Department of Information Technology

BACHELOR OF TECHNOLOGY IN

INFORMATION TECHNOLOGY

(As per National Education Policy 2020)

Scheme & Syllabus



G H RAISONI COLLEGE OF ENGINEERING AND MANAGEMENT

Department of Information Technology

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-VII													
23BTITL204 / 23BTITP204	Software Engineering & Project Management	PCC11	2	-	2	4	3	10	15	50	25	-	100
23BTCSL401IT	Compiler Design	PCC12	3	-	-	3	3	10	15	50	-	-	75
23BTCSL403IT / 23BTCSP403IT	Computer System Security	PCC13	3	-	2	5	4	10	15	50	25	-	100
23BTITL441 23BTITL442 23BTITL443	Programme Elective Core4 1) Digital Forensics 2)Digital Marketing 3) Software Testing & Quality Assurance	PEC4	4	-	-	4	4	10	15	50	-	-	75
23BTITL405	Multi-Disciplinary Minor-V (Foundation of Machine Learning)	MDM5	4	-	-	4	4	10	15	50	-	-	75
23BTITP404	Project	P	-	-	8	8	4	-	-	-	50	50	100
TOTAL			**16**	-	**12**	**28**	**22**	**50**	**75**	**250**	**100**	**50**	**525**

Department of Information Technology

Course Title: **SOFTWARE ENGINEERING AND PROJECT MANAGEMENT**										
Semester	IV	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	ODD	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	PCC11	2Hrs	--	2Hrs	3	10	15	50	25	--
Course Code	23BTITL204									
Teaching Mode	Offline	4 Hrs			Total	75			25	
Duration of ESE	3 Hrs					100				

Course Objectives	The student should be made to: 1. Understand the phases in a software project
	2. Understand fundamental concepts of requirements engineering and Analysis Modeling.
	3. Understand the major considerations for enterprise integration and deployment.
	4.Learn various testing and maintenance measures
Course Outcomes	Up on successful completion of this course, student will be able to:
	CO1: Identify the key activities in managing a software project
	CO2: Compare different process models and design techniques.
	CO3: Understand the concepts of requirements engineering and Analysis.
	CO4: Apply quality management and project management procedure for software design and deployment.
	CO5: Remember various software testing and planning approaches.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O	PS O	PSO 3
CO1	3	2	3	-	-	-	-	-	-	-	3	-	-	-	-
CO2	3	2	3	-	-	-	-	-	-	-	3	-	-	-	-
CO3	2	3	3	2	1	-	-	-	-	-	3	-	3	2	-
CO4	2	3	3	-	-	-	-	-	-	-	3	-	3	3	-
CO5	3	-	3	1	-	-	-	-	-	-	3	-	-	3	-

Department of Information Technology

Course Contents:

Unit	Contents	Hours
I	**SOFTWARE PROCESS** Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models, Agile models, Software Project Management, Project Scheduling – Scheduling, Earned Value Analysis.	7
II	**REQUIREMENTS ANALYSIS AND SPECIFICATION** Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management-Classical analysis: Structured system Analysis, Petri Nets- Data Dictionary	7
III	**SOFTWARE DESIGN** Design process – Design Concepts-Design Model– Design Heuristic – Architectural Design – Architectural styles, Architectural Design, Architectural Mapping using Data Flow- User Interface Design: Interface analysis, Interface Design –Component level Design: Designing Class based components, traditional Components.	7
IV	**PROJECT MANAGEMENT** Estimation – FP Based, LOC Based, Make/Buy Decision, COCOMO II – Planning – Project Plan, Planning Process, RFP Risk Management – Identification, Projection, RMMM – Scheduling and Tracking –	7
V	**TESTING** Software testing fundamentals-Internal and external views of Testing-white box testing – basis path testing-control structure testing-black box testing Debugging	7

