

# **Nallamuthu Gounder Mahalingam College**

## **Department of Information Technology**

### **Vision**

The Vision of our Department is to assist the student in becoming proficient in using latest Technologies, and critical thinking being prepared for the next level of education and successfully attaining the skills and proficiencies required of today's work force.

### **Mission**

The Information Technology department is committed to providing the highest quality technology services and support, thereby enhancing the operation, and educational capabilities among the students.

### **Program Educational Objectives:**

<b>PEO1</b>	Prepare the students to engage in independent learning for developing the Applications based on industry and social needs.
<b>PEO2</b>	To train students to a level where they can readily compete for the higher educational programs.
<b>PEO3</b>	To make students as computer professionals, who can be directly employed or start their own work as Programmer, Web Designer, Database User, Testing professional, Designer of a System and Network administrator or implementer.
<b>PEO4</b>	To familiar with the contemporary issues, latest trends in technological development and there by innovate new ideas and solutions to existing problems.
<b>PEO5</b>	To participate effectively as a member of a development team and undertake leadership roles in appropriate arena.

## Program Outcomes:

<b>PO1</b>	<b>Problem Solving and Communication Skill:</b> Ability to apply knowledge of mathematical fundamentals and programming ability to solve complex problems in the field of Information Technology.
<b>PO2</b>	<b>Disciplinary Knowledge:</b> Exhibit the knowledge of emerging technologies and tools to create need-based, customized applications for industrial automation.
<b>PO3</b>	<b>Entrepreneurship skills:</b> Ability to become an entrepreneur by acquiring skills related to their domain and addressing industry and social needs with environmental considerations.
<b>PO4</b>	<b>Research Related Skills:</b> Ability to cultivate research-based knowledge for innovating new ideas and solutions to contemporary issues by linking knowledge of computer science with other domains.
<b>PO5</b>	<b>Moral and Ethical Awareness/ Reasoning:</b> Exhibit professional ethics in the usage of digital data.
<b>PO6</b>	<b>Life Long Learning:</b> Knack to pursue higher studies of specialization courses by clearing entrance exams in top institutions.
<b>PO7</b>	<b>Critical Thinking:</b> Aptitudes to analyze, design, and implement tools and applications to solve real-world hitches.
<b>PO8</b>	<b>Information / Digital Literacy:</b> Ability to handle different types of networks, hardware, and other resources on a large-scale platform for Industry 4.0.
<b>PO9</b>	<b>Data Analytic Skills:</b> Capability of presenting and securing voluminous data with emerging tools and techniques.
<b>PO10</b>	<b>Contemporary Skills:</b> Skill enrichment to provide web-based solutions using recent technologies and tools.

## Program Specific Outcomes:

<b>PSO1</b>	<b>Embracing the Cutting Edge:</b> To identify and utilize the latest updates on recent technologies by applying knowledge on Artificial Intelligence, Internet of Things, and Mobile computing.
<b>PSO2</b>	<b>Strategic Fusion:</b> To develop the ability to integrate Information technology with business applications and to impart knowledge on the fundamentals of research.

**Mapping** (POs and PSOs with COs): H - High, M - Medium, L – Low

**NGM College - Department of Information Technology**  
**Scheme of Examination For 2024 - 2027**  
**Choice Based Credit System & OBES**

**SEMESTER - I**

Part	Subject Code	Title of the Paper	Hrs / Week		Hrs / Sem.	Exam Hrs.	Maximum Marks		Total Marks	Credits
			L	P	T		Internal	External		
I	24UTL1C1	Tamil Paper - I	5	-	-	3	25	75	100	3
	24UHN1C1	Hindi Paper - I		-	-					
	24UFR1C1	French Paper – I		-	-					
II	24UEN101	Communication Skills – I (Level I) /	5	-	-	3	25	75	100	3
	24UEN102	Communication Skills – I (Level II)		-	-					
III	24UIT101	CC - I : Programming in 'C'	4	-	4	3	25	75	100	4
	24UIT102	CC - II : Computer System Architecture	5	-	-	3	25	75	100	4
	24UIT1A1/ 24UIT1A2	GE I - Allied : Mathematics - I (Statistics) / Numerical Methods	4	-	5	3	25	75	100	4
	24UIT103	CC Lab - I : Programming in 'C'	-	4	-	3	20	30	50	2
IV	24UIT1S1	SS Lab. – I : Web Designing (HTML) Self study	-	-	-	2	-	50	50	2
	24EVS101	AECC I: Environmental Studies	2	-	-	2	-	50	50	2
	24HEC101	Human Excellence - Personal Values & SKY Yoga Practice - I	1	-	-	2	20	30	50	1
V		Extension Activities – Annexure I	-	-	-	-	-	-	-	-
EC		Online Course (Optional) (MOOC / NPTEL / SWAYAM )	-	-	-	-	-	-		Grade
Total			26	4	9				700	25

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course  
 CC – Core Course; GE – Generic Elective; AECC - Ability Enhancement Compulsory Course

