td>T</td><td>P</td><td>C</td><td rowspan="2">100</td></tr>
<tr><td>2</td><td>0</td><td>2</td><td>3</td></tr>
<tr><td>Objective(s)</td><td colspan="6">The student should be made:
● To Familiarize with the concepts of Client Side scripting
● To Gain knowledge on server side scripting
● To Learn about React web framework
● To Know HTML CSS and JavaScript
● To Study Application using React JS</td></tr>
<tr><td>Outcome(s)</td><td colspan="6">Upon completion of this course, the Learners will be able to :
● Write programs for creating dynamic designing in client side using Java Scripts
● Develop dynamic web pages using server side scripting using Node.js
● Write programs using react web framework
● Create web page using HTML CSS and JavaScript
● Design Applications using React JS</td></tr>
<tr><td>UNIT-I</td><td colspan="5">WEBSITE BASICS AND CLIENT SIDE SCRIPTING</td><td>9</td></tr>
<tr><td colspan="7">Web Essentials: Basics of HTML5 – Basics of CSS3 - Java Script: An introduction to JavaScript– Syntax-Variables and Data Types -JavaScript DOM Model-Exception Handling-Validation- Built-in objects-Event Handling- DHTML with JavaScript- JSON introduction – Syntax – Function Files- JavaScript Debuggers</td></tr>
<tr><td>UNIT-II</td><td colspan="5">SERVER SIDE SCRIPTING</td><td>9</td></tr>
<tr><td colspan="7">Introduction to Node.js- NPM - Events, Timers, and Callbacks in Node.js – file upload – email – Express framework – request –response –routing - templates- view engines. Introduction to Mongo DB- creating DB, collection – CRUD operations - Accessing MongoDB from Node.js. – Accessing online Mongo DB from Node JS.</td></tr>
<tr><td>UNIT-III</td><td colspan="5">REACT WEB FRAMEWORK</td><td>9</td></tr>
<tr><td colspan="7">Introduction – Environment setup – JSX – React DOM – React Elements - Components – react state – Props – Hooks – Component life cycle - React Router – event handlers - React lists – react forms</td></tr>
<tr><td colspan="6">Total hours</td><td>27</td></tr>
</table>

S.NO.	LISTOF EXERCISES
1.	Write a program to create a website using HTML CSS and JavaScript.
2.	Write a program to build a Chat module using HTML CSS and JavaScript.
3.	Write a program to create a simple calculator Application using React JS.
4.	Write a program to create and Build a Password Strength Check using Jquery.
5.	Create a Simple Login form using React JS.
6.	Create a blog using React JS.
	Total hours **18**

TEXT BOOK :	
1.	Deitel and Deitel and Nieto, Internet and World Wide Web - How to Program, Prentice Hall, 5th Edition, 2018
2.	Jeffrey C and Jackson, Web Technologies A Computer Science Perspective, Pearson Education, 2011
3.	Vasan Subramanian, Pro MERN Stack - Full stack web app development, 2nd Edition, 2019
REFERENCES:	
1	Jessica Minnick, Responsive Web Design with HTML 5 & CSS, Cengage Learning, 2020.
2	Frank Zammetti, Modern Full-Stack Development: TypeScript, React, Node.js, 1st Edition, Apress,2020
3	UttamK.Roy, “Web Technologies”, Oxford University Press, 2011
4	Chris Bates, Web Programming – Building Intranet Applications, 3rd Edition, Wiley Publications, 2009.

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MAHENDRA ENGINEERING COLLEGE (Autonomous)						
Syllabus						
Department	**Computer Science and Engineering**	**Programme Code**			**1031**	
Semester-VI						
Course Code	**Course Name**	**Hours/Week**			**Credit**	**Maximum marks**
		L	**T**	**P**	**C**	
22CS24601	**MACHINE LEARNING LAB**	**0**	**0**	**3**	**1.5**	**100**
Objective(s)	The student should be made: ● To learn the foundations of various learning algorithms. ● To train the students better understand the context of supervised and unsupervised learning through real-life examples. ● Apply all learning algorithms over appropriate real-time dataset.					
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Apply probabilistic based learning and supervised learning algorithms for the given data. ● Employ the concepts of information theoretic approach and unsupervised learning algorithms for the specified data. ● Model the solutions for the given problem using genetic algorithm and reinforcement learning.					

