B.Sc Information Technology

Syllabus for the Academic Year 2022-2023

Batch
2022 - 2023

NEHRU ARTS AND SCIENCE COLLEGE

(An Autonomous Institution affiliated to Bharathiar University)
(Reaccredited with "A" Grade by NAAC, ISO 9001:2015& 14001:2004 Certified
Recognized by UGC with 2(f) &12(B), Under Star College Scheme by DBT, Govt. of India)
Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105, Tamil Nadu.

DEPARTMENT OF INFORMATION TECHNOLOGY

PROGRAMME SPECIFIC OUTCOMES (PSOs)

After the successful completion of the programme, the students are expected to

PSO1	Understand the programming concepts and methodology & the functionality of hardware and software aspects of computer systems.
PSO2	To provide the structure and development methodologies of software systems, acquire professional skills and knowledge of software design process. Familiarity and practical competence with a broad range of programming language and open source platforms.
PSO3	To apply mathematical methodologies to solve computation task, model real world problem using appropriate data structure and suitable algorithm.
PSO4	To comprehend and write effective project report in multidisciplinary environment in the context of changing technologies.
PSO5	The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

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DEPARTMENT OF INFORMATION TECHNOLOGY

PROGRAMME OUTCOMES

On successful completion of the programme, the graduates will have

PO1	**Critical Thinking**	Develop a systematic, critical approach to problem solving at all levels and apply the domain specific knowledge to form conclusions based on quantitative information to meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO2	**Usage of Technology**	Equip the students to meet the industrial needs by utilizing tools and technologies for Peer Communication, Data Interpretation and Problem-Solving aspects.
PO3	**Effective Communication**	Develop language competence and be proficient in oral and written communication with a focus on LSRW.
PO4	**Environment and Sustainability**	Understand the consequential responsibilities to analyze and realize the interactions between social and environmental sustainability procedures and create processes.
PO5	**Individual and Team Work**	Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings and manifest the best outcomes.
PO6	**Ethics and Values**	Acquire life skills to become a better human being and apply ethical principles and commit to professional ethics and responsibilities.
PO7	**Social Interactions**	Participate actively in initiatives that encourage equity and growth for all and to act with an informed awareness of local, regional, national and global needs
PO8	**Life Long Learning**	Engage in lifelong learning and Work on career enhancement and adapt to changing personal, professional and societal needs.

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Scheme of Examination

B. Sc., Information Technology
Programme Code - UIT
(Applicable to the students admitted during the year 2022 – 2023 onwards)

Semester	Part	Course Code	Name of the Course	Instruction hours / week	Duration of Examination	Examination Marks			Credits
						CIA	ESE	Total	
I	I	22U1TAM101/ 22U1HIN101 / 22U1MAL101/ 22U1FRN101	Elanthamizh Rachnathmak Hindi Kadhayum Samskaravum Le Français Fondamental - I	5	3	50	50	100	4
	II	22U2ENG101	Professional English - I	5	3	50	50	100	4
	III	22U3CKC101	Core Paper I: Python Programming	4	3	50	50	100	4
		22U3CKC102	Core Paper II: Digital Fundamentals and Computer Architecture	4	3	50	50	100	4
		22U3ITP101	Core Paper III: Practical in Python Programming	4	3	50	50	100	4
		22U3MIA101	Allied Paper I: Mathematics for Computer Science	5	3	50	50	100	4
	IV	21U4ENV101	@**Ability Enhancement Compulsory Course: Environmental Studies	2	3	50	-	50	2
		22U4HVY201	Value Education: Human Values and Yoga Practice	1	-	-	-	-	-
				30				**650**	**26**
II	I	22U1TAM202/ 22U1HIN202/ 22U1MAL202/ 22U1FRN202	Pienthamizh Sanchar Hindi Novelum Bhashapadanavum Le Français Fondamental - II	5	3	50	50	100	4
	II	22U2ENG202	Professional English - II	5	3	50	50	100	4
	III	22U3CKC203	Core Paper IV: Java Programming	4	3	50	50	100	4
		22U3CKC204	Core Paper V: Data Structures	4	3	50	50	100	4
		22U3ITP202	Core Paper VI: Practical in Java Programming	4	3	50	50	100	4
		22U3MIA202	Allied Paper II: Discrete	5	3	50	50	100	4

	Part	Code	Title						
			Mathematics						
	IV	21U4HRC202	@Ability Enhancement Compulsory Course: Human Rights and Constitution of India	2	3	50	-	50	2
		22U4HVY201	Value Education: Human Values and Yoga Practice	1	2	50	-	50	2
				30				**700**	**28**
III	III	22U3CKC305	Core Paper VII: Operating Systems	6	3	50	50	100	4
		22U3ITC303	Core Paper VIII: Software Engineering	5	3	50	50	100	4
		22U3ITP303	Core Paper IX: Practical in Operating System	6	3	50	50	100	4
		22U3MIA303	Allied Paper III: Operations Research	5	3	50	50	100	4
	IV	22U4ITZ301	Skill Based Paper I: Case Tools Lab	4	3	30	45	75	3
		22U4NM3BT1/ 22U4NM3AT1/ 22U4NM3CAF/ 22U4NM3GTS/ 22U4NM3WRT	#@Basic Tamil - I / ##Advanced Tamil - I / *NME: Consumer Affairs / Gandhian Thoughts / Women's Rights	2	3	50		50	2
		SBOEC	Skill Based Open Elective Courses – Extra Departmental Course	2	3	-	50	50	2
		22U4ITVALC	**Skill Enhancement: Value Added Course - Institute Industry Linkage	-	-	-	-	-	-
				30				**575**	**23**
IV	III	22U3ITC404	Core Paper X: Computer Networks	5	3	50	50	100	4
		22U3CKC406	Core Paper XI: RDBMS & MySQL	6	3	50	50	100	4
		22U3ITP404	Core Paper XII: Practical in RDBMS and MySQL	6	3	50	50	100	4
		22U3ITA404	Allied Paper IV: Robotics	5	3	50	50	100	4
	IV	22U4ITZ402	Skill Based Paper II: Practical in Multimedia	4	3	30	45	75	3
		22U4NM4BT2/ 22U4NM4AT2/ 22U4NM4GEN	#@Basic Tamil - II / ##Advanced Tamil - II / General Awareness	2	2	50		50	2
		VBOEC	Value Based Open Elective Courses – Intra School Course	2	3	-	50	50	2
		22U4ITVALC	**Skill Enhancement: Value Added Course - Institute Industry Linkage	-	-	-	-	-	Grade
				30				**575**	**23**
V		22U3CKC509	Core Paper XIII: PHP Programming	5	3	50	50	100	4

		22U3CKC510	Core Paper XIV: Artificial Intelligence	5	3	30	45	75	3
	III	22U3ITP505	Core Paper XV: PHP Programming Lab	6	3	50	50	100	4
		22U3ITP506	Core Paper XVI: Practical in Web Technology	4	3	30	45	75	3
		22U3CKE501/ 22U3CKE502 22U3CKE503/ 22U3CKE504	Discipline Specific Elective Paper - I	6	3	50	50	100	4
		22U3ITV509	In-Plant Training	-	-	50	-	50	2
	IV	22U4ITS503	Skill Based Paper III: Cyber Law	4	3	30	45	75	3
				30				575	23
VI	III	22U3CKC611	Core Paper XVII: Data Mining	6	3	50	50	100	4
		22U3ITV610	Project and Viva-Voce	6	-	50	50	100	4
		22U3CKE605/ 22U3CKE606/ 22U3CKE607/ 22U3CKE608	Discipline Specific Elective Paper - II	6	3	50	50	100	4
		22U3ITE609/ 22U3ITE610/ 22U3ITE611/ 22U3ITE612	Discipline Specific Elective Paper - III	6	3	50	50	100	4
	IV	22U3ITZ604	Skill Based Paper IV: Practical in Kotlin	6	3	30	45	75	3
	V	22U5EXT601	Extension Activities	-	-	50	-	50	2
				30				525	21
Total								3600	144
Additional Credit (Optional II - V)									8$

#@**Basic Tamil** -Students who have not studied Tamil upto 12th standard.

##**Advanced Tamil** - Students who have studied Tamil language upto12th / 10th standard and have chosen other languages under part I of the programme but would like to advance their Tamil language skills.

*NME - Students shall choose any one course out of three courses.

@ No End Semester Examinations. Only Continuous Internal Assessment (CIA).

$Not included in CGPA calculation.

** Examination and Evaluation for Value Added Course shall be conducted by the Industry and the marks shall be submitted to the CoE section for the award of Grade.

List of Elective Papers

Elective Papers	Course Code	Name of the Course
Elective Paper I	22U3CKE501	Blockchain Technology
	22U3CKE502	Next Generation Networks
	22U3CKE503	Internet of Things
	22U3CKE504	Big Data Analytics
Elective Paper II	22U3CKE605	Software Quality Assurance
	22U3CKE606	Information Security
	22U3CKE607	Cloud Computing
	22U3CKE608	Cyber Security
Elective Paper III	22U3ITE609	Digital Marketing
	22U3ITE610	Intellectual Property Rights and Privacy Laws
	22U3ITE611	Information Technology for Management
	22U3ITE612	Ethical Hacking

Extra Departmental Course

S. No.	Semester	Course Code	Course Title
1	III	22U4IT3ED1	Practical in Libreoffice Suite
2		22U4IT3ED2	GIMP

- Students need to opt a Course other than the Course offered by their Department.

Intra School Course offered by the Department to other Department Students (within the School)

S. No	Course Code	Name of the Course
1	22U4VBOE01	Design Ecosystem
2	22U4VBOE02	Design Thinking
3	22U4VBOE03	Disaster Management
4	22U4VBOE04	Environmental Pollution and Waste Management (EMS)
5	22U4VBOE05	History of Ancient India
6	22U4VBOE06	Indian Knowledge System
7	22U4VBOE07	Principles of IPR
8	22U4VBOE08	Science, Society and Culture
9	22U4VBOE09	Community Engagement
10	22U4VBOE10	Emotional Intelligence
11	22U4VBOE11	Fundamentals of Tourism
12	22U4VBOE12	Health Education
13	22U4VBOE13	Media and Politics
14	22U4VBOE14	Positive Psychology and Work Life
15	22U4VBOE15	Professional Ethics
16	22U4VBOE16	The Science of Happiness
17	NCC	

- Students shall opt any course within their Schools.
- NCC – Students who qualify NCC B Certificate Examination need not appear for these open Electives. The Credits shall be transferred.

Self Study Paper offered by Department of Information Technology

S. No.	Semester	Course Code	Course Title
1	Semester II - V	22UITSS01	Practical in Word Press
2		22UCKSS02	Quantitative Aptitude

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Nehru Arts and Science College
Coimbatore

]Course Code	Title		
22U3CKC305	**Core Paper VII: Operating Systems**		
Semester: III	**Credits: 4**	**CIA: 50 Marks**	**ESE: 50 Marks**

Course Objective	To understand the importance of Operating Systems, its functionalities to manage resources of Computer and Peripherals.
Course Category	Employability
Development Needs	Global
Course Description	This course examines the important problems in operating system design and implementation. The operating system provides an established, convenient, and efficient interface between user programs and the bare hardware of the computer on which they run.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Recognize the basic concepts of Operating system	Lecture	Unit Test
CO 2	Understand the concepts of processes and scheduling of process.	Tutorial	Assignment
CO 3	Explain the techniques of managing the deadlock and memory	Video Lecture	Seminar
CO 4	Illustrate the Segmentation of Paging and Page Replacement policies.	Case Studies	Unit Test
CO 5	Apply various file system implementation	Class Projects	Quiz

Offered by	Information Technology

Course Content	Instructional Hours / Week : 6

Unit	Description	Text Book	Chapters
I	Introduction: Abstract views of an OS – Goals of an OS – OS and the Computer System – Classes of Operating System: Batch Processing systems – Multiprogramming systems – Time sharing systems – Real Time Operating System – Distributed Operating System – Modern Operating systems	1	1,2
	Instructional Hours		**18**
Suggested Learning Methods : Unit Test			**02 Hrs**
II	Processes and Programs – Programmer View of Process – OS view of Process – Controlling Processes – Process State Transitions – Process Control Block – Process Scheduling: Scheduling Concepts and Terminology – Fundamental Techniques of scheduling – Non-Preemptive scheduling policies - Preemptive scheduling policies.	1,2	3,4
	Instructional Hours		**18**
Suggested Learning Methods : Assignment			**02 Hrs**

III	Deadlock: Definition – Deadlocks in Resource Allocation – Handling deadlocks – Deadlock Detection and Resolution - Deadlock Prevention – Deadlock Avoidance. Memory Management: Static and dynamic Memory Allocation – The Memory Allocation Model – reuse of Memory – Contiguous Memory allocation – Non-Contiguous Memory Allocation.	1	11
	Instructional Hours		**18**
Suggested Learning Methods : Seminar			**02 Hrs**
IV	Paging – Segmentation – Segmentation with Paging. Virtual Memory: Basics – Demand Paging – Overview of Paging – Demand Paging preliminaries – Page replacement policies – Virtual Memory using segmentation	1	15
	Instructional Hours		**18**
Suggested Learning Methods : Unit Test			**02 Hrs**
V	Layers of the Input Output Control System (IOCS) – Overview of I/O Organization – Disk Scheduling. File systems: File System and IOCS – Files and File Operations – Fundamental File organizations – directory Structures – Case study on LINUX OS, UNIX OS, Android OS (Self-study)	1	7
	Instructional Hours		**18**
Suggested Learning Methods : Quiz			**02 Hrs**
	Total Hours		**90 Hrs**

Text Books	1. D. M. Dhamdhere, Operating Systems – A concept Based Approach, 2nd Edition, 2006
Reference Books	1. William Stallings, Operating Systems Internals and Design Principles, Seventh Edition, Pearson Education Inc. 2012. 2. Abraham Silberchatz, Peter Baer Galvin, Greg Gagne, Operating System Concepts, Seventh Edition, Pearson Education 2009.
Web. URLs	https://www.tutorialspoint.com/operating_system/os_overview.htm

Tools for Assessment (50 Marks)						
CIA I	CIA II	CIA III	Case Study Analysis	Assignment	Seminar	Total
8	8	10	8	8	8	50

Mapping												
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	M	L	M	M	H	M	H	H	H
CO2	H	H	H	M	L	H	L	H	M	H	H	H	H
CO3	H	H	H	H	H	M	H	H	H	H	M	H	H
CO4	H	M	H	H	M	L	M	M	M	M	H	M	H
CO5	H	H	M	M	H	H	H	H	M	M	M	M	M

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3ITC303	**Core Paper VIII: Software Engineering**		
Semester: III	**Credits: 4**	**CIA: 50 Marks**	**ESE: 50 Marks**

Course Objective	To gain knowledge about basic concepts of Software Engineering and Testing.
Course Category	Employability and Entrepreneurship
Development Needs	Global
Course Description	The Software Engineering course syllabus is designed to impart knowledge about Computer Programming, Web Development, Data Structures, Project Management, etc.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Able to understand the nature of the software and different types of process models	Video Lecture	Assignment
CO 2	Gains knowledge about the requirements stage development of the software	Brainstorming	Seminar
CO 3	Analyze the different types of architectural designs of the software	Lectures / Video Lessons	Quiz
CO 4	Setting the context on Software Development and Evaluates different testing strategies of the software	Jigsaw	Just A Minute Presentation
CO 5	Understand the testing types and test automation	Flipped Classroom	Group Discussion

Offered by	Information Technology

Course Content	Instructional Hours / Week :5

Unit	Description	Text Book	Chapters
I	**Introduction to Software Engineering:** Evolving role of software – Software- The changing nature of Software- Software Myths. A Generic view of Process- A Layered Technology	**1**	**1**
	Software Process Models: Prescriptive models- The Waterfall Model - Incremental Process Models- Evolutionary Process Models.	**1**	**3**
	Instructional Hours		**15**