SEMESTER - II										
Part	Subject Code	Title of the Paper	Hrs / Week		Hrs / Sem.	Exam Hrs.	Maximum Marks		Total Marks	Credits
			L	P	T		Internal	External		
I	24UTL2C2	Tamil Paper - II	5	-	-	3	25	75	100	3
	24UHN2C2	Hindi Paper - II		-	-					
	24UFR2C2	French Paper – II		-	-					
II	24UEN202 /	Communication Skills – II (Level I) /	5	-	-	3	25	75	100	3
	24UEN203	Communication Skills – II (Level II))		-	-					
III	24UIT204	CC - III : Object Oriented Programming with Java	4	-	-	3	25	75	100	4
	24UIT205	CC - IV : Data Structures	5	-	-	3	25	75	100	4
	24UIT2A1/ 24UIT2A2	GE II - Allied : Mathematics II (Discrete Mathematics) / Operations Research	4	-	10	3	25	75	100	4
	24UIT206	CC Lab - II : Programming in Java with Data Structures	-	4	-	3	20	30	50	2
IV	24UIT2S1/ 24UEL2S2	SEC I: Naan Mudhalvan: Web Programming Lab. (PHP)/ Professional Skills	-	2	-	2	-	50	50	2
	24HEC201	Human Excellence - Family Values & SKY Yoga Practice – II	1	-	-	2	20	30	50	1
V		Extension Activities - Annexure I	-	-	-	-	-	-	-	-
EC	24CMM201	Manaiyiyal Mahathuvam - I	15Hrs./Sem	-	-	2	-	50	50	Grade
	24CUB201	Uzhavu Bharatham – I	15Hrs./Sem	-	-	2	-	50	50	Grade
		Online Course (Optional) (MOOC / NPTEL / SWAYAM )	-	-	-	-	-	-	-	-
Total			24	6	10				650	23

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course.  
 CC – Core Course; GE – Generic Elective; AECC - Ability Enhancement Compulsory Course;  
 SEC – Skill Enhancement Course.

### SEMESTER – III

Part	Subject Code	Title of the Paper	Hrs / Week		Hrs / Sem.	Exam Hrs.	Maximum Marks		Total Marks	Credits
			L	P			T	Internal		
I	24UTL3C3	Tamil Paper - III	3	-	-	3	25	75	100	3
	24UHN3C3	Hindi Paper - III		-	-					
	24UFR3C3	French Paper – III		-	-					
II	24UEN3C3	Communication Skills – III	3	-	-	3	25	75	100	3
III	24UIT307	CC - V : Operating Systems	5	-	-	3	25	75	100	4
	24UIT308	CC - VI : Relational Database Management System	4	-	-	3	25	75	100	4
	24UIT3A1/ 24UIT3A2	GE III - Allied : Microprocessor / Embedded Systems	4	-	-	3	25	75	100	4
	24UIT309	CC Lab - III : RDBMS	-	4	-	3	20	30	50	2
	24UIT310	CC Lab. – IV: Excel Lab.	-	4	-	3	20	30	50	2
IV	24UIT3N1/ 24UIT3N2	Non Major Elective - I : Social Networks / Non Major Elective - I : Hardware & Networking	2	-	-	2	-	50	50	2
	24HEC303	Human Excellence - Professional Values & Ethics – III	1	-	-	2	20	30	50	1
V		Extension Activities - Annexure I	-	-	-	-	-	-	-	-
EC	24CMM302	Manaiyiyal Mahathuvam - II	15 Hrs./Sem		-	2	-	50	50	Grade
	24CUB302	Uzhavu Bharatham – II	15Hrs./Sem		-	2	-	50	50	Grade
	24UIT3VA	VAC I : Workplace Digitization	30 Hrs.		-	3	30	70	100	2*
			22	8	-	-	-	-	700	25

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course  
 CC – Core Course; GE – Generic Elective; VAC-Department Specific Value Added Course;  
 \*Extra Credits;

SEMESTER – IV										
Part	Subject Code	Title of the Paper	Hrs / Week			Exam Hrs.	Maximum Marks		Total Marks	Credits
			L	P	T		Internal	External		
I	24UTL4C4	Tamil Paper - IV		-	-					
	24UHN4C4	Hindi Paper - IV	3	-	-	3	25	75	100	3
	24UFR4C4	French Paper – IV		-	-					
II	24UEN4C4	Communication Skills – IV)	3	-	-	3	25	75	100	3
III	24UIT411	CC - VII : Data Communication and Networks	5	-	-	3	25	75	100	4
	24UIT412	CC - VIII : Advanced Java Programming	4	-	5	3	25	75	100	4
	24UIT4A1/ 24UIT4A2	GE IV - Allied : Software Engineering/Software Project Management	5	-	-	3	25	75	100	4
	24UIT413	CC Lab.- V : Programming in Advanced Java	-	5	-	3	20	30	50	2
IV	24UIT4S1/ 24UIT4S2	SEC II: Naan Mudhalvan: Advanced Excel Lab. / Quantitative Aptitude	-	2	-	2	-	50	50	2
	24UIT4N1 / 24UIT4N2	Non Major Elective - II : Data Analytics / Non Major Elective - II : Computer Security	2	-	-	2	-	50	50	2
	24HEC404	Human Excellence - Social Values & SKY Yoga Practice – IV	1	-	-	2	20	30	50	1
V		Extension Activities - Annexure I	-	-	-	-	-	-	50	1
EC	24CMM403	Manaiyiyal Mahathuvam - III	15 Hrs./Sem		-	2	-	50	50	Grade
	24CUB403	Uzhavu Bharatham - III	15 Hrs./Sem		-	2	-	50	50	Grade
	24UIT4VA	VAC II: Data Visualization	30 Hrs.		-	3	30	70	100	2*
	Total			23	7					750

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course

CC – Core Course; GE – Generic Elective; SEC – Skill Enhancement Course; VAC-Department Specific Value Added Course;

\*Extra Credits;