LISTOF EXERCISES	
1	Study of UCI, Kaggle repository datasets and tools like WEKA, Rapid Miner, Python scikit-learn, etc.,
2	Perform data manipulation using NumPy and Pandas and, data visualization using matplotlib.
3	Implement Naïve Bayes classification and predict the class label for a given data.
4	Implement linear models to approximate the given data.
5	Implement multi-layer perceptron algorithm for the specified data.
6	Implement K-NN algorithm for the specified data.
7	Implement SVM algorithm for the given data.
8	Implement the concept of decision tree with suitable dataset.
9	Implement K-means clustering algorithm for the given data and visualize and interpret the result.
10	Build a supervised model / unsupervised model using appropriate dataset
	Total hours **30**

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<tr><td colspan="7">VI Semester</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">COURSE NAME</td><td colspan="3">Hours/week</td><td>Credit</td><td>Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td></td></tr>
<tr><td>22CS36601</td><td>MINI PROJECT</td><td>0</td><td>0</td><td>6</td><td>3</td><td>100</td></tr>
<tr><td>Objectives</td><td colspan="6">The student should be made:
● To Identify the area of the project based on core knowledge
● To train the students in preparing literature review
● To develop simulation model of the Identified problem
● To design prototype and validate the result
● To cultivate the art of thesis writing</td></tr>
<tr><td>Outcomes</td><td colspan="6">At the end of the course, students will be able to,
● Identify the real-time / problems in area of interest
● Review literature to identified gaps and define objectives & scope of the work.
● Derive the model for Identified problem using simulation tools
● Develop prototypes/models, experimental set-up necessary to meet the objectives.
● Formulate the different modules of the work into thesis/ research paper.</td></tr>
<tr><td colspan="7">● The students in a group of 3 to 4 works on a topic approved by the project guide and head of the department.
● The progress of the project is evaluated in successive reviews (Min 3). The review committee will be constituted by the Head of the Department.
● At end of the semester a project report, experimental setup is required for completion of project work.
● The project work is evaluated by external and internal examiners constituted by the Head of the Department based on design, working condition of the project, oral presentation and quality of report.</td></tr>
<tr><td colspan="6">Total Hours</td><td>45</td></tr>
</table>

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MAHENDRA ENGINEERING COLLEGE
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Regulations 2022

VII Semester

Sl. No.	Course Code	Course Title	L	T	P	C	Category
		THEORY					
1	22CS14701	Cryptography and Network Security	3	0	0	3	PC
2	22CS34702	DevOps	2	0	2	3	PC
3	22CS14703	Agile Methodology	3	0	0	3	PC
4		Program Elective – IV	3	0	0	3	PE
5		Open Elective – VI	3	0	0	3	OE
		PRACTICAL					
6	22CS24701	Cryptography and Network Security Lab	0	0	3	1.5	PC
7	22CS36702	Project work Phase – I	0	0	6	3	EEC
8	22CS56701	Internship in Industry	0	0	-	1	EEC
		TOTAL	**14**	**0**	**11**	**20.5**	