Suggested Learning Methods : Assignment	02 Hrs

Unit	Description	Text Book	Chapters
II	**Requirements Engineering:** Requirements Engineering Tasks- Initiating the Requirements Engineering Process- Eliciting Requirements- Building the Analysis Model.	1	7
	Building the Analysis Model: Scenario-Based Modelling- Flow Oriented Modelling.	1	6
	Instructional Hours		**15**

Suggested Learning Methods : Seminar	02 Hrs

III	**Design Engineering:** Design Concepts -The design model.	1	9
	Creating an Architectural Design: Representing the System in Context- Defining Archetypes- Refining the Architecture into Components- Describing Instantiations of the System.	1	10
	Modelling Component-Level Design: What is a Component – Designing Class-Based Components.	1	11
	User Interface Design: User Interface Analysis and Design-Interface Design steps.	1	12
	Instructional Hours		**15**
Suggested Learning Methods : Quiz			**02 Hrs**
IV	**Software Development Life Cycle models:** Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation. **White-Box Testing:** Static Testing – Structural Testing. **Black-Box Testing:** How to do Black-Box Testing procedures.	2	2,3,4
	Instructional Hours		**15**
Suggested Learning Methods : Just A Minute Presentation			**02 Hrs**
V	**Integration Testing:** Integration Testing as Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash. System and Acceptance **Testing:** System Testing Overview - Functional versus Non-functional Testing - Functional testing - Non-functional Testing – Acceptance Testing. **Performance Testing:** Methodology of Performance Testing – tools for Performance Testing. **Regression Testing:** Regression Testing Overview – Types of Regression Testing - Test Automation.	2	5,6,7,8,16
	Instructional Hours		**15**
Suggested Learning Methods : Group Discussion			**02 Hrs**

VI	**Contemporary Issues:**
	  o Workshop on Software Tools.
	  o Seminar on Various Software Models.
	  o Guest Lecture on Software development Lifecycle		

	Total Hours		**75 Hrs**

Text Books	1. Roger S Pressman, Software Engineering a Practitioner's Approach, Seventh Edition, McGraw Hill, International Edition, 2013 2. Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing Principles and Practices", Pearson, 2006.
Reference Books	1. Richard Fairley, Software Engineering Concepts, Tata McGraw-Hill Publishing Company Limited,2010 2. Waman S. Jawadekar, Software Engineering - Principles and Practice, Tata McGraw Hill Publishing Company Limited,2011
Web. URLs	https://www.tutorialspoint.com/software_engineering/index.htm

Tools for Assessment (50 Marks)

CIA I	CIA II	CIA III	Case Study Analysis	Assignment	Quiz	Total
8	**8**	**10**	**8**	**8**	**8**	**50**

										Mapping			
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	H	H	M	M	M	L	M	M	H	H	M	H	H
CO2	H	H	H	M	M	H	L	H	H	M	H	H	M
CO3	H	H	H	H	H	M	H	H	M	H	H	H	M
CO4	H	M	H	H	M	M	M	M	H	H	M	H	H
CO5	H	H	M	M	H	H	H	H	H	H	H	M	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3ITP303	**Core Paper IX: Practical in Operating System**		
Semester: III	**Credits: 4**	**CIA: 50 Marks**	**ESE: 50 Marks**

Course Objective	To know about the basics of shell Script programming language
Course Category	Employability, Skill Development
Development Needs	Global
Course Description	This course examines the important techniques in operating system design and implementation.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understanding the shell programming concept		
CO 2	To review the file concept in the working environment	Demonstration Method	Laboratory Experiments
CO 3	Compare the different management techniques		
CO 4	To Apply socket communication in Program		
CO 5	Able to apply various scripting concept in programs		

Offered by	**Information Technology**

Course Content	Instructional Hours / Week : 6

Progra mme	Description
1	Write a shell script to stimulate the file commands: rm, cp, cat, mv, cmp, wc, split, diff.
2	Write a shell script to show the following system configuration : a. currently logged user and his log name b. current shell, home directory, Operating System type, current Path setting, current working directory c. show currently logged number of users, show all available shells d. show CPU information like processor type, speed e. show memory information
3	Write a Shell Script to implement the following: pipes, Redirection and tee commands.
4	Write a shell script for displaying current date, user name, file listing and directories by getting user choice.
5	Write a shell script to implement the filter commands.
6	Write a shell script to remove the files which has file size as zero bytes.
7	Write a shell script to find the sum of the individual digits of a given number.
8	Write a shell script to find the greatest among the given set of numbers using command line arguments.

9	Write a shell script for palindrome checking.
10	Write a shell script to print the multiplication table of the given argument using for loop.

							Instructional Hours	90

Tools for Assessment (50 Marks)

Application of Logic	Program Creativity	Program Debugging	Test 1	Test 2	Observation Note Book	Total
8	8	8	10	10	6	50

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	M	M	H	H	H	H	M	H	H
CO2	H	M	H	M	M	H	H	M	M	H	H	M	H
CO3	M	M	M	H	M	M	M	L	H	H	M	H	M
CO4	H	M	H	M	M	M	M	L	M	M	H	M	H
CO5	H	M	H	M	M	M	H	H	H	M	M	H	M

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3MIA303	**Allied Paper III : Operations Research**		
Semester: III	**Credits : 4**	**CIA: 50 Marks**	**ESE: 50 Marks**

	(Common to all UG Programmes)		
Course Objective	On successful completion of the course the students to learn various mathematical applications in industries, decision making for real time environment		
Course Category	**Skill Development**		
Development Needs	**Global**		
Course Description	Operations research is an analytical approach of problem-solving skill and Decision-making that is useful in the management of organizations.		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Classify different OR models and knowing their advantages in decision making environment	Group learning / Lectures	Assignment
CO 2	Recognize and formulate transportation, assignment problems and derive their optimal solution.	Peer Teaching / Lectures	Unit Test
CO 3	Gain knowledge about Game theory and replacement models.	Lectures / Tutorial	Seminar
CO 4	Outlining the Queuing Theory concepts.	Group learning / Lectures	Assignment
CO 5	Construct Network models (PERT & CPM) for scheduling the project.	Video Lectures / Lectures	Quiz

Offered by	**Mathematics**

Course Content	**Instructional Hours / Week : 5**

Unit	Description	Text Book	Chapters
I	Linear programming – Mathematical Formulation-Solving LPP using Graphical Method-Canonical and Standard form of LPP .	1	2, 3
	Simplex Method - Big-M Method, Principles of Duality.	1	4, 5
	Instructional Hours		**15**
Suggested Learning Methods : Problem Solving Practice			**02 Hrs**
II	**Transportation Problems**: Introduction – Initial Basic Feasible solutions – Balanced Transportation Problem : North West Corner Rule, Least Cost Method , Vogel's Approximation Method - Unbalanced Transportation Problem- Optimality – MODI Method (Non Degeneracy).	1	10
	Assignment Problem: Introduction – Hungarian Assignment method – Maximization in Assignment problem - Unbalanced Assignment problem- Travelling salesman problem.	1	11
	Instructional Hours		15
Suggested Learning Methods : Seminar			**02 Hrs**

III	**Game Theory:** Concept of Pure and Mixed Strategies – Solving 2 x 2 matrix with and without saddle point - n x 2 & 2 x m games by Graphical Method - Dominance Property.	1	17
	Replacement models: Elementary Replacement Models - Present Value - Rate of Return - Depreciation - Individual Replacement – Group Replacement.	1	18
	Instructional Hours		15

Suggested Learning Methods : Group Discussion		**02 Hrs**

IV	**Queuing Theory (Derivations not included):** Introduction – Elements of Queuing System – Operating Characteristics of Queuing systems – Probability Distributions in Queuing Systems - Birth death process.	1	20
	Classification of Queuing Models: Single Server - finite and infinite population models. (Model I , Model II & Model III) – Problems only.	1	20
	Instructional Hours		15

Suggested Learning Methods : https://youtu.be/xGkpXk-AnWU		**02 Hrs**

V	**Network Scheduling:** Critical Path Method – Principles of Network Construction: Forward Pass – Backward Pass computations – Types of Floats - Practical Problems in Networking Methods. **PERT:** Critical Path – Probability of completion of project-Difference between PERT and CPM.	1	21
	Instructional Hours		15

Suggested Learning Methods : Problem Solving Practice		**02 Hrs**
	Total Hours	75 Hrs

Text Books	1.Kanti Swarup, P.K. Gupta, Man Mohan, **Operations Research,** S. Chand & Sons, 1997.
Reference Books	1.Hamdy A Taha, **Operations Research – An introduction,** Prentice Hall of India PVT.LTD, 8th edition, 2008. 2.J. K. Sharma, **Operations Research Theory and Applications**, MacMillan India Ltd, 2008.
Web. URLs	1. https://youtu.be/4U3B5lr-MqM.(Introduction to OR) 2.https://www.youtube.com/watch?v=2AOhCWhwOKo (PERT concepts)

Tools for Assessment (50 Marks)						
CIA I	CIA II	Model	Seminar	Assignment	Periodical Quizzes	Total
8	**8**	**10**	**8**	**8**	**8**	**50**

Mapping												
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1													
CO2													
CO3													
CO4													
CO5													

H-High; M-Medium; L-Low

Course designed by	**Verified by**

Course Code	Title		
22U4ITZ301	**Skill Based Paper I: Case Tools Lab**		
Semester: III	**Credits: 3**	**CIA: 30 Marks**	**ESE: 45 Marks**

Course Objective	1. To enable the students to get better understanding and knowledge in the field of CASE tools. 2. To gain practical knowledge on developing case tools 3. To develop UML diagrams for the real time problems
Course Category	Employability, Skill Development
Development Needs	Global
Course Description	The case tool techniques focus in the automation of the entire information systems development life cycle process using a set of integrated software tools, such as modelling, methodology and automatic code generation.

Course Outcomes		**Teaching Methods**	**Assessment Methods**
CO 1	Prepare the Problem Statement and Requirement Specification for the given Problem.	Demonstration Method	Laboratory Experiments
CO 2	Create ERD And DFD for the specification using CASE TOOLs.		
CO 3	Design a Software using USE CASE and activity Diagrams		
CO 4	Generate Code from the Class diagram using CASE Tools		
CO 5	Analyze the architecture of the software using the Component and DeploymentDiagram		

Offered by	**Information Technology**

Course Content	**Instructional Hours / Week : 4**

Programme	**Description**

For the Following Real time Systems (Any 3)
   a) Payroll Processing System
   b) Student MIS
   c) Library Management System
   d) Hostel Management System
   e) ATM Management System
   f) Hospital Management System
   g) Stock Maintenance System
   h) Online Ticket Reservation System
   i) Platform Assignment System
   j) E-Mail Client Management System	

1	Write the complete problem statement

2	Write the software requirement specification document	
3	Draw the entity relationship diagram	
4	Design DFD for real time problem	
5	Draw use-case diagrams	
6	Draw the activity diagram for the given application	
7	Construct state chart and sequence diagram for use-case	
8	Assign objects in sequence diagram to classes and generate the class diagram and convert into JAVA/VB CODE	
9	Draw the Component Level Diagram	
10	Draw the Deployment Diagram	

	Instructional Hours	**75**

Tools for Assessment (30 Marks)						
Application of Logic	**Program Creativity**	**Program Debugging**	**Test 1**	**Test 2**	**Observation Note Book**	**Total**
5	**5**	**5**	**6**	**6**	**3**	**30**

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	H	H	L	M	H	L	M	H	H	H	H	M	M
CO2	H	H	L	M	H	L	M	H	H	H	H	M	M
CO3	H	H	L	M	H	L	M	H	H	H	H	H	H
CO4	H	H	L	M	H	L	M	H	H	H	H	H	H
CO5	H	H	L	M	H	L	M	H	H	H	H	H	H

H-High; M-Medium; L-Low

Course designed by	**Verified by**

Course Code	Title		
22U3ITC404	**Core Paper X: Computer Networks**		
Semester: IV	**Credits: 4**	**CIA: 50 Marks**	**ESE: 50 Marks**

Course Objective	To inculcate knowledge on Networking concepts and technologies like Wireless, Broadband and Bluetooth.
Course Category	Employment and Skill Development
Development Needs	Global
Course Description	To learn the fundamentals of networking systems, their architecture, function and operation and how those fundamentals are reflected in current network technologies.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand about network hardware, software and uses of computer networks	Flipped Classroom	Just a Minute Presentation
CO 2	Understand Guided Transmission Media, Wireless Transmission, and Communication Satellites	Video Lectures	Seminar
CO 3	Understand error detection and correction, elementary data link protocol and Routing algorithms	Brainstorming	Assignment
CO 4	Understand and Identify the applications of application layer and network security	Interactive Lecture	Poster Presentation
CO 5	Understand the importance of applications layer and cryptography	Lecture / Class Projects	Quiz

Offered by	Information Technology

Course Content	Instructional Hours / Week : 5

Unit	Description	Text Book	Chapters
I	**Uses of computer networks**: Business Applications- Home Applications - Mobile Users - and Social Issues. **Network Hardware**: Personal Area Networks - Local Area Networks - Metropolitan Area Networks - Wide Area Networks, Internetworks. **Network software**: Protocol Hierarchies - Design Issues for the Layers - Connection-Oriented Versus Connectionless Service - Service Primitives - the Relationship of Services to Protocols - **Reference Models**: The OSI Reference Model - The TCP/IP Reference Model – A Comparison of the OSI and TCP/IP Reference Models.	1	1
	Instructional Hours		**18**
Suggested Learning Methods: Just a Minute Presentation			**02 Hrs**

II	**Physical Layer** - **Guided Transmission Media**: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. **Wireless Transmission**: Electromagnetic Spectrum –Radio Transmission – Microwave Transmission – Infrared and Millimeter Waves – Light Waves. **Communication Satellites**: Geostationary - Medium-Earth Orbit - Low Earth- orbit Satellites – Satellites versus Fiber.	1	2
	Instructional Hours		**18**
Suggested Learning Methods : Seminar			**02 Hrs**
III	**Data link Layer:** Services Provided to the Network Layer – Framing- Error Control - Flow Control. **Error detection and Correction:** Error-Correcting Codes - Error-Detecting Codes. **Elementary data link Protocols**: A Utopian Simplex Protocol- A Simplex Stop-and-Wait Protocol for an Error-Free Channel- A Simplex Stop-and-Wait Protocol for a Noisy Channel. **Sliding Window Protocols:** One-Bit sliding window protocol – A protocol using Go-Back-N – A Protocol using Selective Repeat.	1	3
	Instructional Hours		**18**
Suggested Learning Methods : Assignment			**02 Hrs**
IV	**Network layer: Routing algorithm**-The Optimality Principle, Shortest Path Algorithm, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Anycast Routing, Routing for Mobile Hosts, Routing in Ad Hoc Networks, **Transport layer: Elements of transport protocols**-Addressing, Connection Establishment, Connection Release, Error Control and Flow Control, Multiplexing, Crash Recovery **The Internet Transport Protocols UDP**: Introduction to UDP. TCP- Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, TCP Connection Management Modeling, TCP Sliding Window, TCPTimerManagement, TCP Congestion Control.	1	5,6
	Instructional Hours		**18**
Suggested Learning Methods : Poster Presentation			**02 Hrs**
V	**Application layer:** DNS - The Domain Name System, The DNS Name Space, Domain Resource Records, Name Servers, **Electronic mail**-Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery, **Network Security: Cryptography**-Introduction to Cryptography, Substitution Ciphers, TranspositionCiphers,One-Time Pads, Two Fundamental Cryptographic Principles.	1	7,8
	Instructional Hours		**18**
Suggested Learning Methods : Quiz			**02 Hrs**
	Total Hours		**75 Hrs**
Text Books	1. Andrew S. Tanenbaum; Computer Networks, 4th Edition, PHI		