## SEMESTER – V

Part	Subject Code	Title of the Paper	Hrs / Week		Hrs / Sem.	Exam Hrs.	Maximum Marks		Total Marks	Credits
			L	P	T		Internal	External		
III	24UIT514	CC -IX : Python Programming	5	-	-	3	25	75	100	4
	24UIT515	CC - X : Visual Programming	5	-	5	3	25	75	100	4
	24UIT5E1/ 24UIT5E2/ 24UIT5E3	<b>DSE -I: #</b>	5	-	-	3	25	75	100	4
	24UIT516	CC Lab - VI : Visual Programming	-	5	-	3	20	30	50	2
	24UIT517	CC Lab - VII : Python Programming	-	5	-	3	20	30	50	2
	24UIT5S1/ 24UIT5S2	SEC III: Graphic Designing Lab. (Photoshop / Canva)	-	4	-	-	-	50	50	2
IV	24HEC505	Human Excellence - National Values & SKY Yoga Practice - V	1	-	-	2	20	30	50	1
EC	24CSD501	Soft Skills Development - I	-	-	-	-	-	-	-	Grade
	24GKL501	General Knowledge	-	-	-	2	-	50	50	Grade
	24UIT5AL	ALC – I Cyber Law (Optional) – self study	-	-	-	-	-	-	100	2**
Total			16	14	5				500	19
<b>Discipline Specific Elective (DSE) – I<sup>#</sup></b>										
24UIT5E1: Data Mining 24UIT5E2: Cloud Computing 24UIT5E3: Wireless Networks										

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course

CC – Core Course; DSE – Discipline-Specific Elective; SEC – Skill Enhancement Course

ALC-Advanced Learner Course (Optional)

\*Extra Credits; \*\*Credits – Based on course content maximum of 4 credits

## SEMESTER - VI

Part	Subject Code	Title of the Paper	Hrs / Week		Hrs/ Sem.	Exam Hrs.	Maximum Marks		Total Marks	Credits	
			L	P	T		Internal	External			
III	24UIT618	CC - XI : Information Security	6	-	-	3	25	75	100	4	
	24UIT6E4/ 24UIT6E5/ 24UIT6E6	<b>DSE – II : ##</b>	5	-	-	3	25	75	100	4	
	24UIT6E7/ 24UIT6E8/ 24UIT6E9	<b>DSE – III : ###</b>	6	-	-	3	25	75	100	4	
	24UIT619	Core Lab - VIII : Software Testing & Data Visualization Tools	-	5	-	3	20	30	50	2	
	24UIT620	Core Lab IX: Open Source Methodologies	-	5	-	-	20	30	50	2	
	24UIT621	Project	-	-	-	-	25	75	100	3	
IV	24UIT6S1/ 24UIT6S2	SEC IV :Naan Mudhalvan: Multimedia Lab.(Flash / 3Ds Max )	-	2	-	2	-	50	50	2	
	24HEC606	Human Excellence - Global Values & SKY Yoga Practice - VI	1	-	-	2	20	30	50	1	
EC	24CSD602	Soft Skills Development - II	-	-	-	-	-	-	-	Grade	
	24UIT6AL	ALC - II Digital Forensics (Optional) – Self Study	-	-	-	-	-	-	100	2**	
<b>Total</b>			18	12					600	22	
<b>Grand Total</b>									3900	140+8*	
<b>Discipline Specific Elective (DSE) – II ##</b>						<b>Discipline Specific Elective (DSE) – III ###</b>					
24UIT6E4: Machine Learning 24UIT6E5: Internet of Things 24UIT6E6: Digital Marketing						24UIT6E7 : Big Data Analytics 24UIT6E8 : Artificial Intelligence 24UIT6E9 : Block Chain Technology					

### List of Abbreviations:

CC – Core Course

GE – Generic Elective

AECC - Ability Enhancement Compulsory Course    SEC – Skill Enhancement Course

DSE – Discipline-Specific Elective

VAC –Value Added Course

ALC – Advanced Learner Course

AL-Advanced Learner Course (Optional); VA-Department Specific Value Added Course;

\*Extra Credits

\*\*Credits – Based on course content maximum of 4 credits

EC – Extra Credit Course / Certificate Course / Co-scholastic Course / Job Oriented Course

**Grand Total = 3900; Total Credits = 140**



## Question Paper Pattern (Based on Bloom's Taxonomy)

K1-Remember; K2- Understanding; K3- Apply; K4-Analyze; K5- Evaluate

### 1. Theory Examinations: 75 Marks (Part I, II, & III)

(i) Test- I & II, ESE:

Knowledge Level	Section	Marks	Description	Total
K1 & K2 (Q1 - 10)	A (Q1 – 5 MCQ) (Q6 – 10 Define / Short Answer / MCQ)	10 * 1 = 10	MCQ / Define	<b>75</b>
K3 (Q11-15)	B (Either or pattern)	5 * 5 = 25	Short Answers	
K4 & K5 (Q16 – 20)	C (Either or pattern)	5 * 8 = 40	Descriptive/ Detailed	

### 2. Practical Examinations:

Paper	Maximum Marks	Marks for		Components for CIA		
		CIA	CEE	Tests	Observation Note	Record Note
Practical (Core / Elective)	50	20	30	10	05	05

### 3. Project:

Paper	Maximum Marks	Marks for		
		CIA	CEE	
			Evaluation	Viva-voce
Project	100	25	50	25

\* CIA – Continuous Internal Assessment & CEE – Comprehensive External Examinations

# Components of Continuous Internal Assessment (CIA)

## THEORY

**Maximum Marks: 100; CIA Mark: 25; CEE Mark: 75;**

Components		Calculation	CIA Total
Test 1	75	$(75+75+15+10)/7$	25
Test 2 / Model	75		
Assignment / Digital Assignment	15		
Others*	10		

\*Others may include the following: Seminar / Socratic Seminars, Group Discussion, Role Play, APS, Class participation, Case Studies Presentation, Field Work, Field Survey, Term Paper, Workshop / Conference Participation, Presentation of Papers in Conferences, Quiz, Report / Content Writing, etc.