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<tr><td colspan="7">VII Semester</td></tr>
<tr><td>Course code</td><td colspan="3">Course Name</td><td colspan="2">Hours/week</td><td>Credit</td><td>Maximum marks</td></tr>
<tr><td rowspan="2">22CS14701</td><td colspan="3" rowspan="2">CRYPTOGRAPHY AND NETWORK SECURITY</td><td>L</td><td>T</td><td>P</td><td>C</td><td rowspan="2">100</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>3</td></tr>
<tr><td>Objective(s)</td><td colspan="7">The student should be made:
● To Understand OSI security architecture and classical encryption techniques.
● To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
● To understand the various key distribution and management schemes.
● To design security applications in the field of Information technology
● To Understand Security practices and Security technology</td></tr>
<tr><td>Outcome(s)</td><td colspan="7">Upon completion of this course, the Learners will be able to :
● Describe the basic security system mechanisms and explain the classification of classical encryption techniques
● Illustrate various block cipher techniques
● Summarize public key cryptography and security protocols
● Interpret security investigation processes
● Describe various standards, architectures and policies for information security</td></tr>
<tr><td>UNIT-I</td><td colspan="6">BASICS OF CRYPTOGRAPHY</td><td>9</td></tr>
<tr><td colspan="7">Computer Security Concepts-OSI security architecture -Attacks, Services and Mechanisms - Network security model-Classical Encryption techniques: Substitution techniques, Transposition Tehcniques - Steganography - Foundation of modern cryptography: Perfect Security- Inforamtion Theory- Prodcut Cryptosystem- Cryptanalysis</td></tr>
<tr><td>UNIT-II</td><td colspan="6">SYMMETRIC CIPHERS</td><td>9</td></tr>
<tr><td colspan="7">Block cipher - Data Encryption Standard- Strength of DES- Principles-Block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm</td></tr>
<tr><td>UNIT-III</td><td colspan="6">PUBLIC KEY CRYPTOGRAPHY & SECURITY PROTOCOLS</td><td>9</td></tr>
<tr><td colspan="7">Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange, MD5, SHA. Secret Sharing Schemes-Kerberos-Pretty Good Privacy (PGP)-Secure Socket Layer (SSL)-Intruders -HIDS-NIDS -Firewalls –Viruses</td></tr>
</table>

UNIT-IV	**NETWORK SECURITY**	**9**
Remote User Authentication Principles, Kerberos –Electronic Mail Security–PGP–S/MIME-IP Security–Transport Layer Security, 802.11 wireless security		
UNIT-V	**PLANNING FOR SECURITY AND SECURITY TECHNOLOGY**	**9**
Information Security Planning and Governance- standard and Practices-Security Blueprint-Continutiy Strategies-Security Technology-Intrusion Detection and Prevention System - Honeypot- Scanning and Analysis Tools- Biometric Access Controls		
	Total hours	**45**

TEXT BOOK :	
1	William Stallings, "Cryptography and Network Security : Principles and Practices", Sixth Edition, Prentice Hall, 2014.(UNIT I,II,III)
2	Michael Whitman, Herbert J. Mattord, "Management of Information Security", Third Edition, Course Technology, 2010.(UNIT IV ,V)
REFERENCES:	
1	Michael Howard, David LeBlanc, John Viega, "24 Deadly Sins of Software Security: Programming Flaws and How to Fix Them", First Edition, Mc Graw Hill Osborne Media, 2009.
2	Matt Bishop, "Computer Security: Art and Science", First Edition, AddisonWesley, 2002.
3	https://onlinecourses.nptel.ac.in/noc18_cs07/preview
4	https://nptel.ac.in/courses/106105031/