Reference Books	1. Achyut Godbole, Data Communication and Networks, 2007,TMH. 2. Uyless Black, Computer Networks: Protocols, Standards, and Interfaces, 2nd ed.,PHI
Web. URLs	www.w3schools.com//computer_networks.html

Tools for Assessment (50 Marks)						
CIA I	**CIA II**	**CIA III**	**Class Participation**	**Assignment**	**Quiz**	**Total**
8	**8**	**10**	**8**	**8**	**8**	**50**

Mapping												
CO \ PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**	**PSO 4**	**PSO 5**
CO1	H	M	M	H	H	H	M	H	M	H	H	M	M
CO2	M	M	H	M	M	H	M	M	H	H	M	M	M
CO3	M	L	L	H	M	L	M	L	M	H	H	H	H
CO4	M	M	M	L	L	H	M	L	H	M	H	H	M
CO5	H	L	M	H	M	M	L	H	H	M	H	H	M

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3CKC406	**Core Paper XI: RDBMS and MySQL**		
Semester: IV	**Credits: 4**	**CIA: 50 Marks**	**ESE: 50 Marks**

Course Objective	To inculcate fundamental knowledge in RDBMS concepts and designed for students to writing SQL queries using MySQL.
Course Category	Skill Development
Development Needs	Global
Course Description	The course gives introduction to the fundamentals of MySQL and relational databases using database programming techniques emphasizing database structures, modelling, and database access.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	List and explain the fundamental concepts of a relational database system	Lecture / Flipped Classroom	Assignment
CO 2	Explain the basic concepts of relational data model, entity-relationship model and relational database design	Constructivist Approach/ Tutorial	Seminar
CO 3	Improve the database design by normalization	Lectures / Video Lessons	Quiz
CO 4	Understanding of SQL syntax used with MySQL	Tutorial / Case Studies	Program Execution
CO 5	Explain the basic functions of MySQL database program	Lecture / Class Projects	Program Execution

Offered by	Information Technology

Course Content	Instructional Hours / Week : 6

Unit	Description	Text Book	Chapters
I	**Introduction:** Introduction to DBMS – Information-Data and Data Management-File-based data management – Database System - DBMS - Components of a DBMS- Database User-Database Architecture and Design- Data Abstraction - Physical and Logical Data Independence	**1**	1, 2
	Instructional Hours		**15**
Suggested Learning Methods : **Video lectures**			**02 Hrs**
II	**Data Models:** Data Models-Introduction-Conceptual, Physical Models-Hierarchical Model - Network Model-Relational Model – E-R Model **Entity – Relationship (E-R) Modeling:** Introduction – E-R Model -　Components of an E-R Model-Relationships-Relationships, E-R conventions- Composite Entities - Entity List-E-R diagrams, E-R Modeling Symbols	1	3, 4

			Instructional Hours	**15**
Suggested Learning Methods :				**02 Hrs**
III	**Data Integrity, Constraints and Normalization:** Introduction-Integrity Constrains - Normalization-Keys-Relationships-Normalization - Keys-Relationships-First Normal Form(1NF)-Second Normal form(2NF) -Third Normal Form(3NF)- Boyce-Codd Normal Form (BCNF)		1	7, 9
			Instructional Hours	**15**
Suggested Learning Methods : Develop small programmes using tuples				**02 Hrs**
IV	**MySQL:** Introduction to MySQL - Identifier in MySQL - Creating a Database - Selecting Database-Creating Tables-Data Types in in MySQL-Using INSERT-Using DELETE-Using Truncate - Using Update-Overview of SELECT - Simple Queries - Selecting Particular Column - Using WHERE Clause to Select particular Rows-Using GROUPBY Clause -HAVING - ORDER BY – LIMIT.		2	4, 5
			Instructional Hours	**15**
Suggested Learning Methods : Apply the programs in the Python Software				**02 Hrs**
V	**MySQL Queries and Functions:** Using Joins to Run Queries over Multiple table-Understanding the different Join Types-Operator in My SQL-Control Flow functions-String Functions-Numeric Function-Date and Time Functions **PL/SQL Concepts :** Cursors, Stored Procedures, Database Triggers		2	7, 8
			Instructional Hours	**15**
Suggested Learning Methods : Laboratory practice				**02 Hrs**
			Total Hours	**90 Hrs**

Text Books	1. Alexis Leon and Mathews Leon 'Fundamentals of database Management Systems', Vijay Nicole Imprints Private Limited, Chennai, 2006. 2. Luke Welling and Laura Thomson ,'My SQL Tutorial, Pearson Education, First Edition,2006 **Unit I:** Sections: 1.1 to 1.4, 2.1 to 2.4 (Chapter 1 and 2) **Unit II:** Sections: 3.1 to 3.7, 4.1 to 4.10 (Chapter 3 and 4) **Unit III:** Sections: 7.1 to 7.3, 9.1, 9.5 to 9.12 (Chapter 7 and 9) **Unit IV:** Section: 4.1 to 4.9, 5.1 to 5.6 (Chapter 4 and 5) **Unit V:** Sections: 7.1 to 7.3, 8.1 to 5.5 (Chapter 7 and 8)
Reference Books	1. Abraham Silberschatz , Henry F.Korth and S.Sudarshan,'Database System Concepts', Tata Mc Graw Hill,Sixth Edition,2013. 2. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Eight Edition, Pearson Education, 2006. 3. Hugh E. Williams, Saied M.M. Tahaghoghi ,'Learning MySQL',O'Reilly Media, Inc ,Second Edition ,2006
Web. URLs	www.mysql.com

Tools for Assessment (50 Marks)						
CIA I	**CIA II**	**CIA III**	**Assignment**	**Seminar**	**Quiz**	**Total**
8	**8**	**10**	**8**	**8**	**8**	**50**

CO \ PO	PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO 4	PSO 5
Mapping													
CO1	H	H	L	M	H	L	M	H	H	H	H	M	M
CO2	H	H	L	M	H	L	M	H	H	H	H	M	M
CO3	H	H	L	M	H	L	M	H	H	H	H	H	H
CO4	H	H	L	M	H	L	M	H	H	H	H	H	H
CO5	H	H	L	M	H	L	M	H	H	H	H	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3ITP404	**Core Paper XII: Practical in RDBMS and MySQL**		
Semester: IV	**Credits: 4**	**CIA: 50 Marks**	**ESE: 50 Marks**

Course Objective	To make the students to understand Relational Database Management System concepts using Oracle and able to do the various operations on Tables.
Course Category	Employability, Skill Development
Development Needs	Global
Course Description	The course focuses on the basic concepts of relational database scheme and it analyses the relational data model with optimal and feasible solutions.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Remember to transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a RDBMS.	Demonstration Method	Laboratory Experiments
CO 2	Understand the processes of Database Development and Administration using SQL and PL/SQL.		
CO 3	Apply the Programming and Software Engineering skills and techniques using SQL.		
CO 4	Analyze the relational data model with optimal and feasible solutions		
CO 5	Evaluate the Optimal Solutions		

Offered by	**Information Technology**

Course Content	**Instructional Hours / Week : 6**

Programme	Description
1	Create a table for Employee details with Employee Number as primary key and following fields: Name, Designation, Gender, Age, Date of Joining and Salary. Insert at least ten rows and perform various queries using any one Comparison, Logical, Set, Sorting and Grouping operators.
2	Create tables for library management system which demonstrate the use of primary key and foreign key. Master table should have the following fields: Accno, Title, Author and Rate. Transaction table should have the following fields: User id, Accno, Date of Issue and Date of Return. Create a Report(Select verb) with fields Accno, Title, Date of Issue for the given Date of Return with column formats.
3	Write a PL/SQL to update the rate field by 20% more than the current rate in inventory table which has the following fields: Prono, ProName and Rate. After updating the table a new field (Alter) called for Number of item and place for values for the new field without using PL/SQL block.
4	Write a PL/SQL program to check whether given string is palindrome or not
5	Write a PL/SQL program to find factorial of numbers using function and procedure.
6	Create a PL/SQL Program to perform updation using various triggers.

7	Create a database trigger to implement on master and transaction tables which are based on inventory management system for checking data validity. Assume the necessary fields for both tables.
8	Write a PL/SQL to split the student table into two tables based on result (One table for ―Pass and another for ―Fail). Use cursor for handling records of student table.
9	Write a PL/SQL to raise the exceptions in Bank Account Management table
10	Write a PL/SQL to handle package
11	Write a PL/SQL Cursor for referencing fields in a record
12	Write a PL/SQL trigger for entering mark in the student table

		Instructional Hours	**90**

Tools for Assessment (50 Marks)

Application of Logic	Program Creativity	Program Debugging	Test 1	Test 2	Observation Note Book	Total
8	8	8	10	10	6	50

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	H	H	L	M	H	L	M	H	H	H	H	M	M
CO2	H	H	L	M	H	L	M	H	H	H	H	M	M
CO3	H	H	L	M	H	L	M	H	H	H	H	H	H
CO4	H	H	L	M	H	L	M	H	H	H	H	H	H
CO5	H	H	L	M	H	L	M	H	H	H	H	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3ITA404	**Allied Paper IV: Robotics**		
Semester: IV	**Credits: 4**	**CIA: 50 Marks**	**ESE: 50 Marks**

Course Objective	To gain knowledge about Robots and its applications in real time environment.
Course Category	Skill Development
Development Needs	Global
Course Description	This course covers a variety of multidisciplinary topics necessary to understand the fundamentals of designing, building, and programming robots

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the basics of robot's family tree	Video Lectures	Assignment
CO 2	Describing the robots in real time	Tutorial	Poster Presentation
CO 3	Applications of robots	Lectures / Video Lessons	Quiz
CO 4	Correlating the robots with the society	Tutorial / Case Studies	Group Discussion
CO 5	Analyze the biological foundations of the reactive paradigm	Lecture / Class Projects	Seminar

Offered by	**Information Technology**

Course Content	**Instructional Hours / Week : 5**

Unit	Description	Text Book	Chapters
I	The Robot Family Tree: The First Robots – Computers – Factory Automation – Machine Tools – Industrial Robots – Fictional Robots – Modern Fictional Robots Anatomy of a Robot: The Human Body – and a Robot's Body – Arms and Hands – Moving Around – Sensors – The Brain – Robot School Teaching Robots to be Robots – From Master-Slave to Androids	**1**	1,2
	Instructional Hours		**9**
Suggested Learning Methods : Video lectures on the basics of Robot Family Tree			**02 Hrs**
II	Robots at Work Today: Factory Robots – Flexible Manufacturing Systems – Service Industry – Robot Delivery Systems – Working in Hazardous Environments – TOMCAT Live Electric Transmission Line Maintenance – Coal Mining – Security Robots – Underwater Robots – Medicine and Health – Why aren't there more Robots at Works? Artificial Intelligence: What does the human brain do? – expert systems – Uncertainty – Talking to intelligent systems – computer forAI.	1	3,4
	Instructional Hours		**9**
Suggested Learning Methods : Poster Presentation			**02 Hrs**

III	Intelligent and Advanced Robots: Are there Intelligent Robots? – How Smart should Robots be? – Artificially Intelligent Robots – Planning – Intelligent Teaching and Learning – Introspection – Better Robot Bodies – Advanced Tele operation – Advanced Sensing – Telepresence – Brainless, but Intelligent Robots – Microro bots Robots in Space: Robots on the U.S.Space Station Robots for Exploring the Mars Surface – Space Robots Beyond the Mars mission.	1	5,6

	Instructional Hours	**9**
Suggested Learning Methods : Quiz		**02 Hrs**

IV	Robots, Society – and you: Working Safely with Robots – The "Three laws of Robotics: Revisited – Will Robots Replace People in the Workplace" – Robotics and U.S. Industry – Living Robots? – Robots up Close – Building a Robot	2	7

	Instructional Hours	**9**
Suggested Learning Methods : Group Discussion		**02 Hrs**

V	Biological Foundations of the Reactive Paradigm: Overview – why Explore the Biological Scientist Agency and Computational Theory – What are Animal Behaviors – Reflective Behaviors – Coordination and Control of Behaviors – Innate Releasing Mechanisms –Concurrent Behaviors Perception in Behaviors – Action – Perception Cycle – Two Functions of Perception – Gibson: Ecological Approach – Neisser: Two Perceptual Systems Schema Theory – Behaviors and Scheme Theory – Principles and Issues in Transferring insights to Robots	2	3

	Instructional Hours	**9**
Suggested Learning Methods : Seminar		**02 Hrs**
	Total Hours	**75 Hrs**

Text Books	1. Ellen Thro, "Robotics the Marriage of Computers and Machines", Universities Press, 2000. 2. Robin. R. Murphy, "Introduction to AI Robotics", PHI,2007
Reference Books	1. King-sun Fu, C.S George Lee, Ralph Gongzalez, "Robotics: Control, Sensing, Vision and Intelligence", Third Edition, 1987.
Web. URLs	www.builtin.com/robotics

Tools for Assessment (50 Marks)

CIA I	CIA II	CIA III	Class Participation	Assignment	Quiz	Total
8	8	10	8	8	8	50

Mapping

CO \ PO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PSO 1	PSO2	PSO 3	PSO 4	PSO 5
CO1	H	M	H	M	H	H	M	H	H	M	H	H	H
CO2	H	M	H	M	H	M	H	M	M	H	L	H	L
CO3	H	H	M	H	M	L	M	L	H	H	M	H	H
CO4	M	H	L	M	H	H	M	H	M	M	H	M	H
CO5	M	M	H	H	M	H	M	M	M	M	M	M	M

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
21U4ITZ301 / 22U4ITZ402	**Skill Based Paper II: Practical in Multimedia**		
Semester: IV	**Credits: 3**	**CIA: 30 Marks**	**ESE: 45 Marks**
Course Objective	To enable the students to know the fundamental tool of image editing software and make them to apply in real world business.		
Course Category	Employability, Skill Development		
Development Needs	Global		
Course Description	This course examines the different tools and scripting techniques in GIMP		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the basics of GIMP		
CO 2	To transform a photograph to drawing	Demonstration Method	Laboratory Experiments
CO 3	To work with tools		
CO 4	To work with scripting		
CO 5	To work with animations		

Offered by	**Information Technology**

Course Content	Instructional Hours / Week : 4

Progra mme	Description
1	Create Sun Flower
2	Animate Plane flying in the Clouds
3	Create Plastic Surgery for the Nose
4	Create See-through text.
5	Create a Web Page
6	Convert Black and White Photo to Color Photo
7	Design a visiting card containing at least one Graphic and text information.
8	Create an animation to represent the growing Moon.
9	Create an animation to indicate a ball Bouncing on steps
10	Simulate movement of a cloud
11	Display the background given (filename: Tulip.jpg) through your name
12	Create an animation with the following features. Welcome * letters should appear one by one * the fill color of the text should change to a different color after**.**
	Instructional Hours **60**

Tools for Assessment (30 Marks)						
Application of Logic	Program Creativity	Program Debugging	Test 1	Test 2	Observation Note Book	Total
5	5	5	6	6	3	30
Mapping						

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	L	H	H	H	H	H	S	H	H	M
CO2	M	M	M	M	H	M	M	M	H	H	H	M	M
CO3	H	M	M	H	M	M	L	H	H	S	H	H	H
CO4	L	H	L	M	H	H	H	M	H	M	S	H	H
CO5	M	M	H	H	M	H	M	H	H	M	H	H	S

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3CKC509	**Core Paper XIII: PHP Programming**		
Semester: V	**Credits: 4**	**CIA: 50 Marks**	**ESE:50 Marks**
Course Objective	To acquire fundamental knowledge for web development using PHP.		
Course Category	Employability/Skill Development		
Development Needs	Global/National /Local/Regional		
Course Description	To understand the conceptsof PHP Programming and develop webpage.		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Recognize the basic development concepts of PHP	Lecture	Group Discussion
CO 2	Write a simple program using conditional statements	Tutorial	Quiz
CO 3	Understand the concepts of functions and arrays	Video Lessons	Seminar
CO 4	Use of Functions, Classes and files	Demonstration	Seminar
CO 5	Construct a simple database program for adding and modifying records	Video Lessons	Assignment