## PROJECT

**Maximum Marks: 100; CIA Mark: 25; CEE Mark: 75;**

Components		Calculation	CIA Total
Review I	5	$5+5+5+10$	25
Review II	5		
Review III	5		
Report Submission	10		

Originality of Idea, Relevance to Current Trend, Candidate Involvement, and Presentation of Report for Commerce, Management & Social Work.

Synopsis, System Planning, Design, Coding, Input form, Output format, Preparation of Report & Submission for Computer Science cluster.

# Continuous Internal Assessment for Project For Computer Science Cluster

**Maximum Marks:** 100 Marks

**Components for CIA: 25 Marks**

Criterion	Mode of Evaluation	Marks	Total
I	Synopsis, Company Profile, System Specification, Existing System, Proposed System OR (For Android Developments) Planning Stage	05	25
II	Supporting Diagrams like system flowchart, ER, DFD, Use case and Table Design OR UI and UX Design Application Architect and Prototyping	05	
III	Coding, Input forms, Output format, Testing OR Development, Testing	05	
IV	Preparation of Report & Submission	10	

**Components for CEE: 75 Marks**

Components for CEE	Marks	Total	Grand Total
<b>Evaluation</b>			75
Title Relevance of the Industry/Institute	10	50	
Technology	10		
Design and Development Publishing	10		
Testing, Report	20		
<b>Viva Voce</b>			
Project Presentation	10	25	
Q&A Performance	15		

# STUDENT SEMINAR EVALUATION RUBRIC

Grading Scale:

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>8-10</b>	<b>5-7</b>	<b>3-4</b>	<b>0-2</b>

<b>CRITERIA</b>	<b>A - Excellent</b>	<b>B - Good</b>	<b>C - Average</b>	<b>D - Inadequate</b>
<b>Organization of presentation</b>	Information presented as an interesting story in a logical, easy-to-follow sequence	Information presented in logical sequence; easy to follow	Most of the information is presented in sequence	Hard to follow; sequence of information jumpy
<b>Knowledge of the subject &amp; References</b>	Demonstrated full knowledge; answered all questions with elaboration & Material sufficient for clear understanding <b>AND</b> exceptionally presented	At ease; answered all questions <b>but</b> failed to elaborate & Material sufficient for clear understanding <b>AND</b> effectively presented	At ease with information; answered most questions & Material sufficient for clear understanding <b>but</b> not clearly presented	Does not have a grasp of information; answered only rudimentary Questions & Material not clearly related to the topic <b>OR</b> background dominated seminar
<b>Presentation Skills using ICT Tools</b>	Uses graphics that explain and reinforce text and presentation	Uses graphics that explain the text and presentation	Uses graphics that relate to text and presentation	Uses graphics that rarely support text and presentation
<b>Eye Contact</b>	Refers to slides to make points; engaged with the audience	Refers to slides to make points; eye contact the majority of the time	Refers to slides to make points; occasional eye contact	Reads most slides; no or just occasional eye contact
<b>Elocution – (Ability to speak English language)</b>	Correct, precise pronunciation of all terms The voice is clear and steady; the audience can hear well at all times	Incorrectly pronounces a few terms Voice is clear with few fluctuations; the audience can hear well most of the time	Incorrectly pronounces some terms Voice fluctuates from low to clear; difficult to hear at times	Mumbles and/or Incorrectly pronounces some terms Voice is low; difficult to hear

# WRITTEN ASSIGNMENT RUBRIC

Grading Scale:

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>13-15</b>	<b>10-12</b>	<b>7-9</b>	<b>4-6</b>	<b>0-3</b>

<b>CRITERION</b>	<b>A - Excellent</b>	<b>B - Good</b>	<b>C - Average</b>	<b>D - Below Average</b>	<b>F - Inadequate</b>
<b>Content &amp; Focus</b>	Hits on almost all content exceptionally clear	Hits on most key points and the writing is interesting	Hits in basic content and writing are understandable	Hits on a portion of content and/or digressions and errors	Completely off track or did not submit
<b>Sentence Structure &amp; Style</b>	<ul style="list-style-type: none"> <li>* Word choice is rich and varies</li> <li>* Writing style is consistently strong</li> <li>* Students own formal language</li> </ul>	<ul style="list-style-type: none"> <li>* Word choice is clear and reasonably precise</li> <li>* Writing language is appropriate to the topic</li> <li>* Words convey intended message</li> </ul>	<ul style="list-style-type: none"> <li>* Word choice is basic</li> <li>* Most writing language is appropriate to the topic</li> <li>* Informal language</li> </ul>	<ul style="list-style-type: none"> <li>* Word choice is vague</li> <li>* Writing language is not appropriate to the topic</li> <li>* Message is unclear</li> </ul>	* Not Adequate
<b>Sources</b>	Sources are cited and are used critically	Sources are cited and some are used critically	Some sources are missing	Sources are not cited	Sources are not all cited
<b>Neatness</b>	Typed; Clean; Neatly bound in a report cover; illustrations provided	Legible writing, well-formed characters; Clean and neatly bound in a report cover	Legible writing, some ill-formed letters, print too small or too large; papers stapled together	Illegible writing; loose pages	Same as below standard
<b>Timeliness</b>	Report on time	Report one class period late	Report two class periods late	Report more than one week late	Report more than 10 days late