Text Books	1.	Roger S. Pressman, "Software Engineering – A Practitioner‟s Approach", Seventh Edition, McGraw-Hill International Edition, 2010.
	2.	Ian Sommerville, "Software Engineering", 9th Edition, Pearson Education Asia, 2011.
E--Books	1.	Foundations of Software Engineering by Kevin Amaratunga
	2.	The New Software Engineering by Sue Conger
Reference Books	1.	Rajib Mall, "Fundamentals of Software Engineering", Third Edition, PHI Learning Private Limited, 2009.
	2.	PankajJalote, "Software Engineering, A Precise Approach", Wiley India, 2010.
Online TL Material	1.	Certification Courses available: https://nptel.ac.in/downloads/106105087/
	2.	Free Courses available: https://swayam.gov.in/course/236-software-enginnering

Department of Information Technology

Practical List

Sr. No.	Practical List	Mapping with CO	Mapping with PO & PSO
1	To understand the importance of SDLC approach & various processes models.	CO1	PO1, PSO1
2	To identify the requirements from the problem statement.	CO1	PO1, PO2, PSO2
3	To identify the suitable selection criteria of software development model for the given problem.	CO2	PO3, PSO2
4	To identify the various requirement development activities viz. elicitation, analysis, specification and verification for the given scenarios.	CO3	PO3, PO4, PSO2, PSO3
5	To identify the elements in Software Requirements Specification document for a given scenario.	CO3	PO1, PO2, PSO2
6	To understand E-R Modeling from the problem statement.	CO4	PO4, PO5, PSO2, PSO3
7	To study and illustrate the various software testing techniques.	CO4	PO3, PSO1, PSO2
8	To study and illustrate various UML diagrams and the use of class diagrams.	CO4	PO3, PSO1, PSO2
Open Ended Practical			
9	To design test cases for given problem statement.	CO5	PO2, PO3, PSO1, PSO2
Content Beyond Practical			
10	To study and illustrate the various automation tool like selenium.	CO5	PO2, PO3, PSO1, PSO2

Department of Information Technology

Course Title: **Compiler Design**										
Semester	VII	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	ODD	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	PCC12	3.	-	-	3	10	15	50	-	-
Course Code	23BTCSL 401IT									
Teaching Mode	Offline	3 Hrs			Total	75			-	
Duration of ESE	3 Hrs					75				

Course Objectives	1. This course introduces student general ideas of compiler.
	2. This course introduces to use regular languages to describe the lexical elements of a programming language and understand syntax analysis.
	3. Aimed to develop skills to understand optimization technique
Course Outcomes	Upon successful completion of this course, student will be able to:
	CO1: Understand basic concepts of compiler and different phases of compiler.
	CO2: Explain the role of a semantic analyzer and describe the purpose of a syntax tree.
	CO3: Apply context free grammars, compiler parsing techniques, construction of abstract syntax trees, symbol tables.
	CO4: Demonstrate lexical analysis using a finite automata along with error recovery.
	CO5: Apply optimization techniques to intermediate code and generate machine code for high level language program.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes:													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	--	3	--	--	3	--	-	--	--	--	--	-	3	1
CO2	2	3	3	--	3	1	-	--	--	--	--	2	3	1
CO3	--	3	2	--	2	--	--	--	--	--	--	1	3	--
CO4	2	2	--	3	2	--	--	--	--	--	--	--	2	3
CO5	--	3	3	1	2	--	--	--	--	--	--	1	2	3

Department of Information Technology

Course Contents:

Unit	Contents	Hours
I	INTRODUCTION TO COMPILERS Overview of compiler and translator, types of Compiler, Analysis of the Source Program, The Phases of a compiler, grouping of phases, Cousins of the Compiler, design of lexical Analysis, compiler writing tools, Cross compiler- bootstrapping	6
II	SYNTAX ANALYSIS Review of Context-Free Grammars – Derivation trees and Parse Trees, Ambiguity. Top-Down Parsing: Recursive Descent parsing, Predictive parsing, LL(1) Grammars. Bottom-Up Parsing: Shift Reduce parsing – Operator precedence parsing (Concepts only)LR parsing – Constructing SLR parsing tables, Constructing, Canonical LR parsing tables and Constructing LALR parsing tables.	8
III	SEMANTIC ANALYSIS Need of semantic analysis, Abstract Parse trees for Expressions, variables, statements, functions and class declarations, Syntax directed definitions, Syntax directed translation schemes for declaration processing, type analysis, scope analysis, Symbol Tables (ST),Organization of ST for block structure and non-block structured languages, Symbol Table management.	7
IV	INTERMEDIATE CODE GENERATION AND ERROR RECOVERY Intermediate code generation: Intermediate languages, Design issues, Translation of different language features, different types of intermediate forms. Error Handling and Recovery in Syntax Analyzer-YACC-Design of a syntax Analyzer for a Sample Language.	7
V	CODE OPTIMIZATION Principal Sources of Optimization-DAG- Optimization of Basic Blocks-Global Data Flow Analysis-Efficient Data Flow Algorithms-Issues in Design of a Code Generator - A Simple Code Generator Algorithm. Recent trends and Compiler tools, advanced topics & its Application. Virtual Machines and Interpretation Techniques, Just-In-Time (JIT) and Adaptive Compilation.	7