Offered by	Computer Science

Course Content	Instructional Hours / Week : 5

Unit	Description	Text Book	Chapters
I	Introducing PHP – Basic development Concepts-Creating first PHP Scripts. Using Variable and Operators - Storing Data in variable – Understanding Data types –Setting and checking variables Data types.	**1**	1,2
	Instructional Hours		**15**
Suggested Learning Methods: Group Discussion			**03 Hrs**
II	Using Constants-Manipulating variables with operators. **Controlling Program Flow:** Writing Simple Programs. Conditional Statements-Writing more complex Conditional Statements – Repeating Action with Loops	1	2,3
	Instructional Hours		15
Suggested Learning Methods: Quiz			**03 Hrs**
III	Working with String and Numeric Functions - **Working with Arrays:**Storing Data in Arrays - Processing Arrays with Loops and Iterations –Using Arrays with Forms – Working with Array Functions-Working with Dates and Times.	1	4
	Instructional Hours		15
Suggested Learning Methods : Seminar			**03 Hrs**
IV	**Using Functions and Classes:** Creating User-Defined Functions-Creating Classes. **Working with Files and Directories:** Reading Files –Writing Files.	1	5, 6
	Instructional Hours		15

Suggested Learning Methods : Seminar		**03 Hrs**

V	**Working with Database and SQL:** Introducing Database and SQL - Using MySQL - Adding and modifying Data - Handling Errors. cookies – working with sessions. Working with XML	1	7,28

	Instructional Hours	15

Suggested Learning Methods : Assignment		**03Hrs**

	Total Hours	75 Hrs

Text Books	1. VikramVaswani,**PHP A Beginner's Guide**, Tata McGraw-Hill Publishing Company Limited, 1stEdition, New Delhi, 2010. 2. Julie C.Meloni, **PHP, MYSQL and Apache**, Pearson Education,2009
Reference Books	1. Steven Holzner, **The PHP Complete Reference**, Tata McGraw-Hill Publishing Company Limited, 1st edition New Delhi, 2010. 2. Steven Holzer, **Spring in to PHP5**, Tata McGraw-Hill Publishing Company Limited,1stedition New Delhi, 2010.
Web. URLs	1. **https://www.w3schools.com/php/php_intro.asp** 2. **https://www.tutorialspoint.com/php/index.htm**

Tools for Assessment (50 Marks)						
CIA I	**CIA II**	**CIA III**	**Class Participation**	**Assignment**	**Seminar**	**Total**
8	8	10	8	8	8	50

Mapping												
CO \ PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	M	H	M	M	H	M	H	M	H	M	M	H
CO2	M	M	H	H	H	H	M	H	M	H	H	H	H
CO3	M	H	H	H	H	H	H	H	H	H	H	H	H
CO4	M	H	H	H	H	S	H	H	H	H	H	H	S
CO5	H	H	H	M	H	S	H	H	H	H	M	H	S

H-High; M-Medium; L-Low

Course designed by	**Verified by**

Course Code	Title		
22U3CKC510	**Core Paper XIV: Artificial Intelligence**		
Semester: V	**Credits: 3**	**CIA: 30 Marks**	**ESE: 45 Marks**

Course Objective	To understand how Artificial Intelligence used as a Problem Solving technique in real world.		
Course Category	Employability, Entrepreneurship		
Development Needs	Global		
Course Description	The Artificial Intelligence course syllabus is aimed to impart knowledge about networks, algorithms, and programming skills to create algorithms capable of human-like solutions.		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Knowledge about overview of Artificial Intelligence	Lecture / Flipped Classroom	Assignment
CO 2	Gain Knowledge about Problem Solving methods	Construct visit Approach/ Tutorial	Seminar
CO 3	Apply Knowledge and reasoning to the problem	Lectures / Video Lessons	Quiz
CO 4	Analyze how to use reasoning methods by constructing plans	Tutorial / Case Studies	Program Execution
CO 5	Evaluate methods of Knowledge Generation using Learning	Lecture / Class Projects	Program Execution

Offered by	**Information Technology**		

Course Content		**Instructional Hours / Week : 5**	

Unit	Description	Text Book	Chapters
I	I **Introduction:** What is AI? - The foundation of AI – AI Problems. Intelligent Agent: Introduction-How Agent should act-Structure of Intelligent Agent	**1 2**	1,2
		Instructional Hours	**18**
Suggested Learning Methods : Assignment			**02 Hrs**
II	**Problem Solving by searching:** Problem Solving Agents-Formulating Problems-Examples: 8 queens problem. Search Strategies- Game Playing: Minim ax-Alpha-Beta Pruning.	1	3,5
		Instructional Hours	**18**
Suggested Learning Methods : Seminar			**02 Hrs**

III	**Knowledge and Reasoning:** A Knowledge based agent-Representation, Reasoning and Logic.Propositional Logic-Very simple Logic- Introduction toFirst Order Logic.	1	6,7
	Instructional Hours		**18**

Suggested Learning Methods : Quiz			**02 Hrs**
IV	**Planning:** A simple planning agent – From Problemsolving to Planning – Basic Representation of Planning– A partial Order Planning Algorithm- Example**.**	1	11
	Instructional Hours		**18**

Suggested Learning Methods : Program Execution			**02 Hrs**
V	**Learning:** A General model of Learning Agent – Inductive Learning – Learning from Decision Trees.	1	18
	Instructional Hours		**18**

Suggested Learning Methods : Program Execution		**02 Hrs**
	Total Hours	**75 Hrs**

Text Books	1. Stuart J.Russell, Peter Norvig, Artificial Intelligence – A Modern Approach, Prentice Hall Incorporation. 2.Elaine Rich, Kevin Knight, Shivasankar B. Nair, Artificial Intelligence, 3rd Edition, Tata-McGraw, 2009.
Reference Books	1.Deepak Khemani, A First course in Artificial Intelligence, McGraw Hill Education Pvt Ltd,2013.
Web. URLs	

Tools for Assessment (30 Marks)

CIA I	CIA II	CIA III	Class Participation	Assignment	Semi nar	Total
4	**4**	**7**	**5**	**5**	**5**	**30**

Mapping

CO \ PO	PO 1	PO2	PO3	PO4	PO 5	PO6	PO7	P O8	PSO1	PSO2	PSO3	PS O4	PSO 5
CO1	H	M	H	M	H	M	L	L	H	H	H	M	H
CO2	H	M	H	M	H	M	M	M	H	M	H	H	H
CO3	H	M	M	H	M	M	H	H	H	H	M	H	H
CO4	H	M	H	M	H	M	L	L	H	H	M	H	H
CO5	H	M	H	M	H	M	H	M	H	H	H	M	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3ITP505	**Core Paper XV: PHP Programming Lab**		
Semester: V	**Credits: 4**	**CIA: 50 Marks**	**ESE:50 Marks**
Course Objective	To acquire fundamental knowledge web development using PHP.		
Course Category	Skill Development /Employability		
Development Needs	Global/Local		
Course Description	To development skill set in Machine Learningand apply the concepts to develop applications in order to meet the Local and Global needs		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Develop the program for control structure and functions	Program Demonstration	Program Creativity
CO 2	Implement the concepts of string and Arrays	Program Demonstration	Debugging
CO 3	Create a simple database program for student information	Program Demonstration	Application of Logic
CO 4	Develop simple program to import Gen bank and finding of mutations	Program Demonstration	Program Development
CO 5	Create a program for Concatenating DNA Fragments Transcription	Program Demonstration	Program Development

Offered by	**Computer Science(Data Science)**

Course Content	**Instructional Hours / Week : 6**
Program List	

1. Write a PHP program to illustrate Conditional and Looping Statements.

2. Write a PHP program to demonstrate Array Functions, string, numeric and date functions.

3. Write a PHP program to create user defined functions.

4. Write a PHP program for file creation and file manipulation.

5. Write a PHP program for creating sessions.

6. Write a PHP program for creating cookies

7. Create a Simple application using forms in PHP

8. Write a PHP program for creating tables with constraints and demonstrate table join.

9. Write a PHP program for Database connectivity, Create, Insertion, Updating and Deleting rows in MySQL tables

10. Write a PHP program for sorting and searching a data.

11. Write a PHP Program to illustrate the usage of subqueries, aggregate functions, set operators.

12. Write a PHP program to create a simple web page. Validate the Input and apply appropriates to format the output.

Solving Case studies and Program development	10 hrs
Total Hours	**90** Hrs

Tools for Assessment (50 Marks)

Laboratory Performance- Application of Logic	Laboratory Performance- Program Creativity	Laboratory Performance- Program Debugging	Test 1	Test 2	Observation Note Book	Total
8	8	8	10	10	6	50

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	H	H	M	H	S	H	H	S	H	H	M
CO2	H	S	H	H	M	H	S	H	H	S	H	H	M
CO3	H	S	H	H	H	H	S	H	H	S	H	H	H
CO4	H	S	H	H	H	H	S	H	H	S	H	H	H
CO5	H	S	H	H	H	H	S	H	H	S	H	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3ITP506	**Core Paper XVI: Practical in Web Technology**		
Semester: V	**Credits: 3**	**CIA: 30 Marks**	**ESE: 45 Marks**

Course Objective	Students will acquire the skill to choose the technology to use based on the requirements and functionality of the web site.
Course Category	Employability, Skill Development
Development Needs	Global
Course Description	This course supports exploration in careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	To develop an ability to design and implement static and dynamic	Demonstration Method	Laboratory Experiments
CO 2	To develop HTML pages with the help of frames, scripting languages, and evolving technology like DHTML,XML.		
CO 3	Able to work with CSS		
CO 4	Analyze different types of features in XML		
CO 5	Able to design web site		

Offered by	**Information Technology**

Course Content	Instructional Hours / Week : 4

Progra mme	Description
1	Create Web Page and apply background color, text color, horizontal rules andspecial characters.
2	Create Web Page and include images with different alignment and wrapped text
3	Create tables and format tables using basic table tags and different attributes.
4	Create a frameset that divides browser window into horizontal and verticalframesets.
5	Create Web Page and apply style rules using CSS.
6	Create Web Page including control structures using JavaScript.
7	Develop and demonstrate the usage of inline and external style sheet using CSS.
8	Write an HTML page including any required JavaScript that takes a number from one text field in the range of 0 to 999 and shows it in a another text field in words. If the number is out of range, it should show "out of range" and if it is not a number, it should show "not a number" message in the result box.
9	Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, words and lines in the text entered using an alert message. Words are separated with a white space and lines are separated with new line character.

10	Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (colour, bold and font size).
11	Write a java script to validate the following fields in a registration page 1. Name (should contains alphabets and the length should not be less than 6 characters) 2. Password (should not be less than 6 characters) 3. E-mail(should not contain invalid addresses)
12	Design a web page using CSS which includes the following: 1) Use different font styles 2) Set background image for both the page and single elements on page. 3) Control the repetition of image with background-repeat property 4) Define style for links as a: link, a:active, a:hover, a:visited 5) Add customized cursors for links. 6)Work with layers.

	Instructional Hours	**60**

Tools for Assessment (30 Marks)

Application of Logic	Program Creativity	Program Debugging	Test 1	Test 2	Observation Note Book	Total
5	**5**	**5**	**6**	**6**	**3**	**30**

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	H	M	H	M	H	M	H	M	H	M	H	H	H
CO2	H	M	H	M	H	M	M	M	H	M	H	H	M
CO3	H	M	M	H	M	M	H	H	M	H	H	M	H
CO4	H	M	H	M	H	M	L	L	M	M	H	H	M
CO5	H	H	M	M	M	L	H	H	H	M	H	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title			
22U3CKE501	Elective Paper I : Block Chain Technology			
Semester: V	Credits: 4	CIA: 50 Marks		ESE:50 Marks

Course Objective	To understand the Block chain technology and explain about the Block chain technology Techniques.
Course Category	Employability/Skill Development
Development Needs	Global/National /Local/Regional
Course Description	To understand the concepts of Block chain technology and its Techniques.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand emerging abstract models for Block chain Technology.	Poster Presentation	Group Discussion
CO 2	Identify major research challenges and technical gaps existing between theory and practice in crypto currency domain.	Just a Minute Presentation	Group Discussion
CO 3	It provides conceptual understanding of the function of Block chain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable.	Video Lectures	Assignment
CO 4	Apply hyper ledger Fabric and Etheric platform to implement the Block chain Application.	Demonstration	Seminar
CO 5	Understand the role of Block chain technology	Video Lessons	Seminar

Offered by	Computer Science

Course Content	Instructional Hours / Week : 6

Unit	Description	Text Book	Chapters
I	**INTRODUCTION TO BLOCKCHAIN** Block chain- Public Ledgers, Blockchain as Public Ledgers -Bitcoin, Blockchain 2.0, Smart Contracts,Block in a Blockchain, Transactions-Distributed Consensus, The Chain and the Longest Chain - Cryptocurrency to Blockchain 2.0 - Permissioned Model of Block chain, Cryptographic -Hash Function, Properties of a hash function-Hash pointer and Merkle tree	1	1
	Instructional Hours		**15**
Suggested Learning Methods : Video Lectures on Introduction to blockchain			**03 Hrs**
II	**BITCOIN AND CRYPTO CURRENCY** A basic crypto currency, Creation of coins, Payments and double spending, FORTH - the precursor for Bitcoin scripting, Bitcoin Scripts , Bitcoin P2P Network, Transaction in Bitcoin Network, Block Mining, Block propagation and block relay, Consensus introduction, Distributed consensus in open environments-Consensus in a Bitcoin network	1	2
	Instructional Hours		15
Suggested Learning Methods : Video Lectures on Introduction to bitcoin scripting			**03 Hrs**
III	**BITCOIN CONSENSUS** Bitcoin Consensus, Proof of Work (PoW)- Hashcash PoW , Bitcoin PoW, Attacks on PoW ,monopoly problem- Proof of Stake- Proof of Burn - Proof of Elapsed Time - Bitcoin Miner, Mining Difficulty,		

	Mining Pool-Permissioned model and use cases, Design issues for Permissioned Blockchains, Execute contracts- Consensus models for permissioned block chain-Distributed consensus in closed environment Paxos	1	3
		Instructional Hours	15
Suggested Learning Methods : Group Discussion			**03 Hrs**
IV	**DISTRIBUTED CONSENSUS** RAFT Consensus-Byzantine general problem, Byzantine fault tolerant system-Agreement Protocol, Lamport- Shostak-Pease BFT Algorithm- BFT over Asynchronous systems, Practical Byzantine Fault Tolerance	1	5
		Instructional Hours	15
Suggested Learning Methods : Group Discussion			**03 Hrs**
V	**BLOCK CHAIN APPLICATIONS** Internet of Things-Medical Record Management System-Blockchain in Government and Block chain Security-Blockchain Use Cases –Finance	1	7
		Instructional Hours	15
Suggested Learning Methods : Apply the techniques with real time data			**03 Hrs**
		Total Hours	90 Hrs

Text Books	1. Bashir, Imran **, Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks**,2017. **Unit I:** Sections: 1.1 to 1.6 (Chapter 1) **Unit II:** Sections: 2.1 to 2.5 (Chapter 2) **Unit III:** Sections: 3.1 to 3.8 (Chapter 3) **Unit IV:** Sections: 5.1 to 5.4, 5.8 (Chapter 5) **Unit V:** Sections: 7.1 to 7.5 (Chapter 7)
Reference Books	1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. **Bitcoin and cryptocurrency technologies:A comprehensive introduction**. Princeton University Press, 2016. 2. Joseph Bonneau et al, **SoK: Research perspectives and challenges for Bitcoin and cryptocurrency**, IEEE Symposium on security and Privacy, 2015.
Web. URLs	1. https://www.investopedia.com

Tools for Assessment (50 Marks)

CIA I	CIA II	CIA III	Class Participation	Assignment	Seminar	Total
8	8	10	8	8	8	50