<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT101			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	4	CC I: Programming in 'C'	<b>Semester:</b>	I	
					<b>Credits:</b>	4	

### Course Objective

To cultivate programming ability on logic development, clear view on control structures, pointers (memory management), file handling, etc.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To keep in mind the fundamentals of C programming.	K1
CO2	To understand the concepts of problem solving techniques.	K2
CO3	To apply concepts and techniques for implementation.	K3
CO4	To analyze the level of logical thinking in program development	K4
CO5	To evaluate the program output.	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
<b>CO1</b>	L	L	-	-	-	H	-	-	-	-	-	-
<b>CO2</b>	H	-	L	M	-	M	H	L	M	L	-	L
<b>CO3</b>	M	L	M	H	M	M	H	-	M	L	-	M
<b>CO4</b>	H	-	M	-	L	-	H	M	M	M	-	L
<b>CO5</b>	M	M	-	M	-	L	M	-	-	L	-	-

Units	Content	Hrs. L+T
Unit I	Programming development methodologies - Programming style – <b>Problem solving techniques:</b> Algorithm, Flowchart, Pseudo code. Structure of a C program – C character set - Delimiters – Keywords – Identifiers – Constants – Variables – Rules for defining variables – Data types – Declaring and initializing variables – Type conversion. Operators and Expressions.	13
Unit II	<b>Formatted and Unformatted I/O functions. Decision statements:</b> If, If...Else, Nested If. Else, Break, Continue, Go to, Switch, Nested switch...case, switch...case and nested ifs statements. <b>Loop control statements:</b> For, Nested for, While, Do...while and with while loops.	12+ 1
Unit III	<b>Arrays:</b> Initialization, definition, characteristics, One dimensional, predefined streams, two dimensional, three or multi-dimensional arrays – scanf (), printf (). <b>Strings:</b> Declaration and initialization, displaying, standard functions and applications. <b>Pointers:</b> Futures, Declarations, arithmetic operations, pointers and arrays, two dimensional arrays, array of pointers, pointers to pointers, pointers and strings, void pointers.	10+1
Unit IV	<b>Functions:</b> Definition, declaration, return statements, types, call by value and reference, returning more multiple values, function as an argument, function with arrays and pointers. <b>Structure and Union:</b> Features of structure, Declaration and initialization of structure, Structure within structure, Array of structure, Pointer to structure, structure and functions, typedef, Bit fields, Enumerated data types, Union, union of structures.	11+1
Unit V	<b>Files:</b> Streams and file types, Steps for file operation, File I/O, Structures read and write, Other file functions, searching errors in reading or writing files, low level disk I/O, Command line arguments, I/O redirection. <b>Preprocessor directives:</b> #define, #include, #ifndef, #error, #line, #pragma, and Predefined macros.	10+1
	<b>Total Contact Hrs.</b>	<b>60</b>

### Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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### Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD/ Roll Play /APS)
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## Text Book

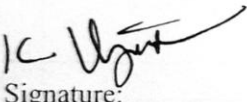

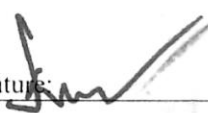

- ❖ Ashok .N. Kamthane. (2009). *PROGRAMMING AND DATA STRUCTURES*. First Indian Print. Pearson Education: ISBN 978-81-317-2423-4.

## Reference Books

- ❖ Balagurusamy. E. (2008). *Programming in ANSI C*. Tata McGraw-Hill.
- ❖ PradipDey, ManasGhosh. (2008). *Computer Fundamentals and Programming in C*. Oxford.

## Web Reference

- ❖ <https://www.tutorialspoint.com/cprogramming/index.htm>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: K.Vijayakumar Signature: 	Name: K.Vijayakumar Signature: 	Name: Mr. K. Srinivasan Signature: 	Name: Mr. K. Srinivasan Signature: 

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT102			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-	CC- II : Computer System Architecture	<b>Semester:</b>	I	
					<b>Credits:</b>	4	

### Course Objective

To obtain the basic knowledge of computer organization, input, output and memory organization.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember basic building block of digital computer system	K1
CO2	To understand the execution sequence of instruction through the processor	K2
CO3	To apply interfacing of various peripheral devices used with the system	K3
CO4	To analyze functioning of various parts of the computer from hardware point of view	K4
CO5	To judge the pros and cons of various types of memory organizations	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	L	H	-	M	M	H	H	L	-	M	-
CO2	M	M	L	-	L	L	H	L	L	-	L	-
CO3	L	L	H	-	M	M	H	H	L	-	M	-
CO4	L	L	H	-	H	M	H	H	M	-	M	-
CO5	L	M	L	M	L	L	M	H	H	-	L	-