Text Books	1.	Alfred V. Aho, Monica S.Lam, R. Sethi and J.D. Ullman ―Compilers: principles, techniques and tools‖ Pearson Education.
	2.	"Modern Compiler Implementaton in ML" by Andrew W. Appel, Cambridge University Press, 1998.
E―Books	1.	Introduction to Compilers and Language Design - by Prof. Douglas Thain University of Notre Dame https://www3.nd.edu/~dthain/compilerbook/compilerbook.pdf
Referenc e Books	1.	Kenneth C Louden, ―Compiler Construction Principle and Practice‖, PWS publishing Company, 1997
	2.	Dhamdhere D.M., ―Compiler Construction Principle and Practice‖, Mac. Millan India, New Delhi, 1983
on line TL Material	1.	NPTEL Course Compiler Design, IIT Kharagpur https://nptel.ac.in/courses/106/105/106105190/

Department of Information Technology

Course Title: **Computer System Security**										
Semester	VII	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	ODD	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	PCC13	3	-	2	4	10	15	50	25	-
Course Code	23BTCSL403IT / 23BTCSP403IT									
Teaching Mode	Offline	5 Hrs			Total	75			25	
Duration of ESE	3 Hrs					100				

Course Objectives	1. This course covers the fundamentals of computer systems security.
	2. It introduces many different areas of security such as encryption, malicious code, authentication and access control, trusted computer systems, operating system and network security.
	3. The objective of this course is to provide students with a comprehensive overview of the threats to computer security, technologies for security assurance, and engineering approaches to security solutions.
Course Outcomes	Up on successful completion of this course, student will be able to:
	CO1: Understand the basic concepts and goals of Information security such as Confidentiality, Integrity, Authentication, Non - Repudiation, Authorization, and availability and their relevance in various Contexts.
	CO2: Identify and design the various cryptographic algorithms for the appropriate protection measures against malicious code.
	CO3: Apply the modern principles of network security threats and determine efforts to counter them.
	CO4: Analyze, implement and maintain security requirements and mechanisms in various computer systems and networks.
	CO5: Design and apply the principles of trusted system to achieve the degree of assurance.

Mapping of **Course Outcomes** with **Program Outcomes** and **Program Specific Outcomes**:

Course Outcomes	Program Outcomes and Program Specific Outcomes													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	2	-	-	-	-	-	-	-	2	-
CO3	2	2	2	-	3	-	-	-	-	-	-	-	-	3
CO4	2	2	2	-	-	-	-	-	-	-	-	-	2	3
CO5	2		3	-	-	-	-	-					-	3

Department of Information Technology

Course Contents:

Unit	Contents	Hours
I	Introduction: attacks, services, mechanisms, security attacks, security services, a model for internet work security, encryption model, steganography, classical encryption techniques, modern techniques - simplified DES, block cipher principles, data encryption standard, strength of DES.	8
II	Confidentiality using conventional encryption: placement of encryption function, traffic confidentiality, key distribution. Public key cryptography: principles, RSA algorithm, key management, Diffie-Hellman key exchange, elliptic curve cryptography, Chinese remainder theorem.	7
III	Message Authentication & hash functions: Authentication requirements, functions, codes, hash functions, security of hash function & MACs. Hash & Mac algorithms: MD5 message digest algorithm, authentication protocols, digital signature standard.	8
IV	Networks security practice: E-mail security: pretty Good privacy, S/MIME. IP security: overview, architecture, authentication header, encapsulating security payload, combining security associations, key management. Computer Security testing: Penetration Testing, Security Penetration Tools like Netsparker, Wireshark, etc.	8
V	Web security: Requirements, secure electronic transaction, networks management security. System Security: Intruders, viruses and worms, Firewalls: design principles, trusted systems. Privacy rules: Access, data backup, test security systems and processes. Mobile/Cloud security issues and challenges in futuristic web security applications.	9