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	M	M	M	M	M	M	M	M	M
CO2	M	M	M	M	M	M	M	M	M	M	M	M	M
CO3	M	H	H	H	H	M	H	H	M	H	H	H	H
CO4	M	H	H	H	H	M	H	H	M	H	H	H	H
CO5	H	H	H	H	H	H	H	H	H	H	H	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3CKE502	**Discipline Specific** **Elective Paper I: Next Generation Networks**		
Semester: V	**Credits: 4**	**CIA: 50 Marks**	**ESE: 50 Marks**
(Common to B. Sc. CS / DCFS / IT / BCA)			

Course Objective	To learn the technical, economic and service advantages of next generation networks. Analyse the evolution of technologies of 4G and beyond, to explore the NGN framework catering services of end user with QoS provisioning.
Course Category	Skill Development /Employability/Entrepreneurship
Development Needs	Global
Course Description	Description about Course category and Development Needs

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Describe the issues and challenges of wireless domain in future generation network design	Smart Board	Assignment
CO 2	Explain the evolution of technologies of 4G and beyond	Video Lessons	Seminar
CO 3	Explore the LTE concepts and technologies	Smart Board	Seminar
CO 4	Outline the process of integrating SDN with LTE	Case study Assignments	Group Discussion
CO 5	Explain the NGN architectures, management and standardizations	Fishbowl Techniques	Assignment

Offered by	**Computer Applications**

Course Content	**Instructional Hours / Week : 6**

Unit	Description	Text Book	Chapters
I	**INTRODUCTION:** Evolution of public mobile services - motivations for IP based services, Wireless IP network architecture –3GPP packet data network architecture. Introduction to next generation networks - Changes, Opportunities and Challenges, Technologies, Next Generation Society, future Trends.	3 2	1, 2 1
	Instructional Hours		**18**
	Report Presentation		**2**
II	**LTE - Introduction:** Architectural Review of UMTS and GSM, History of Mobile Telecommunication Systems, Need for LTE. **Architecture of LTE Air Interface:** Air Interface Protocol Stack, Logical, Transport and Physical Channels, The Resource Grid, Multiple Antenna Transmission, Resource Element Mapping.	5	1, 6
	Instructional Hours		**18**
	Report Presentation		**2**
III	**SDMN-LTE INTEGRATION:** SDN paradigm and applications, SDN for wireless-challenges, Leveraging SDN for 5G network Ubiquitous connectivity-mobile cloud-cooperative cellular network-restructuring mobile networks to SDN-SDN/LTE integration benefits.	4	3, 4, 5, 6
	Instructional Hours		**18**
	Group Discussion		**2**

IV	**NGN ARCHITECTURE**: Evolution towards NGN-Technology requirements, NGN functional architecture- Transport stratum, service stratum, service/ content layer and customer terminal equipment function. NGN entities, Network and Service evolution - fixed, mobile, cable and internet evolution towards NGN.		1	1, 3, 4, 6
	Instructional Hours			**18**
	Group Discussion			**2**
V	**NGN MANAGEMENT AND STANDARDIZATION**: NGN requirements on Management-Customer, third party, Configuration, Accounting, performance, device and information management. Service and control management- End-toEndQoS and security. ITU and GSI-NGN releases, ETSI-NGN concept and releases, NGMN alliance and NGMN.		1	3,7,8
			2	4
	Instructional Hours			**18**
	Video Presentation			**2**
	Total Hours			**90**
Text Books	**1.** Jingming Li Salina, Pascal Salina "**Next Generation Networks-perspectives and potentials**" Wiley, January 2008. **2.** Thomas Plavyk, ―**Next generation Telecommunication Networks, Services and Management**, Wiley & IEEE Press Publications, 2010. **3.** Jyh-Cheng Chen, National Tsing Hua University, Tao Zhang, Telcordia Technologies **- "IP-Based Next-Generation Wireless Networks",** Systems, Architectures and Protocols. **4.** MadhusangaLiyanage, Andrei Gurtov, Mika Ylianttila, **"Software Defined Mobile Networks beyond LTE Network Architecture",** Wiley, June 2015. **5.** Christopher Cox Director, Chris Cox Communications Ltd, UK, **"An Introduction to LTE, LTE-Advanced, Sae, Volte and 4G Mobile Communications".**			
Reference Books	**1. "Next-Generation Wireless Technologies",** Naveen Chilamkurti Sherali Zeadally Hakima Chaouchi.			
Web. URLs	https://www.academia.edu/38394302/_ebook_4G_LTE_LTE_Advanced_for_Mobile_Broadband_pdf			

Tools for Assessment (50 Marks)

CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total
8	**8**	**10**	**8**	**8**	**8**	**50**

Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	M	L	M	H	H	H	H	M	M
CO2	H	H	M	M	M	L	M	H	H	H	H	M	M
CO3	H	H	M	M	M	L	M	H	H	H	H	H	H
CO4	H	H	M	M	M	L	M	H	H	H	H	H	H
CO5	H	H	M	M	M	L	M	H	H	H	H	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3CKE503	**Elective Paper - I : Internet of Things**		
Semester: V	**Credits: 4**	**CIA: 50 Marks**	**ESE:50 Marks**
Course Objective	To understand the Data and Knowledge Management and use of Devices in IoT Technology, Understand State of the Art – IoT Architecture and Real World IoT Design.		
Course Category	Employability/Skill Development		
Development Needs	Global/National /Local/Regional		
Course Description	To understand the concepts of IOT		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the vision of IoT from a global context.	Social Media	Group Discussion
CO 2	Understand the Market perspective of IoT.	Brainstorming	Quiz
CO 3	Understand Use of Devices, Gateways and Data Management in IoT.	Video Lectures	Assignment
CO 4	Build state of the art architecture in IoT.	Demonstration	Assignment
CO 5	Application of IoT in Industrial and Commercial Building Automation and Real World Design Constraints.	Discussion	Seminar

Offered by	Computer Science

Course Content	Instructional Hours / Week : 6

Unit	Description	Text Book	Chapters
I	**M2M to IoT**-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics.	1	2
	Instructional Hours		**15**
Suggested Learning Methods : Group Discussion			**03 Hrs**
II	**M2M to IoT – A Market Perspective**– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. **M2M to IoT-An Architectural Overview**– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.	1	3-4
	Instructional Hours		15
Suggested Learning Methods : Quiz			**03 Hrs**
III	**M2M and IoT Technology Fundamentals-** Devices and gateways, Local and wide area networking, Data management.	1	5
	Instructional Hours		15
Suggested Learning Methods : Assignment			**03 Hrs**
IV	Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.	1	5

			Instructional Hours	15
Suggested Learning Methods : Assignment			**03 Hrs**	
V	**IoT Architecture-State of the Art –** Introduction, State of the art. **Architecture Reference Model-** Introduction, Reference Model and architecture, IoT reference Model.		1	6-7
		Instructional Hours	15	
Suggested Learning Methods : Seminar			**03 Hrs**	
		Total Hours	90 Hrs	

Text Books	1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** Academic Press, 2014.
Reference Books	1. Vijay Madisetti and ArshdeepBahga, **"Internet of Things (A Hands-on-Approach)",** VPT, 2014. 2. Francis daCosta, **"Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",** Apress Publications, 2013
Web. URLs	**1.** https://www.tutorialspoint.com/internet_of_things/index.html

Tools for Assessment (50 Marks)

CIA I	CIA II	CIA III	Class Participation	Assignment	Seminar	Total
8	**8**	**10**	**8**	**8**	**8**	**50**

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	M	M	M	M	M	M	M	M	M
CO2	M	M	M	M	M	M	M	M	M	M	M	M	M
CO3	M	H	H	H	H	M	H	H	M	H	H	H	H
CO4	M	H	H	H	H	M	H	H	M	H	H	H	H
CO5	H	H	H	H	H	H	H	H	H	H	H	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title			
22U3CKE504	**Elective Paper I : Big Data Analytics**			
Semester: V	**Credits: 4**	**CIA: 50 Marks**		**ESE:50 Marks**
Course Objective	To provide an overview of an exciting growing field of big data analytics, analyse big data like Hadoop, NoSql Map-Reduce and learn fundamental techniques and principles in achieving big data analytics.			
Course Category	Employability/Skill Development			
Development Needs	Global/National /Local/Regional			
Course Description	To understand the concepts of Big Data			

Course Outcomes		**Teaching Methods**	**Assessment Methods**
CO 1	Know about the big data analytics	Jigsaw	Group Discussion
CO 2	Tools in big data analytics using Hadoop	Inquiry Based	Quiz
CO 3	Data model in big data analytics using NoSql	Demonstration	Assignment
CO 4	Understanding and Know about Map Reduce Programming	Video Lectures	Assignment
CO 5	Gain more knowledge about Hadoop streaming with R	Flipped Classrooms	Seminar
Offered by	**Computer Science, Computer Technology, Information Technology and BCA Departments**		

Course Content		**Instructional Hours / Week : 6**	

Unit	Description	**Text Book**	**Chapters**
I	**INTRODUCTION TO BIG DATA**: Introduction to Big Data, Big Data characteristics, types of Big Data, Traditional vs. Big Data business approach, Bigdata Challenges, Case Study of Big Data Solutions.	1	1
	Instructional Hours		**15**
Suggested Learning Methods : Group Discussion			**03 Hrs**
II	**HADOOP:** Introducing Hadoop – Why Hadoop – Why not RDBMS – RDBMS versus Hadoop – History of Hadoop – Hadoop Overview – Hadoop Distributed File System (HDFS) – Processing Data with Hadoop – Managing Resources and Applications with Hadoop YARN – Interacting with Hadoop Ecosystem	2	2
	Instructional Hours		15
Suggested Learning Methods : Quiz			**03 Hrs**
III	**NoSQL DATA MODEL:** Introduction to NoSQL – NoSQL Business Drivers – NoSQL Data Architectural Patterns – Variations of NoSQL Architectural Patterns – Using NoSQL to Manage Big data – Case study of NoSQL	1	3
	Instructional Hours		15
Suggested Learning Methods : Assignment			**03 Hrs**
IV	**MAP REDUCE Programming:** Introduction to MapReduce – Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression	2	4

			Instructional Hours	15
Suggested Learning Methods: Assignment				**03 Hrs**
V	**Hadoop streaming with R:** Understanding the basics of Hadoop streaming – How to run Hadoop streaming with R – Understanding a MapReduce application – Understanding how to code and run a Map-Reduce application – how to explore the output of Map Reduce application		3	4
			Instructional Hours	15
Suggested Learning Methods: Seminar				**03 Hrs**
			Total Hours	90 Hrs
Text Books	1. Radha Shankarmani, M Vijayalakshmi, **"Big Data Analytics",**WileyPublications,first Edition 2016 2. Seema Acharya, Subhashini Chellappan**,** "**Big Data and Analytics",** Wiley Publication, first edition. Reprint in 2016 3. Vignesh Prajapati, **"Data analytics with R and Hadoop"** , Copyright © 2013, Packt Publishing.			
Reference Books	1. Michael Minelli, Michelle Chambers, and AmbigaDhiraj, **"Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses"**, Wiley, 2013 2. Bill Franks, Taming,**"The Big Data Tidal Wave: Finding Opportunities In Huge Data Streams With Advanced Analytics"**, Wiley			
Web. URLs	1. **http://www.techtarget.com/searchdatamanagement/definition/Hadoop**			

Tools for Assessment (50 Marks)

CIA I	CIA II	CIA III	Class Participation	Assignment	Seminar	Total
8	8	10	8	8	8	50

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	M	M	M	M	M	M	M	M	M
CO2	M	M	H	H	H	M	M	H	H	H	H	H	H
CO3	H	M	H	H	H	H	M	H	H	H	H	H	H
CO4	H	H	H	H	H	H	H	H	H	H	H	H	H
CO5	H	H	H	H	H	H	H	H	H	H	H	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U4ITS503	**Skill Based Paper III: Cyber Law**		
Semester: V	**Credits: 3**	**CIA: 30 Marks**	**ESE: 45 Marks**

Course Objective	To know about the various types of Cyber Crimes, Cyber Laws and its applicability.
Course Category	Employability, Entrepreneurship
Development Needs	Global
Course Description	Cyber Law is a specialisation in the field of law which looks into and rectifies legal issues related to the World Wide Web. The field of Cyber Law deal with criminal activities such as fraud, theft, forgery, and defamation conducted on the internet.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Learn the various types of cybercrimes	Lecture / Flipped Classroom	Assignment
CO 2	Demonstrate the various types of cyber laws and their applicability	Construct visit Approach/ Tutorial	Seminar
CO 3	Classification of civil, criminal cases and Essential elements of criminal law	Lectures / Video Lessons	Quiz
CO 4	Determine the sections of Indian Evidence act	Tutorial / Case Studies	Assignment
CO 5	Know about the Indian Evidence Act	Flipped Classroom	Seminar

Offered by	**Information Technology**		
Course Content		**Instructional Hours / Week : 4**	

Unit	Description	Text Book	Chapters
I	Introduction to Cyberspace, Cybercrime and Cyber Law:The World Wide Web, Web Centric Business, e-Business Architecture, Models of e-Business, e-Commerce, Threats to virtual world. IT Act 2000 - Objectives, Applicability, Non-applicability, Definitions, Amendments and Limitations. Cyber Crimes- Cyber Squatting, Cyber Espionage, Cyber Warfare, Cyber Terrorism, Cyber Defamation. Social Media-Online Safety for women and children, Misuse of Private information.	**1**	1,2
	Instructional Hours		**18**
Suggested Learning Methods : Assignment			**02 Hrs**

II	Regulatory Framework of Information and Technology Act 2000 - Information Technology Act 2000, Digital Signature, E-Signature, Electronic Records, Electronic Evidence and Electronic Governance. Controller, Certifying Authority and Cyber Appellate Tribunal. (Rules announced under the Act), Network and Network Security, Access and Unauthorized Access, Data Security, E Contracts and E Forms.	1	3,4, 5, 9
	Instructional Hours		**18**
Suggested Learning Methods : Seminar			**02 Hrs**
III	Offences and Penalties Information Technology (Amendment) Act 2008 – Objective, Applicability and Jurisdiction; Various cyber- crimes under Sections 43 (a) to (j), 43A, 65, 66, 66A to 66F, 67, 67A, 67B, 70, 70A, 70B, 80 etc. along with respective penalties, punishment and fines, Penal Provisions for Phishing, Spam, Virus, Worms, Malware, Hacking, Trespass and Stalking; Human rights in cyberspace, International Co-operation in investigating cybercrimes.	1	6,7,8
	Instructional Hours		**18**
Suggested Learning Methods : Quiz			**02 Hrs**
IV	Classification – civil, criminal cases-Essential elements of criminal law- Constitution and hierarchy of criminal courts. Criminal Procedure Code. Cognizable and non-cognizable offences. Bailable and non-bailable offences. Sentences which the court of Chief Judicial Magistrate may pass.	1	8, 14, 15
	Instructional Hours		**18**
Suggested Learning Methods : Assignment			**02 Hrs**
V	Indian Evidence Act – Evidence and rules of relevancy in brief. Expert witness. Cross examination and re-examination of witnesses. Sections 32, 45, 46, 47, 57, 58, 60, 73, 135, 136,137, 138, 141. Section 293 in the code of criminal procedure. Secondary Evidence Section 65-B.	1	13, 17
	Instructional Hours		**18**
Suggested Learning Methods : Seminar			**02 Hrs**
	Total Hours		**75 Hrs**
Text Books	1. Karnika Seth; "Computers, Internet and New Technology Laws", Lexis Nexis Butters worth Wadhwa, 2012. 2. VikasVashishth.; "Law and practice of intellectual property in India"3. Jonathan Rosenoer; "Cyber Law: The Law of Internet", Springer- Verlag, New York, 1997. 3. Sreenivasulu N.S; "Law Relating to Intellectual Property", Patridge Publishing, 2013 4. Pavan Duggal; "Cyber Law – The Indian Perspective", Saakshar Law Publications.		