<b>Units</b>	<b>Content</b>	<b>Hrs.</b>
<b>Unit I</b>	<b>Binary Systems:</b> Numbers – Conversions – Complements – Codes – Logic. <b>Canonical &amp; Standard Forms. Digital Logic Gates. Simplification of Boolean Functions:</b> Map method – Two & Three Variable Map – Four Variable Map.	<b>16</b>
<b>Unit II</b>	<b>Basic Computer Organization and Design:</b> Instruction Codes - Computer Registers – Computer Instructions – Instruction Cycle – Memory Reference Instructions – InputOutput and Interrupt.	<b>15</b>
<b>Unit III</b>	<b>Central Processing Unit (CPU):</b> General Register Organization – Stack Organization - Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Program Control.	<b>15</b>
<b>Unit IV</b>	<b>Input – Output Organization:</b> Peripheral Devices- Input – Output Interface – Asynchronous Data Transfer - Direct Memory Access (DMA) - CPU-IOP Communication.	<b>14</b>
<b>Unit V</b>	<b>Memory Organization:</b> Memory Hierarchy – Main Memory - Auxiliary Memory - Cache Memory – Associative Memory - Virtual Memory.	<b>15</b>
	<b>Total Contact Hrs.</b>	<b>75</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class

## Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.( Roll Play)

## Text Book



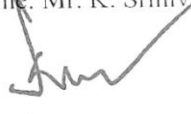
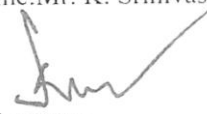
- ❖ M. Morris Mano. (2023), Computer System Architecture, Revised 3rd Edition .Pearson.

## Reference Books

- ❖ M. Carter. (2001). Computer Architecture. Schaum's outline series, TMH Pub.
- ❖ William Stallings. (2006), Computer System and Architecture, 8<sup>th</sup> Edition, Pearson Publication.

## Web References

- ❖ <https://www.youtube.com/watch?v=aWp8ILQgudI>
- ❖ <https://www.youtube.com/watch?v=OwC4JN64QYY>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: C.R. Durga devi Signature: 	Name: K. Vijayakumar Signature: 	Name: Mr. K. Srinivasan Signature: 	Name: Mr. K. Srinivasan Signature: 

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title :</b>	Information Technology		
<b>Course Code:</b>	24UIT1A1			<b>Title:</b>	<b>Batch :</b>	2024 - 2027	
				GE I – Allied :	<b>Semester :</b>	I	
<b>Lecture Hrs/Week:</b>	4	<b>Tutorial Hrs./ Sem.</b>	5	Mathematics – I (Statistics)	<b>Credits :</b>	4	

### Course Objective

Learning various statistical methods like central tendency, dispersion, correlation and regression, probability and sampling theory.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the formula of different Means, Median, Mode, Deviations, Correlation, Regression, Probability, Chi square test, Degree of Freedom, etc.	K1
CO2	To understand the concepts Central tendency, Dispersion, Correlation and regression, Probability and Sampling theory.	K2
CO3	To solve the problems by using formula to apply the programs	K3
CO4	To analyze the solution is right or wrong	K4
CO5	To evaluate the results through the program outputs	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	M	H	H	M	L	-	-	L	-	-
CO2	M	M	H	H	H	H	-	-	-	L	-	M
CO3	H	-	L	H	H	M	M	-	-	-	-	M
CO4	M	M	M	H	H	L	-	-	-	-	-	H
CO5	L	L	M	H	H	M	-	-	-	-	-	M

Units	Content	Hrs. L+T
Unit I	<b>Measures of central tendency:</b> Mean: Arithmetic Mean, Weighted Arithmetic Mean, Combined Arithmetic Mean, Geometric Mean, Harmonic Mean, Median and mode – Relation between mean, median and mode.	11+1
Unit II	<b>Dispersion:</b> Range - Mean deviation - Standard deviation - Coefficient of Variation – Quartile Deviation.	9+1
Unit III	<b>Correlation:</b> Karl Pearson's Coefficient of Correlation – Rank correlation. <b>Regression:</b> Regression Equations - Difference between correlation & Regression.	9+1
Unit IV	<b>Probability:</b> Permutation and Combination- Important terms in probability- <b>Measurement of Probability:</b> Classical Approach- Relative Frequency theory of probability – Personalistic view of probability – Axiomatic Approach of probability. <b>Theorems of probability:</b> Addition – Multiplication – Odds.	13+1
Unit V	<b>Sampling Theory and Test of Significance:</b> Introduction – Estimation theory – Testing of hypothesis – Testing if significance for large samples and small samples. <b>Chi Square Test:</b> Introduction – $\chi^2$ test, Degrees of freedom, Test of goodness of fit, Test of Independence.	13+1
	<b>Total Contact Hrs.</b>	<b>60</b>

### Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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### Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD/ Roll Play /APS)
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## Text Book

- ❖ Pillai R. S. N. Bagavathi V. (2019). *Statistical Methods*. 8<sup>th</sup> Edition, Sultan Chandand Sons & Company Ltd. New Delhi.

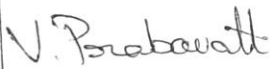



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## Reference Books

- ❖ Gupta. S.C. Kapoor. V.K. (Reprint 2014). *Fundamentals of Mathematical Statistics*. 11<sup>th</sup> edition. S. Chand and Sons.