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MAHENDRA ENGINEERING COLLEGE (Autonomous)						
Syllabus						
Department	**Computer Science and Engineering**	**Programme Code**			**1031**	
Program Elective						
Course code	**Course Name**	**Hours/week**			**Credit**	**Maximum marks**
		L	**T**	**P**	**C**	
22CS34702	**DEVOPS**	2	0	2	3	**100**
Objective(s)	The student should be made: ● To Introduce DevOps terminology, definition & concepts ● To Understand the different Version control tools like Git, Mercurial ● To Familiarize the concepts of Continuous Integration/ Continuous Testing/ Continuous Deployment) ● To Learn Configuration management using Ansible ● To Illustrate the benefits and drive the adoption of cloud-based Devops tools to solve real world problems					
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Describe different actions performed through Version control tools like Git. ● Perform Continuous Integration and Continuous Testing and Continuous Deployment using Jenkins by building and automating test cases using Maven & Gradle. ● Ability to Perform Automated Continuous Deployment ● Ability to do configuration management using Ansible ● Explain to leverage Cloud-based DevOps tools using Azure DevOps					
UNIT-I	**INTRODUCTION TO DEVOPS**					**9**
DevOps Essentials - Introduction to AWS, GCP, Azure - Version control systems: Git and Github - Create Github, Create Repository.						
UNIT-II	**COMPILE AND BUILD USING MAVEN & GRADLE**					**9**
Introduction, Installation of Maven, POM files, Maven Build lifecycle, Build phases (compile build, test, package) Maven Profiles, Maven repositories (local, central, global), Maven plugins, Maven create and build Artifacts, Dependency management, Installation of Gradle, Understand build using Gradle						
UNIT-III	**CONTINUOUS INTEGRATION USING JENKINS**					**9**
Install & Configure Jenkins, Jenkins Architecture Overview, Creating a Jenkins Job, Configuring a Jenkins job, Introduction to Plugins, Adding Plugins to Jenkins, Commonly used plugins (Git Plugin, Parameter Plugin, HTML Publisher, Copy Artifact and Extended choice parameters). Configuring Jenkins to work with java, Git and Maven, Creating a Jenkins Build and Jenkins workspace, YAML file.						

TEXT BOOK :	
1	Roberto Vormittag, “A Practical Guide to Git and GitHub for Windows Users: From Beginner to Expert in Easy Step-By-Step Exercises”, Second Edition, Kindle Edition, 2016.
2	Jason Cannon, “Linux for Beginners: An Introduction to the Linux Operating System and Command Line”, Kindle Edition, 2014
REFERENCES:	
1	Hands-On Azure Devops: Cicd Implementation For Mobile, Hybrid, And Web Applications Using Azure Devops And Microsoft Azure: CICD Implementation for ... DevOps and Microsoft Azure (English Edition) Paperback – 1 January 2020 by Mitesh Soni
2	Jeff Geerling, “Ansible for DevOps: Server and configuration management for humans”, First Edition, 2015.
3	David Johnson, “Ansible for DevOps: Everything You Need to Know to Use Ansible for DevOps”, Second Edition, 2016.
4	Mariot Tsitoara, “Ansible 6. Beginning Git and GitHub: A Comprehensive Guide to Version Control, Project Management, and Teamwork for the New Developer”, Second Edition, 2019.
5	https://www.jenkins.io/user-handbook.pdf
6	https://maven.apache.org/guides/getting-started/

PRACTICAL EXERCISES: **18 HOURS**

1. Create Maven Build pipeline in Azure
2. Run regression tests using Maven Build pipeline in Azure
3. Install Jenkins in Cloud
4. Create CI pipeline using Jenkins
5. Create a CD pipeline in Jenkins and deploy in Cloud
6. Create an Ansible playbook for a simple web application infrastructure

Total Hours:45

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MAHENDRA ENGINEERING COLLEGE (Autonomous)							
Syllabus							
Department	**Computer Science and Engineering**		**Programme Code**			**1031**	
VII Semester							
Course code	**Course Name**	**Hours/week**				**Credit**	**Maximum marks**
		L	**T**	**P**		**C**	
22CS14703	**AGILE METHODOLOGY**	3	0	0		3	**100**
Objective(s)	The student should be made: ● To provide students with a theoretical as well as practical understanding of agile software development practices. ● To do a detailed examination and demonstration of Agile development and Testing techniques. ● To understand the benefits and pitfalls of working in an Agile team. ● To understand agile development and testing. ● To provide Software development and process control using agile and Scrum methodology.						
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Explain the importance of interacting with business stakeholders in determining the requirements for a software system ● Develop techniques and tools for improving team collaboration and Software quality. ● Interpret software process improvement as an ongoing task for development ● Explain how agile approaches can be scaled up to the enterprise level ● Identify the impact of social aspects of scrum methodology						
UNIT-I	**AGILE METHODOLOGY**						**9**
Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model- Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams – Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values							
UNIT-II	**AGILITY AND KNOWLEDGE MANAGEMENT**						**9**
Agile Information Systems – Agile Decision Making – Earl Schools of KM – Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment , Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model (SMM).							
UNIT-III	**AGILITY AND REQUIREMENTS ENGINEERING**						**9**