Text Book s	1.	Cryptography and networks security principles & practice 2/c by William Stalings (Pearson Education prentice Hall).
	2.	Networks security Essentials Applications & standards by William Stalings (Pearson Education, LPF).
	3.	Cryptography in C and C++ by Michael Welschenbach (A press IDG Books India).
E-Book s	1.	https://freecomputerbooks.com/compscspecialSecurityBooks.html
	2.	http://www.cs.unibo.it/~babaoglu/courses/security/resources/documents/Computer_Security_Principles_and_Practice_(3rd_Edition).pdf
	3.	http://www.uoitc.edu.iq/images/documents/informatics-institute/exam_materials/Introduction%20to%20Computer%20Security%20pdf%20DONE.pdf
Reference Book s	1.	Introduction to Data Compression by Khalid Sayood (Morgan kaufmann/Harcourt India).
	2.	Alfred J. Menezes, Paul C. van Oorschot and Scott A. Vanstone, Handbook of Applied Cryptography, CRC Press.
	3.	Michael T. Goodrich and Roberto Tamassia, Introduction to Computer Security, Addison Wesley, 2011.
On line TL Material	1.	https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/download-course-materials/
	2.	http://nptel.ac.in/courses/106105031/
	3.	http://freevideolectures.com/Course/3027/Cryptography-and-Network-Security

Department of Information Technology

List of Practical:

Sr. No.	Name of Experiments **(Programming Language: C++, Python)**	Hrs. Allotted	Relevance to CO
1	Perform encryption and decryption using Caesar cipher Algorithm.	2	CO1
2	Perform encryption and decryption using Play Fair Cipher.	2	CO1
3	Perform encryption and decryption using Rail Fence Technique. (Row Transposition Techniques)	2	CO2
4	Perform encryption and decryption using (Colunmar Transposition Techniques	2	CO2
5	Perform encryption and decryption using One Time Pad Algorithm.	2	CO3
6	Write a program to implement extended Euclidean Algorithm.	2	CO3
7	Write a program to Develop a Secure System by Applying RSA Cryptography Algorithms.	2	CO4
8	Write a C program to implement Digital signature algorithm	2	CO4
9	Write a Program to Implement Elliptic curve based Arithmetic.	2	CO5
10	Write a program to implement Diffie–Hellman Key Exchange.	2	CO5
11	Open source Tools	2	CO5

Department of Information Technology

7TH Sem Elective Subjects

Program Elective-I		
Sr. No	**Couse Code**	**Course Name**
1	23BTITL441	Digital Forensics
2	23BTITL442	Digital Marketing
3	23BTITL443	Software Testing & Quality Assurance

Department of Information Technology

Course Title: **Digital Forensics**										
Semester	VII	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	ODD	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	PEC4	4	-	-	4	10	15	50	-	-
Course Code	23BTITL441									
Teaching Mode	Offline	4 Hrs			Total	75			-	
Duration of ESE	3 Hrs					75				

Course Objectives	1. Understand the fundamental principles and concepts of digital forensics.
	2. Learn techniques for recovering and analyzing digital evidence.
	3. Develop an understanding of the ethical and legal aspects of digital forensics.
Course Outcomes	Up on successful completion of this course, student will be able to:
	CO1: Explain fundamental principles of digital forensics.
	CO2: Recover and analyze digital evidence from different devices.
	CO3: Ensure the integrity and admissibility of digital evidence.
	CO4: Understand and adhere to ethical and legal standards in digital forensics.
	CO5: Apply forensic techniques to practical scenarios in cybercrime investigations.