## Web Reference

- ❖ <https://www.tutorialspoint.com/statistics/index.htm>
- ❖ <https://www.google.com/amp/s/www.edureka.co/blog/statistics-and-probability/amp/>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title :</b>	Information Technology		
<b>Course Code:</b>	24UIT1A2			<b>Title:</b>	<b>Batch :</b>	2024 - 2027	
				GE I – Allied :	<b>Semester :</b>	I	
<b>Lecture Hrs/Week:</b>	4	<b>Tutorial Hrs./ Sem.</b>	5	Numerical Methods	<b>Credits :</b>	4	

### Course Objective

To have an in-depth knowledge of various advanced methods in numerical analysis and to use numerical techniques to get numerical solutions of equations like transcendental and non-linear differential equations when ordinary analytical methods fail.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember numerical analysis techniques	K1
CO2	To understand the solution to problems of algebraic and transcendental equations, simultaneous linear equations.	K2
CO3	To solve the problems using Newton forward and backward interpolation	K3
CO4	To analyze the differential equations	K4
CO5	To evaluate the ordinary differential equations	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	L	H	H	M	L	-	M	L	-	-
CO2	M	M	H	H	H	H	-	-	M	L	-	M
CO3	H	-	L	H	H	M	M	-	-	-	-	M
CO4	M	M	M	H	H	L	-	-	M	-	-	H
CO5	L	L	M	H	H	M	-	-	-	-	-	M

Units	Content	Hrs. L+T
<b>Unit I</b>	<b>The solution of Numerical Algebraic and Transcendental Equations:</b> Introduction - The Bisection method - The iteration method - The method of false position (Regula - Falsi Method) - Newton Raphson method. <b>Simultaneous Linear Algebraic Equations:</b> Introduction – Gauss Elimination Method – Gauss Jordan Method – Computation of the inverse of a Matrix using Gauss’s Elimination Method.	15
<b>Unit II</b>	<b>Simultaneous Linear Algebraic Equations:</b> Iterative Methods - Gauss-Jacobi Method – Gauss-Seidal Method – Comparison of Gauss elimination and Gauss-Seidal Iteration methods.	9+1
<b>Unit III</b>	<b>Interpolation:</b> Introduction - Linear interpolation - Gregory Newton Forward and Backward interpolation Formula - Equidistant terms with one or more missing values.	9+1
<b>Unit IV</b>	<b>Numerical Differentiation:</b> Introduction - Newton’s forward difference formula to compute the derivatives - Newton’s backward difference formula to compute the derivatives. <b>Numerical Integration:</b> The Trapezoidal rule - Simpson’s one third rule – three fourth rule.	13+1
<b>Unit V</b>	<b>Numerical Solution of Ordinary Differential Equations:</b> Solution by Taylor Series - Taylor Series method for higher order differential equations- Euler’s method - Improved Euler’s method - Modified Euler method – Runge Kutta method - Second order Runge Kutta Method	13+1
	<b>Total Contact Hrs.</b>	<b>60</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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## Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD/ Roll Play /APS)
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## Text Book:




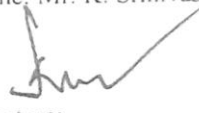
- ❖ Kandasamy P, Thilagavathy K and Gunavathi K, Numerical Methods, S. Chand company Ltd, 2012..

## Reference Books

- ❖ Venkataraman M. K, Numerical Methods in Science and Engineering, The National Publishing Company, Madras, 2009.

## Web Reference

- ❖ <https://nptel.ac.in/courses/111107105>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B. Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT103			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Practical Hrs./Week:</b>	4	<b>Tutorial Hrs./Sem.</b>	-	CC Lab. - I Programming in 'C'	<b>Semester:</b>	I	
					<b>Credits:</b>	2	

### Course Objective

To understand, learn and apply the various programming concepts of 'C' and improving the programming skills in 'C'.

### Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	To apply appropriate mathematical and scientific program logic	K3
CO2	To apply appropriate pointers, structure, and files	K3
CO3	To apply appropriate data structure concepts	K3
CO4	To analyze a problem in different logic	K4
CO5	To verify the solutions of various problems with input and output data	K5
CO6	To create a program using preprocessor directives.	K6

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	L	-	M	M	L	-	L	-	-	-
CO2	H	M	-	-	M	H	L	-	-	M	-	-
CO3	H	M	M	-	H	H	M	-	L	-	-	-
CO4	H	M	M	-	M	M	H	-	M	-	-	-





Content	Hrs.
<b>SAMPLE PROGRAM LIST</b>	
<p><b>Test I</b></p> <ol style="list-style-type: none"> <li>1. Execute a C program to implement basic operators.</li> <li>2. Execute a C program to implement if, if-else, nested if.</li> <li>3. Develop a C program to implement switch case.</li> <li>4. Develop a C program to implement while loop.</li> <li>5. Create a C program to implement do-while loop.</li> <li>6. Develop a C program to implement for loop.</li> <li>7. Create a C program to implement one dimensional array.</li> <li>8. Execute a C program to implement multi-dimensional array.</li> <li>9. Create a C program to implement strings.</li> <li>10. Execute a C program to implement basic pointer operations.</li> </ol> <p><b>Test II</b></p> <ol style="list-style-type: none"> <li>11. Develop a C program to implement array of pointers.</li> <li>12. Create a C program to implement functions using call by value.</li> <li>13. Execute a C program to implement functions using call by reference.</li> <li>14. Create a C program to implement structure and array of structure.</li> <li>15. Develop a C program to implement union.</li> <li>16. Execute a file to perform read and write operations using file accessing modes.</li> <li>17. Create a C program to implement preprocessor directives.</li> </ol>	60
<b>Total Contact Hrs.</b>	60

### Pedagogy

Direct Instruction, Digital Presentation

### Assessment Methods:

Test, Assignments, Group Discussion

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
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<b>Course Code:</b>	24UIT1S1			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Practical Hrs./Week</b>	SS	<b>Tutorial Hrs./Sem.</b>	-	SS Lab. - I : Web Designing (HTML)		<b>Semester:</b>	I
					<b>Credits:</b>	2	

### Course Objective

To know the Basic and Advanced Tags of HTML.