| Reference Books | 1. Harish Chander; "Cyber Laws and IT Protection", PHI Learning Pvt. Ltd, 2012.
2. Nina Godbole and SunitBelapore; "Cyber Security: Understanding CyberCrimes, Computer Forensics and Legal Perspectives", Wiley Publications,2011.
3. Vakul Sharma; "Information Technology: Law and Practice", Universal Law Publishing Co., India, 2011.
4. The Patent Act, 1970
5. The Indian Evidence Act, 1872. |
| Web. URLs | |

Tools for Assessment (30 Marks)						
CIA I	CIA II	CIA III	Class Participation	Assignment	Semi nar	Total
4	4	7	5	5	5	30

Mapping

CO \ PO	PO 1	PO2	PO3	PO4	PO 5	PO6	PO7	P O8	PSO1	PSO2	PSO3	PS O4	PSO 5
CO1	H	M	H	M	H	M	L	L	H	H	H	M	H
CO2	H	M	H	M	H	M	M	M	H	M	H	H	H
CO3	H	M	M	H	M	M	H	H	H	H	M	H	H
CO4	H	M	H	M	H	M	L	L	H	H	M	H	H
CO5	H	M	H	M	H	M	H	M	H	H	H	M	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3CKC611	**Core Paper XVII: Data Mining**		
Semester: VI	Credits: 4	CIA: 50 Marks	ESE: 50 Marks
(Common to all UG Programmes)			
Course Objective	To enable the students to explore data using data mining techniques to solve the business problems.		
Course Category	Employability and Entrepreneurship		
Development Needs	Global		
Course Description	Data mining identifies patterns and relationships in the large databases that can help solve business problems through data analysis. Data mining techniques and tools enable enterprises to predict future trends and make more-informed business decisions.		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Know basic concept of Data Mining and its Association Rules	Lecture / Flipped Classroom	Assignment
CO 2	Understand the different types of Clustering		Seminar
CO 3	Apply the learnt method in splitting the data and creating Decision Tree	Lectures / Video Lessons	Quiz
CO 4	Analyse various type of Mining like Web Mining and Text Mining	Tutorial / Case Studies	Program Execution
CO 5	Assess knowledge of What, When and Where the data applied	Lecture / Class Projects	Program Execution

Offered by	Information Technology

Course Content		Instructional Hours / Week : 6	

Unit	Description	Text Book	Chapters
I	**Data Mining:** Introduction **-** Data Mining Definition – KDD Vs Data Mining – DBMS Vs Data Mining – Data Mining Techniques – Data Mining Application Areas. **Association Rules:** Overview - Methods to Discover Association rules – Apriori Algorithm – Partition Algorithm – Pincer-Search Algorithm	1	3,4
	Instructional Hours		18
Suggested Learning Methods : **Video lectures on the basics of data mining and association rules**			**02 Hrs**
II	**Clustering Techniques:** Introduction - Clustering Paradigms – Partitioning Algorithm – k-means -Medoid Algorithm – CLARA – CLARANS – Hierarchical Clustering – DBSCAN – BIRCH – CURE.	1	5

			Instructional Hours	18
Suggested Learning Methods : Application of Online simulation tool on clustering techniques				02 Hrs
III	**Decision Tree**: Overview – Tree Construction Principle – Best Split – Splitting Criteria – Decision Tree Construction – CART – ID3 – CHAID – Decision Tree Construction with Pre-sorting.		1	6
			Instructional Hours	12
Suggested Learning Methods :				02 Hrs
IV	**Web Mining:** Web Content Mining – Web Structure Mining – Web Usage Mining. **Text Mining:** Unstructured Text - Episode Rule Discovery for Texts – Hierarchy of Categories – Text Clustering.		1	8
			Instructional Hours	
Suggested Learning Methods :				02 Hrs
V	**Temporal Data Mining**: Introduction - Temporal Association Rule – Sequence Mining – GSP Algorithm.**SpatialMining:** Spatial Mining Tasks – Spatial Clustering – Spatial Trends.		1	13,17
			Instructional Hours	12
Suggested Learning Methods :				02 Hrs
			Total Hours	90 Hrs
Text Books	1. Data Mining Techniques by Arun K Purari, Published by University Press India Private Limited.			
Reference Books	1. Insight into Data Mining Theory and Practice by Soman, Diwakar and Ajay, Published by Prentice Hall of India Private India.			
Web. URLs	www.javatpoint.com/data_mining			

Tools for Assessment (50 Marks)

CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total
8	8	10	8	8	8	50

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	H	H	M	M	M	L	M	M	H	H	M	H	M
CO2	H	H	H	M	L	H	L	H	H	M	M	H	H
CO3	S	H	H	H	H	M	H	H	M	H	H	M	M
CO4	H	M	H	H	M	L	M	M	H	H	H	H	H
CO5	H	H	M	M	H	H	H	H	H	H	H	M	H

S - Strong; H-High; M-Medium; L-Low.

Course designed by	Verified by
Name and Department	Name and BoS Chairman SEAL

Course Code	Title		
22U3ITV610	**Project & Viva-Voce**		
Semester: VI	**Credits: 4**	**CIA :50 Marks**	**ESE:50 Marks**
Course Objective	To give project based learning which makes the students to apply practically what they learned.		
Course Category	Employability / Skill Development		
Development Needs	Global		
Course Description			
Course Outcomes		**Teaching Methods**	**Assessment Methods**
Offered by	Information Technology		
Course Content		**Instructional Hours / Week : 6**	

GUIDELINES FOR PREPARATION OF PROJECT REPORT

1. ARRANGEMENT OF CONTENTS

The sequence in which the project report material should be arranged and bound is as follows:

1. Cover Page & Title Page
2. Bonafide Certificate
3. Abstract
4. Table of Contents
5. List of Tables
6. List of Figures
7. List of Symbols, Abbreviations
8. Chapters
9. Appendices
10. References

The table and figures shall be introduced in the appropriate places.

2. PAGE DIMENSION AND SIZE OF THE PROJECT REPORT

(a) The size of the project report for undergraduate and post graduate degree should contain a minimum of 40 and 60 pages of content respectively. The pages will be counted from the first page of Chapter I. The dimension of the project report should be in A4size. The project report should be bound using flexible cover of thick art paper. The cover should be **printed in black**

letters and the text for printing should be identical.

(b) Page Numbering - All page numbers (whether it is in Roman or Arabic numbers) should be typed without punctuation on the central bottom of each page. The preliminary pages of the reports (such as Title page, Acknowledgement, Table of Contents, etc.) should be numbered in lower case Roman numerals. The title page will be numbered as (i) but this should not be typed. The page immediately following the title page shall be numbered as (ii) and it should appear at the top right hand corner as already specified. Pages of main text, starting with Chapter 1 should be consecutively numbered using Arabic numerals.

3. PREPARATION FORMAT

Cover Page & Title Page – A specimen copy of the Cover page & Title page of the project report are given in **Appendix 1.**

Bonafide Certificate – The Bonafide Certificate shall be in **double line spacing using Font Style Times New Roman and Font Size 14**, as per the format in **Appendix 2.**

The certificate shall carry the supervisor's signature and shall be followed by the supervisor's name, academic designation (not any other responsibilities of administrative nature) and Department where the supervisor has guided the student. The term **"SUPERVISOR"** must be typed in capital letters between the supervisor's name and academic designation.

Abstract – Abstract should be one page synopsis of the project report typed double line spacing, Font Style Times New Roman and Font Size 13.

Table of Contents – The table of contents should list all material following it as well as the Abstract which precedes it. The Title page and Bonafide Certificate will not find a place among the items listed in the Table of Contents. **One and a half** spacing should be adopted for typing the matter under this head.

List of Tables – The list should use exactly the same captions as they appear above the tables in the text. **One and a half** spacing should be adopted for typing the matter under this head.

List of Figures – The list should use exactly the same captions as they appear below the figures in the text. **One and a half** spacing should be adopted for typing the matter under this head.

Table and figures - By the word Table, is meant tabulated numerical data in the body of the project report as well as in the appendices. All other non- verbal materials used in the body of the project work and appendices such as charts, graphs, maps, photographs and diagrams

may be designated as figures.

List of Symbols, Abbreviations– One and a half spacing should be adopted for typing the matter under this head. Standard symbols, abbreviations etc. should be used.

Chapters – The chapters may be broadly divided into 3 parts

      (i)   Introductory chapter

      (ii)   Chapters developing the main theme of the project work

      (iii) Conclusions and scope

The introductory chapter will have sections covering a general introduction and importance of the research project.

The main text will be divided into several chapters and each chapter may be further divided into several divisions and sub-divisions.

❖ Each chapter should be given an appropriate title.

❖ Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.

Appendices – Appendices are provided to give supplementary information, which if included in the main text may serve as a distraction.

- Appendices should be numbered using Arabic numerals, e.g. Appendix 1, Appendix 2,etc.

- Appendices, Tables and References appearing in appendices should be numbered and referred at appropriate places just as in the case of Chapters.

- Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.

List of References –The listing of references should be typed 4 spaces below the heading "REFERENCES" in alphabetical order in single spacing left justified. The reference material should be listed in the alphabetical order of the first author. The name of the author / authors should be immediately followed by the year and other details.

(i) If more than one paper bythe same first author and same year of publications, the year of citation will be followed by a, b etc to differentiate them.

(ii) While citing the paper in the text, the name of the first author and year alone must be cited. e.g Samson (2004) or Jeyaraj (2007a). The reference numbers should not be used in the text of

the paper

(ii) A paper, a monograph or a book may be designated by the name of the first author

followed by the year of publication, placed inside brackets at the appropriate places in the thesis.

4. TYPING INSTRUCTIONS

The impression on the typed copies should be black in colour.

One and a half spacing should be used for typing the general text. The general text shall be typed in the **Font style "Times New Roman" and Font size 13.**

APPENDIX 1

TITLE <Font Size 18><1.5 line spacing>

a project report submitted by

<Font Size 14><Italic>

NAME OF THE STUDENT (REGISTER NUMBER) <Font Size 16>

in partial fulfilment for the award of the degree

<Font Size 14><Italic><1.5 line spacing>

in

NAME OF THE PROGRAMME <Font Size 16>

under the supervision of **<Font Size 14><Italic>**

NAME OF THE SUPERVISOR <Font Size 16>

NAME OF THE DEPARTMENT<Font Size 14>

NEHRU ARTS AND SCIENCE COLLEGE

(An Autonomous Institution affiliated to Bharathiar University)
(Reaccredited with "A" Grade by NAAC, ISO 9001:2015 & 14001:2004 Certified
Recognized by UGC with 2(f) &12(B), Under Star College Scheme by DBT, Govt. of India)
Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105, Tamil Nadu.

MONTH & YEAR <Font Size 14>

<div align="right">**APPENDIX 2**</div>

<div align="center">(A typical specimen of Bonafide Certificate)</div>

<div align="right"><Font Style Times New Roman></div>

<div align="center">

BONAFIDE CERTIFICATE

<Font Style Times New Roman – size-16>

<Font Style Times New Roman – size-14>

</div>

This is to certify that the project report entitled **"………. TITLE OF THE PROJECT …………………....** **"** is the bonafide work of "**………………..…..** **NAME OF THE CANDIDATE(S) WITH REGISTER NUMBER………………"** who carried out the project work under my supervision.

<<Signature of the Head of the Department>>   <<Signature of the Supervisor>>

<div align="center">

SIGNATURE   **SIGNATURE**

<<Name>><<size-16>   <<Name>>   <<size-16>

</div>

HEAD OF THE DEPARTMENT   **SUPERVISOR**

<<Academic Designation>>   <<Academic Designation>>

<<Department>>   <<Department>>

<Font Style Times New Roman - Size-14>   <Font Style Times New Roman - Size-14>

Submitted for the Viva Voce held on ……………………….

Internal Examiner   **External Examiner**

EVALUATION PROCESS

Review – I has to be conducted during the Last week of December

Review – II has to be conducted during the Last week of January

Review – III has to be conducted during the Last week of February

Document, Preparation and Implementation has to be done during the First week of March

Viva-Voce examination will be conducted at the end of the semester by both Internal (Respective Guides) and External Examiners, after duly verifying the Project Report available in the College.

									Instructional Hours		90	

Mapping												
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	H	M	L	L	H	H	H	H	M
CO2	H	H	M	M	H	H	H	H	H	M	M	H	H
CO3	H	M	M	H	M	M	H	H	H	H	M	H	H
CO4	H	H	H	M	H	M	L	L	M	H	H	M	H
CO5	H	M	H	M	H	M	H	M	H	H	H	H	M

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3CKE605	**Elective Paper II - Software Quality Assurance**		
Semester: VI	**Credits: 4**	**CIA:50 Marks**	**ESE: 50 Marks**
Course Objective	To describe Quality Assurance, understand quality components and apply the quality models.		
Course Category	Employability / Skill Development		
Development Needs	Global		
Course Description	Develop Problem Solving Skills to solve the computer based problems at Global needs.		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Knowledge about the concept, factors, of Quality Assurance	Video Lecture	Assignment
CO 2	Understand various components of Quality Assurance	Case Based	Group Discussion
CO 3	Analyze Testing process in Quality Assurance	Lectures / Video Lessons	Seminar
CO 4	Analyze various Software Quality metrics	Tutorial / Case Studies	Quiz
CO 5	Interpret the various on Standards for Software Quality.	Lecture / Class Projects	Quiz

Offered by	**Computer Application**

Course Content	**Instructional Hours / Week : 6**

Unit	Description	Text Book	Chapters
I	**What is Software Quality?:** What is software?-Software error, faults and failures-Classification of the causes of software errors-Software Quality Definition and objectives – software quality assurance and software engineering. **Software Quality factors:** Need for comprehensive software quality requirements – classification of software requirements into software quality factors – product operation software quality factors- product revision software quality factors – product transition software quality factors.	1	2,3
	Instructional Hours		**18**
Suggested Learning Methods : Assignment			**02 Hrs**
II	**Components of SQA system :** SQA system and architecture – Pre-project components – software project life cycle components – Infrastructure components for error prevention and improvement – Management SQA components – SQA standards, system certification and assessment components – Organizing for SQA – the human components.	1	4
	Instructional Hours		18
Suggested Learning Methods : Group Discussion			**02 Hrs**
III	**Software Testing – Strategies:** Definition and objectives-software testing strategies – software test classifications – White box testing – Black box testing. **Software Testing – Implementation:** Testing process – Test-case Design – Automated testing – Alpha – beta site testing programs.	1	9,10

		Instructional Hours	18

Suggested Learning Methods : Seminar			02 Hrs
IV	**Software Quality Metrics:** Objectives of quality measurement – Classification of software quality metrics – Process metrics- Product metrics- Implementation of Software Quality metrics – Cost of Software Quality metrics-Classical model of Software Quality.	1	21,22

		Instructional Hours	18

Suggested Learning Methods : Quiz			02 Hrs
V	**Quality Management Standards:** scope –Main standards of software quality management – ISO 9000-3 – certification according to ISO 9000-3 standard – Capability Maturity model principles, structure and processes area – Bootsrap methodology.	1 2	23 4

		Instructional Hours	18

Suggested Learning Methods : Quiz			02 Hrs
		Total Hours	90 Hrs

Text Books	1. Daniel Galin, **"Software Quality Assurance From Theory to Implementation"**, Pearson education Ltd.,2004. 2. Claude Y. Laporte and Alain April, **"Software Quality Assurance"**, IEEE Press wiley, 2018.
Reference Books	1. Stephen H. Kan, **"Metrics and Models in Software Quality Engineering"**, 2nd Edition, Pearson, 2003. 2. Kshirasagar Naik and Priyadarshi Tripathy (Eds), **"Software Testing and Quality Assurance: Theory and Practice"**, John Wiley, 2008
Web. URLs	www.javatpoint.com/software-quality-assurance