Impact of Agile Processes in RE–Current Agile Practices – Variance – Overview of RE Using Agile – Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction Model – Requirements Management in Agile Environment, Agile Requirements Prioritization – User Stories, Backlog Management. Agile Architecture: Feature Driven Development.		
UNIT-IV	**AGILITY AND QUALITY ASSURANCE**	**9**
Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance – Agile Risk Management: Risk and Quality Assurance, Agile Tools. Agile Testing Techniques, Test-Driven Development, User Acceptance Test		
UNIT-V	**AGILE SCRUM FRAMEWORK**	**9**
Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, Agile Manifesto, Twelve Practices of XP, Scrum Practices, Applying Scrum. Need of scrum, working of scrum, advanced Scrum Applications, Scrum and the Organization, scrum values		
	Total hours	**45**

TEXT BOOK :	
1	Hazza and Dubinsky, ―Agile Software Engineering, Series: Undergraduate Topics in Computer Science, Springer, 2009.
2	Ken Schawber, Mike Beedle, Agile Software Development with Scrum, Pearson, 2001.
REFERENCES:	
1	Kevin C. Desouza, ―Agile Information Systems: Conceptualization, Construction, and Management, Butterworth-Heinemann, 2007.
2	David J. Anderson and Eli Schragenheim, ―Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results, Prentice Hall, 2003.
3	Craig Larman, ―Agile and Iterative Development: A Managers Guide, Addison-Wesley, 2004.

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MAHENDRA ENGINEERING COLLEGE
(Autonomous)

Syllabus

Department	Computer Science and Engineering	Programme Code	1031

VII -Semester

Course Code	Course Name	Hours/Week			Credit	Maximum marks
		L	T	P	C	
22CS24701	CRYPTOGRAPHY AND NETWORK SECURITY LAB	0	0	3	1.5	100

Objective(s)

The student should be made:

- To be exposed to the different cipher techniques.
- To Learn and implement the algorithms DES,RSA,SHA
- To Learn Intrusion Detection System tools
- To Know how to use Vulnerability Assessment Tool

Outcome(s)

Upon completion of this course, the Learners will be able to :

- Develop code for classical Encryption Techniques to solve the problems.
- Build cryptosystems by applying symmetric and public key encryption algorithms.
- Construct code for authentication algorithms.
- Develop a signature scheme using Digital signature standard.
- Demonstrate the network security system using open source tools

LIST OF EXERCISES

1	Perform encryption, decryption using the following substitution techniques **i.** Ceaser cipher ii Playfair cipher iii Hill Cipher iv Vigenere cipher
2	Perform encryption and decryption using following transposition techniques i)Rail fence ii) Row & Column Transformation
3	Apply DES algorithm for practical applications.
4	Apply AES algorithm for practical applications
5	Implement RSA Algorithm using HTML and JavaScript
6	Implement the Diffie-Hellman Key Exchange algorithm for a given problem
7	Calculate the message digest of a text using the SHA-1 algorithm
8	Implement the SIGNATURE SCHEME - Digital Signature Standard.
9	Demonstrate intrusion detection system (ids) using any tool eg. Snort or any other s/w.
10	Automated Attack and Penetration Tools Exploring N-Stalker, a Vulnerability Assessment Tool
11	Defeating Malware i Building Trojans ii Rootkit Hunter
	Total hours 30