Mapping of **Course Outcomes** with **Program Outcomes** and **Program Specific Outcomes**:

Course Outcomes	Program Outcomes and Program Specific Outcomes													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	1	2	3	2	3	-	3	1	1	1	1	-	-
CO2	1	3	3	3	3	-	2	2	-	1	2	1	2	-
CO3	-	1	2	3	3	1	1	-	-	-	-	-	1	-
CO4	1	1	1	2	2	2	1	3	-	-	-	-	2	-
CO5	1	2	3	3	1	1	1	3	-	-	2	1	3	-

Department of Information Technology

Course Contents:

Unit	Contents	Hours
I	Introduction to Digital Forensics Definition and Scope: its significance, and its role in cybersecurity; Development of digital forensics over time; Types of Digital Forensics: Computer forensics, mobile device forensics, network forensics, etc.; Legal and Ethical Issues: Understanding the legal framework and ethical considerations in digital forensic investigations.	9
II	Digital Evidence and Crime Scene Management Digital Evidence: Definition, types, and characteristics. Identification and Collection: Procedures for identifying and collecting digital evidence. Preservation of Evidence: Techniques for preserving the integrity of digital evidence. Chain of Custody: Maintaining and documenting the chain of custody.	7
III	Forensic Investigation Process: Steps involved in digital forensic investigations. Imaging and Cloning: Techniques for creating forensic copies of digital media. Data Recovery: Methods for recovering deleted, hidden, or encrypted data. Analysis Techniques: Basic techniques for analyzing digital evidence.	8
IV	Introduction to Forensic Tools and Software Forensic Tools: tools in digital forensics (e.g., FTK, EnCase, Autopsy). Open-source vs. Commercial Tools: Comparison and selection of tools based on the investigation.	8
V	Reporting and Presenting Digital Evidence Documentation: Importance of documentation in digital forensic investigations. Report Writing: Structure and content of forensic reports. Presentation of Evidence: Techniques for presenting digital evidence in court. Expert Testimony: Role of a digital forensic expert in legal proceedings.	9

Text Books	1.	Kevin Mandia, Chris Prosise, “Incident Response and computer forensics”, Tata McGraw Hill, 2006.
	2.	Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
	3.	Digital Forensics and Incident Response: Incident response techniques and procedures to respond to modern cyber threats by Gerard Johansen.
Reference Books	1	Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning
	2	Real Digital Forensics by Keith J. Jones, Richard Bejtiich, Curtis W. Rose, Addison- Wesley Pearson Education
	3	Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.

Department of Information Technology

Course Title: **Digital Marketing**										
Semester	VII	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	ODD	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	PEC4	4	-	-	4	10	15	50	-	-
Course Code	23BTITL442									
Teaching Mode	Offline	4 Hrs			Total	75			-	
Duration of ESE	3 Hrs					75				

Course Objectives	1. Understand digital marketing technologies.
	2. Get knowledge in the areas of digital marketing communications
	3. Learn methodologies, tools and technologies involved in digital marketing.
Course Outcomes	Up on successful completion of this course, student will be able to:
	CO1: Understand the importance of the digital marketing for marketing success
	CO2: Manage customer relationships across all digital channels and build better customer relationships.
	CO3: Create a digital marketing plan, starting from the SWOT analysis and defining a target group.
	CO4: Identify digital channels, their advantages and limitations.
	CO5: Identify perceive ways of integration of various digital channels taking into consideration the available budget.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	2	-	-	-	-	-	-	-	2	-
CO3	1	2	2	-	3	-	-	-	-	-	-	-	-	3
CO4	1	2	2	3	3	-	-	-	-	-	-	-	2	2
CO5	2		3	-	3	-	-	-					-	2

Department of Information Technology

Course Contents:

Unit	Contents	Hours
I	Introduction: Introduction to Digital Marketing - Digital marketing: Introduction to digital marketing, Difference between traditional marketing& digital, Discussion on Ecommerce Discussion on new trends and current scenario of the world, Digital marketing a boon or a Bane, Digital marketing a tool of success for companies, Analysis of recent info graphics released by companies about digital marketing, Digital marketing channels, How did digital marketing help the small companies and for marketing for the business, Diagnosis of the present website and business, Swot analysis of business, present website and media or promotion plan, Setting up vision, mission and goals of digital marketing. Understanding a website: What is a website, Levels of websites, Diff b/w Blog, Portal and Website, Difference between static and dynamic websites.	9
II	Search Engine Optimization (SEO) –SEO: SEO audit and features of SEO, on-page optimization techniques, off-page Optimization techniques, Reports, writing SEO content, Jobs in SEO	7
III	Social Media Optimization (SMO)– SMO: Introduction to Social Media Marketing, Advanced Facebook Marketing, visual identity of the Facebook page, Optimization of Instagram profile, Word Press blog creation, Twitter marketing, LinkedIn Marketing, Creating a campaign on LinkedIn, Google plus marketing, Social Media Analytical Tools, Web Analytics level, Creating business accounts on YouTube.	9
IV	Search Engine Marketing & Digital Marketing Budgeting – Search Engine Marketing: Introduction to Search Engine Marketing, Tools used for Search engine Marketing, Display advertising techniques, Report generation, Email marketing, Email marketing plan, Email marketing campaign analysis.	8
V	Digital Marketing Budgeting: Resource planning, cost estimating, cost budgeting, cost control. Recent trends in Digital Marketing.	7

List of Books:

Text Books	1.	Ryan, D. (2014). Understanding Digital Marketing: Marketing Strategies for Engaging the
	2.	Digital Generation, Kogan Page Limited.
E-Books	1.	https://www.7boats.com/academy/wp-content/uploads/2016/10/50-shades-of-digital-marketing.pdf
	2.	https://www.reliablesoft.net/free-marketing-ebooks/
Reference Books	1.	Fundamentals of Digital Marketing, Second Edition, Pearson by Puneet Bhatia
	2.	Digital Marketing Essentials You Always Wanted to Know by Vibrant Publishers.
On line TL Material	1.	https://www.digitalmarketer.com/digital-marketing/assets/pdf/ultimate-guide-to-digital-marketing.pdf
	2.	https://www.7boats.com/academy/wp-content/uploads/2016/10/50-shades-of-digital-marketing.pdf

Department of Information Technology

Course Title: **Software Testing & Quality Assurance**										
Semester	VII	Teaching Scheme				Evaluation Scheme				
Term	ODD					Theory			Practical	
Course Category	PEC4	Th	Tu	Pr	Credits	TAE	CAE	ESE	Int	Ext
Course Code	23BTITL443	4.	-	-	4	10	15	50	-	-
Teaching Mode	Offline	4 Hrs			Total	75			-	
Duration of ESE	3 Hrs					75				

Course Objectives	1. This course introduces students the criteria for test cases while making them aware of basic methods to design the test cases.
	2. It is also aimed at making students familiar with test management and test automation techniques
	3. The course also provides students an opportunity to get exposed to test metrics and measurements
Course Outcomes	Upon successful completion of this course, student will be able to:
	CO1: Identify bugs to create defect report of a given application.
	CO2: Summarize test cases for different types and levels of testing.
	CO3: Illustrate test plan for an application.
	CO4: Develop and validate a test plan.
	CO5: Analyze software using automated testing tools.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	--	3	--	--	--	--	--	--	--	--	--	--	2	--
CO2	--	--	3	--	--	--	--	--	--	--	--	--	1	--
CO3	--	--	--	3	--	--	--	--	--	--	--	--	2	--
CO4	--	--	3	--	--	--	--	--	--	--	--	--	2	2
CO5	--	--	--	--	3	--	--	--	--	--	--	--	2	2

Department of Information Technology

Course Contents:

Unit	Contents	Hours
I	Unit – I: INTRODUCTION Testing as an Engineering Activity – Testing as a Process – Testing axioms – Basic definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support of Developing a Defect Repository – Defect Prediction strategies.	7
II	Unit – II :TEST CASE DESIGN Test case Design Strategies – Using Black Bod Approach to Test Case Design – Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning – State based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Evaluating Test Adequacy Criteria.	7
III	UNIT III: LEVELS OF TESTING The need for Levers of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation – Website testing.	7
IV	UNIT IV – TEST MANAGEMENT People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – TestPlan Attachments – Locating Test Items – test management – test process – Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.	7
V	Unit V: TEST AUTOMATION Software test automation – skill needed for automation – scope of automation – Selenium Integrated Development Environment (IDE) design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements, Software Testing Matrix Parameters- Requirement ID, Risks involved, Requirement type and description, Unit test cases, Integration test cases, User Acceptance Test Cases and Trace. Advance Topic: (As per the instructor)	7

Text Books	1.	Srinivasan Desikan and Gopalaswamy Ramesh, ‑Software Testing – Principles and Practices‖, Pearson Education, 2006.
	2.	Singh,Y.,Software Testing, Cambridge University Press, 2013
	3.	Ron Patton, ‑Software Testing‖, Second Edition, Sams Publishing, Pearson

Department of Information Technology

		Education, 2007
E-Books	1	Kshirasagar Naik ,Priyadarshi Tripathy, ― Software Testing And Quality Assurance‖ A John Wiley & Sons, Inc., Publication
	2	Paul Ammann, Jeff Offutt, –Introduction To Software Testing – Cambridge University Press
Reference Books	1.	Glenford J. Myers, Corey Sandler, Tom Badgett. The Art of Software Testing, 3rd Edition
	2.	Ron Patton, Software Testing, 2nd Edition, 2005
On-line TL Material	1.	https://www.udemy.com/courses/development/software-testing/https://process.spoken-tutorial.org/index.php/Software-Training

Department of Information Technology

7TH Sem Multi-Disciplinary Minor Subjects

MDM-5		
Sr. No	**Couse Code**	**Course Name**
1	23BTITL405	**Foundation of Machine Learning**

Department of Information Technology

Course Title: **Foundation of Machine Learning**										
Semester	VII	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	ODD	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	MDM5	4	-	-	4	10	15	50	-	-
Course Code	23BTITL405									
Teaching Mode	Offline	4			Total	75			-	
Duration of ESE	3 hrs.					75				

Course Objectives	1. The objectives of the course is to introduce students about the basic of machine learning algorithms.
	2. To understand nature of the problem and apply suitable machine learning algorithm
Course Outcomes	**CO1 :** Understand modern notions in machine learning and computing
	CO2 : Understand a wide variety of learning algorithms
	CO3 : Be capable of confidently applying common Machine Learning algorithms in practice and implementing their own
	CO4 : Evaluate Machine Learning Models generated from data
	CO5 : Apply the algorithms to a real problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	2											2	2	2
CO2		3											2	
CO3			3	2									2	
CO4			3	3									2	
CO5			3	3	3				3				3	

Department of Information Technology

Course Contents

Unit	Contents	Hours
I	Introduction: Basic definitions, types of learning, hypothesis space and inductive bias, evaluation, cross-validation	6
II	Linear regression, Decision trees, over fitting Instance based learning, Feature reduction, Collaborative filtering based recommendation	8
III	Probability and Bayes learning ,Logistic Regression, Support Vector Machine, Kernel function and Kernel SVM	8
IV	Computational learning theory, PAC learning model, Sample complexity, VC Dimension, Ensemble learning	6
V	Clustering: k-means, adaptive hierarchical clustering, Gaussian mixture model	6

List of Books:

Text Books	1.	Mitchell Tom, Machine Learning. McGraw Hill, 1997.
	2.	Introduction to machine learning, Ethem Alpaydin. —2nd ed., The MIT Press,Cambridge, Massachusetts, London, England.
	3.	Chris Bishop, Pattern Recognition and Machine Learning
Reference Books	1.	Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements ofStatistical Learning Data Mining, Inference, and Prediction
	2.	Richard O. Duda, Peter E. Hart, David G. Stork. Pattern classification, Wiley,New York, 2001.
	3.	Machine Learning: The Art and Science of Algorithms that Make Sense ofData (1st Edition) – Peter Falch
On line TL Material	1	https://www.coursera.org/learn/machine-learning
	2	https://www.udemy.com/course/machinelearning/
	3	https://nptel.ac.in/courses/106/105/106105152/