Tools for Assessment (50 Marks)						
CIA I	**CIA II**	**CIA III**	**Assignment**	**Seminar**	**Quiz**	**Total**
8	**8**	**10**	**8**	**8**	**8**	**50**

Mapping												
CO \ PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	H	H	L	M	M	L	M	M	H	H	M	M
CO2	M	M	M	M	H	M	M	M	H	H	H	M	H
CO3	H	L	M	H	M	M	L	H	M	H	H	M	M
CO4	M	H	L	M	L	L	H	M	H	M	H	H	M
CO5	M	M	H	H	M	H	M	H	H	H	M	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3CKE606	**Elective Paper II : Information Security**		
Semester: VI	**Credits: 4**	**CIA:50 Marks**	**ESE: 50 Marks**
Course Objective	To enable the students to understand various aspects of Information Security in the local and Global scenarios.		
Course Category	Employability / Skill Development		
Development Needs	Global		
Course Description	Develop Problem Solving Skills to solve the computer based problems at Global needs.		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the basics of Information Security	Lecture / Flipped Classroom	Assignment
CO 2	Identify the legal, ethical and professional issues in Information Security	Construct visit Approach/ Tutorial	Seminar
CO 3	Understand the Risk Management Strategy	Lectures / Video Lessons	Group Discussion
CO 4	Assess the technologies which are essential to provide Information Security	Tutorial / Case Studies	Quiz
CO 5	Understand the Information Security Maintenance model.	Lecture / Class Projects	Poster Presentation

Offered by	Computer Application

Course Content	Instructional Hours / Week : 6

Unit	Description	Text Book	Chapters
I	**Introduction to Information security:** History-What is Information Security?-Critical Characteristics of Information, NSTISSC Security Model-Components of an Information System, Securing the Components-Balancing Security and Access-The SDLC-The Security SDLC.	1	1
	Instructional Hours		**18**
Suggested Learning Methods : Assignment			**02 Hrs**
II	**Need for Security:** Introduction- Business Needs-Threats-Attacks. **Legal, Ethical and Professional Issues:** Introduction-Laws and ethics-types of law-international laws and legal bodies-Ethics and information security.	1	2,3
	Instructional Hours		18
Suggested Learning Methods : Seminar			**02 Hrs**
III	**Risk Management:** Introduction-overview-Identifying and Assessing Risk- Assessing- Control strategies- selecting strategy.	1	4

			Instructional Hours	18
Suggested Learning Methods : Group Discussion			**02 Hrs**	
IV	**Planning for Security:** Introduction-Information Security Policy-Blueprint for Security-Security education-training and awareness-Continuity strategies, Risk appetite, Management discussion points, documenting results.		1	5
			Instructional Hours	18
Suggested Learning Methods : Quiz			**02 Hrs**	
V	**Implementing Information Security: Introduction**- Project management for information security-Technical and non-technical aspects of implementation. **Information Security Maintenance:** Introduction- Security management models-Maintenance model.		1	10,12
			Instructional Hours	18
Suggested Learning Methods : Poster Presentation			**02 Hrs**	
			Total Hours	90 Hrs

Text Books	**1.** Michael E. Whitman and Herbert J. Mattord, **"Principles of Information Security",** Second Edition, Thomson Publishers.
Reference Books	1. *Surya Prakash Tripathi and Ritendra Goel,* *"Introduction to Information Security and Cyber Laws"*, *2014, Dream Tech Press.* 2. V.K. Pachghare, **"Cryptography and Information Security"**, 2nd Revised edition, Prentice-Hall of India Pvt.Ltd. 3. Mark S. Merkow, **"Information Security: Principles and Practices"**, Second Edition, Pearson Education.
Web. URLs	www.javatpoint.com/information-security

Tools for Assessment (50 Marks)

CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total
8	**8**	**10**	**8**	**8**	**8**	**50**

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	L	M	M	L	M	M	H	H	M	M
CO2	M	M	M	M	H	M	M	M	H	H	H	M	H
CO3	H	L	M	H	M	M	L	H	M	H	H	M	M
CO4	M	H	L	M	L	L	H	M	H	M	H	H	M
CO5	M	M	H	H	M	H	M	H	H	H	M	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3CKE607	**Elective Paper – II : Cloud Computing**		
Semester: VI	**Credits: 4**	**CIA:50 Marks**	**ESE: 50 Marks**
Course Objective	To develop algorithmic solutions to simple computational problems using Python		
Course Category	Employability / Skill Development		
Development Needs	Global		
Course Description	Develop Problem Solving Skills to solve the computer based problems at Global needs.		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	To make the students to understand the Cloud Computing and types,	Interactive Lecture	Poster Presentation
CO 2	To understand the cloud architecture	Constructivist Approach/ Tutorial	Assignment
CO 3	To identify the applications of abstraction & Virtualization	Lectures / Video Lessons	Seminar
CO 4	To apply cloud computing in real-time.	Tutorial / Case Studies	Case Study
CO 5	To make the students to understand the Cloud Computing and types,	Lecture / Class Projects	Case Study

Offered by	**Computer Application**	

Course Content	**Instructional Hours / Week : 6**

Unit	Description	Text Book	Chapters
I	**Defining Cloud Computing:** Defining Cloud Computing – Cloud Types – Examining the Characteristics of Cloud Computing – Disadvantages of cloud computing – Assessing the Role of Open Standards. **Assessing the Value Proposition:** Measuring the Cloud's Value – The laws of cloudonomics – Cloud computing obstacles – Behavioral factors relating to cloud adoption.	1	1,2
	Instructional Hours		18
Suggested Learning Methods : **Video lectures about the basics of Cloud Computing**			**02 Hrs**
II	**Understanding Cloud Architecture :** Exploring the Cloud Computing Stack - Connecting to the Cloud. **Understanding Services and Applications by Type :** Defining Infrastructure as a Service (IaaS) – Defining Platform as a Service (PaaS) – Defining Software as a Service (SaaS) – Defining Identity as a Service (IdaaS) – Defining Compliance as a Service (CaaS).	1	3,4
	Instructional Hours		18
Suggested Learning Methods : Practice using Models			**02 Hrs**
III	**Understanding Abstraction and Virtualization:** Using Virtualization Technologies – Load Balancing and Virtualization – Understanding Hypervisors – Understanding Machine Imaging –	1	5,7

	Porting Applications. **Exploring Platform as a Service:** Defining Services – Using PaaS Application Frameworks.		
	Instructional Hours		18

	Suggested Learning Methods : Develop small programmes using visualization tools	02 Hrs

IV	**Using Google Web Services:** Exploring Google Applications – Surveying the Google Application Portfolio – Exploring the Google Toolkit – Working with the Google App Engine. **Using Amazon Web Services :** Understanding Amazon Web Services – Amazon Web Service Components and Services - Working with the Elastic Compute Cloud (EC2) - Working with Amazon Storage Systems – Understanding Amazon Database Services.	1	8,9

	Instructional Hours		18

Suggested Learning Methods : Apply the concept of web services	02 Hrs

V	**Using Microsoft:** Cloud Services – Exploring Microsoft Cloud Services – Defining the Windows Azure Platform – Using Windows Live. **Understanding Cloud:** Security – Securing the Cloud – Securing Data – Establishing Identity and Presence**.**	1	10,12

	Instructional Hours		18

Suggested Learning Methods : case study	02 Hrs

	Total Hours	90 Hrs

Text Books	1. Barrie Sosinsky,**"Cloud Computing Bible"**, Wiley Publishing ,Inc., 2011.
Reference Books	1. Ray J Rafaels, **"Cloud Computing: From Beginning to End"**, 2015. 2. Arshdeep, Bahga and Vijai Madisetti, **"Cloud Computing: A Hands-on Approach"**, 2014.
Web. URLs	Cloud.ibm.com

Tools for Assessment (50 Marks)						
CIA I	**CIA II**	**CIA III**	**Assignment**	**Seminar**	**Quiz**	**Total**
8	**8**	**10**	**8**	**8**	**8**	**50**

Mapping												
CO \ PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO 5**
CO1	H	H	H	L	M	M	L	M	M	H	H	M	M
CO2	M	M	M	M	H	M	M	M	H	H	H	M	H
CO3	H	L	M	H	M	M	L	H	M	H	H	M	M
CO4	M	H	L	M	L	L	H	M	H	M	H	H	M
CO5	M	M	H	H	M	H	M	H	H	H	M	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3CKE608	**Elective Paper II - Cyber Security**		
Semester: VI	**Credits: 4**	**CIA:50 Marks**	**ESE: 50 Marks**
Course Objective	To make the students to understand Cryptography, Cyber crime and its significance in current scenario of IT and information security.		
Course Category	Employability / Skill Development		
Development Needs	Global		
Course Description	Develop Problem Solving Skills to solve the computer based problems at Global needs.		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Remember the information and various representation	Lecture / Flipped Classroom	Just – A – Minute Presentation
CO 2	Understand the concept of computer networks and overview of internet	Constructivist Approach/ Tutorial	Poster Presentation
CO 3	Understand the information storage , data communication and data modulation techniques	Lectures / Video Lessons	Assignment
CO 4	Understand the knowledge about the Cryptography, Cyber Crime and Information Security	Tutorial / Case Studies	Seminar
CO 5	Understand the importance of Information Security Framework	Lecture / Class Projects	Quiz

Offered by	**Computer Application**	

Course Content	**Instructional Hours / Week : 6**

Unit	Description	Text Book	Chapters
I	**Information and its Representation:** What is information – Quality - of Information - Value of Information - Information Processing - Information Processing cycle in computers - information - Representation and codes - Number Representation - Binary - Representation of Positive integers - Signed Binary Integers - Positive Binary Fractions - signed Binary Fractions - Representing Fractions in Binary - Representation of Alphanumeric - Data - Current Trends in Information Technology – semiconductor - Technology - Information storage - Networking - Applications of - IT - IT Applications in Business - Modelling and Simulation	1	1
	Instructional Hours		18
Suggested Learning Methods : Video lectures about the basics of Cyber Security			**02 Hrs**

II	**Computer Networks and Internet:** An overview - What is – computer Network – Basic networking components - what is Internet - Internet Protocols - Internet protocol types - OSI Reference versus TCP/IP Model - OSI model layers - TCP/IP.	1	2
		Instructional Hours	18

Suggested Learning Methods : Practice using Flow Charts	**02 Hrs**

III	**Information storage and communication:** Information storage - purpose of storage - Types of storage Devices - File organization - Internal file structure - External file structure and file extension - Data communication - an overview - what is data communication - signals - Basic - Data Communication Model - Modulation Techniques.	1	3
		Instructional Hours	18

Suggested Learning Methods : Develop small programmes on internal file structure	**02 Hrs**

IV	**Cryptography Systems**: Introduction-Cryptography Systems Types-Symmetric Cryptography - Asymmetic or Public Key, Cryptography-Hash Functions-Why three Encryption Techniques? – Public key Algorithms – RSA Public Key Algorithm – Digital Signature – Diffie – Hellman - ElGamal-EDCSA-XTR. **Cyber Law and Ethics**: Introduction to cybercrime - Prevention - preventive steps for Individuals - preventive steps for organizations and government - How to protect the computer against threats.	1	5 & 6
		Instructional Hours	

Suggested Learning Methods : Apply the Cryptographic techniques in models	**02 Hrs**

V	Information security Framework - Information security and privacy - security Framework - Information systems security Framework – Framework for Network security access. Access control Techniques- Computer Security and Access Control-Access control Techniques-Biometric Authentication-Authentication Tokens-Token types and usage-Digital signature-Embodiments and vendors-Related Authentication Technologies.	1	8 & 9
		Instructional Hours	18

Suggested Learning Methods : Case Study	**02 Hrs**
Total Hours	90 Hrs

Text Books	1. Pankaj Agarwal, **"Information Security & Cyber Laws"**, Acme Learning Private Limited, First Edition,2010
Reference Books	1. Amy Rose, Deborah Arrand, Kristin E. Ohlim, Malloy, Michael G. Solomon, Mike Chapple, **"Information Security Illuminated"**, Jones & Barlett Publishers, 2005. 2. Lawrence C. Miller, **"Cyber Security for Dummies"**, John Wiley & Sons, Inc
Web. URLs	

Tools for Assessment (50 Marks)						
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total
8	8	10	8	8	8	50

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	H	H	H	L	M	M	L	M	M	H	H	M	M
CO2	M	M	M	M	H	M	M	M	H	H	H	M	H
CO3	H	L	M	H	M	M	L	H	M	H	H	M	M
CO4	M	H	L	M	L	L	H	M	H	M	H	H	M
CO5	M	M	H	H	M	H	M	H	H	H	M	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3ITE609	**Discipline Specific Elective Paper III: Digital Marketing**		
Semester: VI	**Credits: 4**	**CIA: 50 Marks**	**ESE: 50 Marks**

Course Objective	• To identify core concepts of marketing, role of marketing in business and society, acquire knowledge of social, legal, ethical and technological forces on marketing decision-making.
Course Category	Employability and Entrepreneurship
Development Needs	Global
Course Description	This helps give an overview on the major bioinformatics database and tools.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Ability to develop marketing strategies based on product, price, place and promotion objectives.	Flipped Classroom	Group Discussion
CO 2	Ability to create an integrated marketing communications plan which includes promotional strategies and measures of effectiveness.	Video Lecture	Assignment
CO 3	Ability to communicate the unique marketing mixes and selling propositions for specific product offerings.	Problem Solving	Seminar
CO 4	Ability to construct written sales plans and a professional interactive oral sales presentation.	Tutorial / Case Studies	Quiz
CO 5	Ability to formulate marketing strategies that incorporate psychological and sociological factors which influence consumers.	Video Lecture	Flip Test

Offered by	IT

Course Content		Instructional Hours / Week : 6	
Unit	**Description**	**Text Book**	**Chapters**
I	Introduction to think – Digital Marketing Strategy – Introduction – Key terms and Concepts – What is Marketing – What is Digital Marketing - Understanding Marketing Strategy – The Building Blocks of Marketing Strategy – Crafting a Digital Marketing Strategy – Case Study	**1**	2
	Instructional Hours		**18**
Suggested Learning Methods : Video Lectures			**02 Hrs**
II	Market Research – Introduction – Key terms and Concepts – the Importance of Market Research – Key Concepts in Market Research – Online Research Methodologies – Justifying the Cost of Research – tools for the trade – Advantages and Challenges	1	3
	Instructional Hours		**18**

Suggested Learning Methods :Group Discussion			**02 Hrs**
III	Content Marketing Strategy – Introduction – Key Terms and Concepts – Defining Content Marketing – Strategic Building Blocks – Content Creation – Content Channel Distribution – Tools for the Trade – Advantages and Challenges	1	
	Instructional Hours		**18**
Suggested Learning Methods : Worked examples			**02 Hrs**
IV	User Experience Design – Introduction – Key Terms and Concepts – Understanding UX design – Core principles of UX design – Mobile UX – Step –by-step guide to UX design –Toolsof the trade – Case Study	1	
	Instructional Hours		**18**
Suggested Learning Methods : Problem Based Learning			**02 Hrs**
V	Web development and Design – Introduction – Key terms and concepts – Web design – Web Development – Mobile Development – Step-by-step guide to building a website – Case study	1	
	Instructional Hours		**18**
Suggested Learning Methods : Laboratory practice			**02 Hrs**
	Total Hours		**90 Hrs**

Text Books	1. Rob Stokes, E- Marketing the Essential guide to marketing in a digital world, 5th Edition,2017.
Reference Books	Digital Marketing, Vandana Ahuja, 2015, 1st Edition
Web. URLs	www.simplilearn.com

Tools for Assessment (50 Marks)

CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total
8	8	10	8	8	8	50

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	M	H	M	L	H	M	H	H	H
CO2	H	M	H	H	M	M	H	M	M	H	H	S	H
CO3	H	M	H	M	M	H	H	M	H	H	M	H	H
CO4	H	H	M	M	M	M	H	M	H	S	H	M	H
CO5	H	M	H	M	H	H	M	M	S	H	H	H	M