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<tr><td colspan="7">VII Semester</td></tr>
<tr><td>Course code</td><td>Course name</td><td colspan="3">Hours/Week</td><td>Credit</td><td>Maximum marks</td></tr>
<tr><td rowspan="2">22CS24702</td><td rowspan="2">PROJECT WORK
PHASE – I</td><td>L</td><td>T</td><td>P</td><td>C</td><td rowspan="2">100</td></tr>
<tr><td>0</td><td>0</td><td>6</td><td>3</td></tr>
<tr><td>Objective(s)</td><td colspan="6">The student should be made:
● To Identify the area of the project based on core knowledge
● To train the students in preparing literature review
● To develop simulation model of the Identified problem
● To design prototype and validate the result
● To cultivate the art of thesis writing</td></tr>
<tr><td>Outcome(s)</td><td colspan="6">At the end of the course, students will be able to,
● Identify the real-time / problems in area of interest
● Review literature for the project work
● Analyze the results to draw valid conclusions
● Develop prototypes/models, experimental set-up and prepare a report
● Prepare the possibility of publishing papers in peer reviewed journals/conference proceedings</td></tr>
<tr><td colspan="7">● A project must be selected through literature survey in consultation with their Guide.
● Design and development of a model is carried out progressively
● The progress of the project work is evaluated through periodical reviews. The review committee will be constituted by the Head of the Department.
● The project work is evaluated by external and internal examiners constituted by the Head of the Department based on design, working condition of the project, oral presentation and quality of report.</td></tr>
<tr><td colspan="6">Total Hours</td><td>90</td></tr>
</table>

BoS Chairman

MAHENDRA ENGINEERING COLLEGE
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Regulations 2022

VIII Semester

Sl. No.	Course Code	Course Title	L	T	P	C	Category
		THEORY					
1		Program Elective – V	3	0	0	3	PE
2		Program Elective – VI	3	0	0	3	PE
		PRACTICAL					
3	22CS36801	Project Work	0	0	12	6	EEC
		TOTAL	**6**	**0**	**12**	**12**	

BoS Chairman

<table>
<tr><td colspan="8">MAHENDRA ENGINEERING COLLEGE
(Autonomous)</td></tr>
<tr><td colspan="8">Syllabus-R2022</td></tr>
<tr><td>Department</td><td colspan="4">Computer Science and Engineering</td><td colspan="2">Programme Code</td><td>1031</td></tr>
<tr><td colspan="8">VIII Semester</td></tr>
<tr><td>Course code</td><td>Course name</td><td colspan="4">Hours/Week</td><td>Credit</td><td>Maximum marks</td></tr>
<tr><td rowspan="2">22CS36801</td><td rowspan="2">PROJECT WORK</td><td>L</td><td>T</td><td colspan="2">P</td><td>C</td><td rowspan="2">100</td></tr>
<tr><td>0</td><td>0</td><td colspan="2">12</td><td>6</td></tr>
<tr><td>Objective(s)</td><td colspan="7">The student should be made:
● To Identify the area of the project based on core knowledge
● To train the students in preparing literature review
● To develop simulation model of the Identified problem
● To design prototype and validate the result
● To cultivate the art of thesis writing</td></tr>
<tr><td>Outcome(s)</td><td colspan="7">At the end of the course, students will be able to,
● Identify the real-time / problems in area of interest
● Review literature for the project work
● Analyze the results to draw valid conclusions
● Develop prototypes/models, experimental set-up and prepare a report
● Prepare the possibility of publishing papers in peer reviewed journals/conference proceedings</td></tr>
<tr><td colspan="8">● A project must be selected through literature survey or continuation of Phase I in consultation with their Guide.
● Design and development of a model is carried out progressively
● The progress of the project work is evaluated through periodical reviews. The review committee will be constituted by the Head of the Department.
● Detailed Project report with hardware setup and minimum one publication in either Journal/ Conference is mandatory for the successful completion of the work.
● The project work is evaluated by external and internal examiners constituted by the Head of the Department based on design, working condition of the project, oral presentation and quality of report.</td></tr>
<tr><td colspan="7">Total Hours</td><td>180</td></tr>
</table>

BoS Chairman