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3ITE610	**Elective Paper III: Intellectual Property Rights and Privacy Laws**		
Semester: VI	**Credits: 4**	**CIA: 50 Marks**	**ESE: 50 Marks**

Course Objective	To introduce the concepts of Intellectual Property rights and privacy laws
Course Category	Employability and Entrepreneurship
Development Needs	Global
Course Description	This course helps to understand the different IPR, Copyright and Privacy laws.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Define that various laws associated with intellectual property rights	Flipped Classroom	Group Discussion
CO 2	Explain the concept of commercialization of IPR be licensing	Video Lecture	Assignment
CO 3	Outline the concepts of copyrights and international protection of copyrights	Problem Solving	Seminar
CO 4	Recall the history and perspective of privacy laws.	Tutorial / Case Studies	Quiz
CO 5	Classify the compare the various types of privacy laws	Virtual Lab	Flip Test

Offered by	**DCFS**

Course Content			**Instructional Hours / Week : 6**	
Unit	**Description**		**Text Book**	**Chapters**
I	**Intellectual Property Overview -** Concept of Property vis-à-vis Intellectual Property. Types of Intellectual Property- Origin and Development- An Overview. Intellectual Property Rights as Human Right. Role of International Institutions.		**1**	1,2
		Instructional Hours		**18**
Suggested Learning Methods : Video Lectures				**02 Hrs**
II	**Intellectual Property Rights -**Commercialization of Intellectual Property Rights by Licensing. Determining Financial Value of Intellectual Property Rights. Negotiating Payments Terms in Intellectual Property Transaction. Intellectual Property Rights in the Cyber World		1	3,4
		Instructional Hours		**18**
Suggested Learning Methods :Group Discussion				**02 Hrs**
III	**Copyright -**Introduction to Copyright- International Protection of Copyright and Related rights- An Overview (International Convention/Treaties on Copyright).			5,7
		Instructional Hours		**18**
Suggested Learning Methods : Worked examples				**02 Hrs**

IV	**Indian Copyright Law -** Indian Copyright Law- The Copyright Act, 1957 with its amendments, Copyright works, Ownership, transfer and duration of Copyright, Renewal and Termination of Copyright, Infringement of copyrights and remedies.	1	8
		Instructional Hours	**18**
Suggested Learning Methods : Problem Based Learning			**02 Hrs**
V	**Privacy Laws -** History and Perspective of Privacy Laws- Global Privacy Issue- Legal Tools – The Constitution. Statutes & State Protection.	1	10,12
		Instructional Hours	**18**
Suggested Learning Methods : Laboratory practice			**02 Hrs**
		Total Hours	**90 Hrs**

Text Books	1.Vikas Vashishth.; "Law and practice of intellectual property in India"
	2.Sreenivasulu N.S; "Law Relating to Intellectual Property", Patridge Publishing, 2013
	3.Vakul Sharma; "Information Technology: Law and Practice", Universal Law Publishing Co., India, 2011.
Reference Books	1.The Copyright Act, 1957 2.The Patent Act, 1970
Web. URLs	Ipindia.gov.in

Tools for Assessment (50 Marks)

CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total
8	8	10	8	8	8	50

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	L	M	M	L	M	H	M	H	M	L
CO2	M	M	M	M	H	M	M	M	M	L	M	H	H
CO3	H	L	M	H	M	M	L	H	H	L	H	L	M
CO4	M	H	L	M	L	L	H	M	M	L	L	M	L
CO5	M	M	H	H	M	H	M	H	H	L	M	M	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3ITE611	**Elective Paper III: Information Technology for Management**		
Semester: VI	**Credits: 4**	**CIA: 50 Marks**	**ESE: 50 Marks**

Course Objective	To introduce the concepts of Management in Information Technology		
Course Category	Employability and Entrepreneurship		
Development Needs	Global		
Course Description	This course helps to understand the different Information Technology Ma		

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Interpret and Understand the Information Technology for Organization	Flipped Classroom	Group Discussion
CO 2	Analyse the impact of IT on the Organization	Video Lecture	Assignment
CO 3	Outline the concepts of Building systems with creativity	Problem Solving	Seminar
CO 4	Examine the reengineering concept.	Tutorial / Case Studies	Quiz
CO 5	Classify the compare the various types of privacy laws	Tutorial / Case Studies	Flip Test

Offered by	**Information Technology**		

Course Content		**Instructional Hours / Week : 6**	
Unit	**Description**	**Text Book**	**Chapters**
I	**Using Technology to Transform the Organization**: Information Technology in the Workplace – What is Information Technology – Transforming Organizations – Information Technology and the Manager – The Challenge of Change – Six Major Trends – **Interpreting and Understanding Information**: The Nature of Information – How people Interpret Information – From Information to Knowledge – Information Technology in Perspective: Frameworks for Information Technology – A Framework Based on IT – The Basics of Information Systems – The Case of Chrysler	**1**	1,2
	Instructional Hours		**18**
Suggested Learning Methods : Video Lectures			**02 Hrs**

II	**The Impact of Information Technology on the Organization**: Modern Organizations – Creating New Types of Organizations – Building a T-Form Organization – Strategic Issues of Information Technology – Information Technology and Corporate Strategy – Creating and Sustaining a Competitive Edge – Integrating Technology with the Business Environment – Managing Information Technology – International Business and Information Technology – The Impact of Globalization on Business – Key Issues in International Environment – Managing Information Technology Internationally – Business Models and IT Management	1	3,4
	Instructional Hours		**18**
Suggested Learning Methods :Group Discussion			**02 Hrs**
III	**Building Systems: Creativity with Technology**: The Design Task – A Systems Design Life Cycle – The Roles of Managers, Users and Designers – User-Oriented Design – The Spiral Model of Development – Data Collection for Analysis and Design – Structured versus Object-Oriented Design – **Building Systems: Further Developments**: System Analysis – Survey and Feasibility Study – Determining Feasibility – Selecting an Alternative Undertaking System Analysis – Undertaking System Designs – General Design Considerations – Computer-Aided Software Engineering		5,7
	Instructional Hours		**18**
Suggested Learning Methods : Worked examples			**02 Hrs**
IV	**Reengineering: Changing Businesses and Business Processes**: What is Reengineering? – What is a Process? – Reengineering a Process at Mutual Benefit Life – Reengineering a Process at Merrill Lynch – Reengineering the Entire Firm at Oticon – Implementing Change: Implementation – Research on Implementation – An Implementation Strategy – Implementing IT-Based Transformation of the Organization – Beyond Structural Change	1	8
	Instructional Hours		**18**
Suggested Learning Methods : Problem Based Learning			**02 Hrs**
V	**Organization Support Systems**: Decision-Support Systems – Examples of DSSs – The Promise of DSSs – Executive Information Systems – Group Decision-Support Systems – Groupware and Organizational Knowledge – Multimedia for Business, Education and Entertainment	1	9, 10
	Instructional Hours		**18**
Suggested Learning Methods : Problem Based Learning			**02 Hrs**
	Total Hours		**90 Hrs**
Text Books	1. Henry C. Lucas, Jr. Information Technology for Management, 7th Edition, Tata Mc Graw Hill 2001		

Reference Books	Earl, Michael J. Management strategies for information technology. Prentice-Hall, Inc., 1989.
Web. URLs	www.techtarget.com

Tools for Assessment (50 Marks)						
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total
8	8	10	8	8	8	50

Mapping												
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	L	M	M	L	M	H	M	H	M	L
CO2	M	M	M	M	H	M	M	M	M	L	M	H	H
CO3	H	L	M	H	M	M	L	H	H	L	H	L	M
CO4	M	H	L	M	L	L	H	M	M	L	L	M	L
CO5	M	M	H	H	M	H	M	H	H	L	M	M	H

H-High; M-Medium; L-Low

Course designed by	Verified by

Course Code	Title		
22U3ITE612	**Elective Paper III: Ethical Hacking**		
Semester: VI	**Credits: 4**	**CIA: 50 Marks**	**ESE:50 Marks**

Course Objective	To help students understand how ethical hacking is used as a method to prevent hacking. To make it possible for students to learn the process of identifying vulnerabilities and exploits of the technological ecosystem
Course Category	Entrepreneurship, Skill Development
Development Needs	Global
Course Description	This course helps to facilitate students, appreciate the need for understanding non-technology aspects of ethical hacking such as legal frameworks, documentation and report writing.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Explain the importance of numerous methods of real-world information intelligence.	Flipped Classroom	Group Discussion
CO 2	Differentiate the processes of vulnerability assessment and ethical hacking from penetration testing.	Video Lecture	Assignment
CO 3	Comprehend the importance of appropriate countermeasures for managing vulnerabilities.	Problem Solving	Seminar
CO 4	To familiarize with the methodologies that can be used to hack into a target.	Tutorial / Case Studies	Quiz
CO 5	To appreciate the wide variety of attacks that can be performed against awireless network.	Virtual Lab	Flip Test

Offered by	**Information Technology**	

Course Content	**Instructional Hours / Week : 6**

Unit	Description	Text Book	Chapters
I	Introduction To Hacking: Terminologies, Categories of Penetration Test, Writing Reports, Structure of a Penetration Testing Report, Vulnerability Assessment Summary, Risk Assessment, Methodology, Linux Basics: File Structure, Cron Job, Users, Common Applications , BackTrack, Services.	**1**	
	Instructional Hours		**18**
Suggested Learning Methods : Video Lectures			**02 Hrs**

II	Information Gathering, Target Enumeration And Port Scanning Techniques: Active, Passive and Sources of information gathering, Copying Websites Locally, NeoTrace, Cheops-ng, Intercepting a Response, What Web, Net craft, Basic Parameters, Code Exploit Scanner, Interacting with DNS Servers, Fierce, Zone Transfer with Host Command and Automation, DNS Cache Snooping- Attack Scenario, Automating Attacks, SNMP - Problem, Sniffing Passwords, SolarWinds Toolset, sweep, Brute Force and Dictionary- Tools , Attack, Enumeration, Intelligence Gathering Using Shodan, Target enumeration and Port Scanning Techniques.	1	

Instructional Hours		**18**

Suggested Learning Methods :Online Simulation Tools		**02 Hrs**

III	Vulnerability Assessment & Network Sniffing: Introduction to Vulnerability Assessment - Pros and Cons, NMap, Updation of database, Testing SCADA Environments with Nmap, Nessus, Sniffing: Types, Hubs versus Switches, Modes, MITM Attacks, ARP Protocol Basics- working, Attacks, DoS Attacks, Dsniff tool, Using ARP Spoof to Perform MITM Attacks, Sniffing the Traffic with Dsniff, Sniffing Pictures with Drifnet, Urlsnarf and Webspy, Sniffing with Wireshark, Ettercap- ARP Poisoning, Hijacking Session with MITM Attack, ARP Poisoning with Cain and Abel, Sniffing Session Cookies with Wireshark, Hijacking the Session, SSL Strip: Stripping HTTPS Traffic, Requirements, Automating Man in the Middle Attacks, DNS Spoofing, DHCP Spoofing.	1	

Instructional Hours		**18**

Suggested Learning Methods : Worked examples		**02 Hrs**

IV	Remote Exploitation : Understanding Network Protocols, Attacking Network Remote Services, Common Target Protocols, tools for cracking network remote services, Attacking SMTP, Attacking SQL Servers, Client Side Exploitation Methods: E-Mails Leading to Malicious Attachments & Malicious Links, Compromising Client Side Update, Malware Loaded on USB Sticks, Post exploitation: Acquiring Situation Awareness, Privilege Escalation, Maintaining Access, Data Mining, Identifying and Exploiting Further Targets, Windows Exploit DevelopmentBasics.	1	

Instructional Hours		**18**

Suggested Learning Methods : Problem Based Learning		**02 Hrs**

V	Wireless Hacking :Requirements , Aircracking , Hidden SSIDs , Monitor Mode , Monitoring Tool- Beacon Frames on Wireshark ,Airodump-ng , Wireless Adapter in Monitor Mode , Determining the Target , Cracking a WPA/WPA2 Wireless Network Using Aircrack-ng , Capturing Packets and Four-Way Handshake , Web Hacking :Attacking the Authentication , Brute Force and Dictionary Attacks , Types of Authentication , Crawling Restricted Links , Testing for the Vulnerability , Authentication Bypass with Insecure Cookie Handling , SQL injection, XSS – DOM based,BeEF,CSRF, Bypassing CSRF and BeEF with XSS, Vulnerability in FCKeditor, efront.	1	

	Instructional Hours	**18**
Suggested Learning Methods : Laboratory practice		**02 Hrs**
	Total Hours	**90 Hrs**
Text Books	1. Rafay Baloch ,- Ethical Hacking and Penetration Testing Guide, CRC Press, 2015.	
Reference Books	1.PatrickEngebretson,―TheBasicsof Hacking and Penetration Testing : Ethical Hacking and Penetration Testing Made Easy, Syngress Media, Second Revised Edition, 2013. 2. MichaelT. Simpson, Kent Backman, James E.Corley,― Hands On Ethical Hacking and Network Defense, Cengage Learning, 2012.	
Web. URLs	www.simplilearn.com	

Tools for Assessment (50 Marks)						
CIA I	**CIA II**	**CIA III**	**Assignment**	**Seminar**	**Quiz**	**Total**
8	**8**	**10**	**8**	**8**	**8**	**50**

Mapping												
CO \ PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	H	H	L	M	M	L	M	H	M	H	M	L
CO2	M	M	M	M	H	M	M	M	M	L	M	H	H
CO3	H	L	M	H	M	M	L	H	H	L	H	L	M
CO4	M	H	L	M	L	L	H	M	M	L	L	M	L
CO5	M	M	H	H	M	H	M	H	H	L	M	M	H

H-High; M-Medium; L-Low

Course designed by	**Verified by**

Course Code	Title		
22U3ITZ604	**Skill Based Paper IV: Practical in Kotlin**		
Semester: VI	**Credits: 3**	**CIA: 30 Marks**	**ESE: 45 Marks**

Course Objective	To gain knowledge in a new language for JVM.It is astatically-typed open-source programming language for generating code that can run on the Java Virtual Machine. It is a mixture of legacy Java code and Kotlincode which is used to build and run some of the largest and most powerful websites on the Internet
Course Category	Employability, Skill Development
Development Needs	Global
Course Description	The course is based on the Java experience; it shows the similarities between the two languages and focuses on what's going to be different.

Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the basics of Kotlin		
CO 2	Gain knowledge on content management	Demonstration Method	Laboratory Experiments
CO 3	Understand the basic Java, Java Virtual Machine		
CO 4	Apply Android, Javascript		
CO 5	Create a new environment using android platform		

Offered by	**Information Technology**

Course Content	Instructional Hours / Week : 6

Programme	Description
1	Kotlin program to print an Integer
2	Kotlin program to Add two integers
3	To define ASCII value of a character using Kotlin
4	To check whether a number is ODD or EVEN using Kotlin
5	To find the largest among three numbers using Kotlin
6	To display Fibonacci series using Kotlin
7	To check whether number is Prime or not
8	To find Factorial of a number
9	To make a simple Calculator using switch case
10	Kotlin program to get current working directory
11	Kotlin program to get current Date/Time

12	Kotlin program to sort a Map by values

	Instructional Hours	90

Tools for Assessment (50 Marks)						
Application of Logic	Program Creativity	Program Debugging	Test 1	Test 2	Observation Note Book	Total
5	5	5	6	6	3	30

Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	H	M	H	M	H	H	H	H	H	H	H	M	M
CO2	M	M	M	M	H	M	M	M	H	H	H	M	M
CO3	H	M	M	H	M	M	L	H	H	H	H	H	H
CO4	H	H	H	L	H	H	H	M	H	H	H	M	H
CO5	M	M	H	H	M	H	M	H	H	H	H	M	H

H-High; M-Medium; L-Low

Course designed by	Verified by