On the successful completion of the course, students will be able to

CO	CO Statement	Knowledge
CO1	To develop webpage using various HTML tags	K3
CO2	To analyze various HTML formats for web pages	K4
CO3	To assess the various tags in HTML for creating applications	K5
CO4	To verify the usage of HTML in applications	K5
CO5	To create applications using Advanced Tags of HTML	K6

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	M	M	L	L	M	M	L	L	H	L	M
CO2	L	M	L	L	L	L	H	L	H	H	L	M
CO3	L	M	M	L	L	M	M	M	H	H	L	M
CO4	L	M	L	L	L	L	H	L	H	H	L	M
CO5	L	M	M	L	L	M	M	L	L	H	L	M

Content	Hrs.
<b>SAMPLE PROGRAM LIST</b> <b>HTML</b>  1. Experiment with Webpage creation using basic tags. 2. Apply Ordered List and Un-Ordered List in web pages 3. Apply Table Tags in web pages 4. Experiment with Frame creation. 5. Apply Font Attributes in web pages 6. Apply advanced HTML tags in web pages	SS

**Pedagogy:**



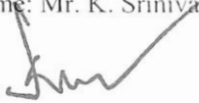
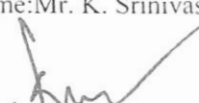
Direct Instruction, Digital Presentation
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**Assessment Methods:**

Test, Assignments, Group Task(GD)
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**WEB REFERENCES:**

- ❖ <https://www.w3schools.com/>
- ❖ <https://www.tutorialspoint.com/html/index.htm>

Course Designed by	Verified by HOD	Checked by	Approved by
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<b>Programme Code:</b>	B.Sc.- IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT204			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				CC - III: Object Oriented Programming with Java	<b>Semester:</b>	II	
<b>Lecture Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	-		<b>Credits:</b>	4	

### Course Objective

To provide knowledge about basic concepts of OOPs, methods, interfaces, multithreads, packages and applets.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To keep in mind the basic concepts of OOPs	K1
CO2	To apprehend a knowledge about how to use java for internet applications	K2
CO3	To implement file, applet, thread concepts for web applications	K3
CO4	To review the usage of packages, exceptions and string concept for developing stand - alone java programs	K4
CO5	To assess the various types of stream classes and file handling	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	M	-	M	H	H	L	L	L	M	M
CO2	H	H	H	-	L	L	H	L	M	H	M	M
CO3	M	H	H	-	L	M	H	L	M	H	M	M
CO4	H	H	H	M	M	M	M	L	M	M	-	-
CO5	H	H	M	M	L	M	M	M	M	L	-	-

Units	Content	Hrs.
Unit I	<b>Fundamentals of Object Oriented Programming:</b> Introduction – Paradigm - Basics – Benefits – Applications. <b>Java Evolution:</b> History – Features – Difference from C/C++ – Web browsers – Hardware and software requirements – Support systems –Environment. <b>Overview of Java language. Constants, Variables and Data types.</b>	12
Unit II	<b>Classes, Objects and Methods:</b> Introduction – Defining – Field, Method Declaration – Creating Objects – Accessing class members – Constructors – Method Overloading - Static Members – Nesting of Methods – Inheritance – Overriding – Final Variables, Methods and Classes. Finalizer Methods – Abstract methods and classes – Methods with Varargs – Visibility control. <b>Arrays, Strings and Vectors:</b> Introduction – One dimensional – Creation – Two-dimensional – Strings - Vectors – Wrapper classes – Enumerated types – Annotations. <b>Interfaces: Multiple Inheritance.</b>	13
Unit III	<b>Packages: Putting classes together:</b> Introduction – API packages – System packages – Naming Conventions – Creation – Accessing – Using – Adding a Class to a package – Hiding classes – Static import. <b>Multithreaded Programming :</b> Introduction – Creation – Extending – Stopping and blocking – Life cycle – Using thread methods – Exceptions – Priorities – Synchronization – Implementing the Runnable interface – Inter-thread communication. <b>Managing Errors and Exceptions.</b>	12
Unit IV	<b>Abstract Windowing Toolkit (AWT) - Applet Programming:</b> Introduction – Difference between Applet and other Applications - Writing and Building Applet - Life Cycle – Creating Executable applets – Designing a Web page – Applet Tag – Applet to HTML – Running Applets – Passing Parameters – Aligning the display – HTML tags – Numerical Values – User input – Event Handling.	12
Unit V	<b>Managing Input / Output Files:</b> Introduction – Streams – Stream Classes – Byte Stream – Character Stream – Using Stream – Useful I/O Classes – File Classes – I/O Exceptions – File Creation – Reading Writing Characters and Bytes – Primitive Data Types – Concatenating and Buffering - Random Access File – Interactive I/O – Other Stream Classes.	11
	<b>Total Contact Hrs.</b>	<b>60</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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## Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.( GD)
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## Text Book





- ❖ E. Balagurusamy. (2019). “Programming with JAVA – A Primer”, Tata McGraw-Hill Publishing Company Limited, 6th Edition. (Unit I, II, III, V)
- ❖ Instructional Software Research and Development (ISRD) Group. 2001. “Introduction to Object Oriented Programming through Java”, Tata McGraw-Hill Publishing Company Limited, New Delhi. (Unit IV – AWT)

## Reference Books

- ❖ Herbert Schild, (2002). Java Complete Reference, 5th Edition, Tata McGraw Hill Pub
- ❖ Y. Daniel Liang (2018) Intro to Java Programming (Comprehensive Version), 10th Edition Pearson Publication.

## Web Reference

- ❖ [https://youtu.be/uWYPVz\\_i7W4](https://youtu.be/uWYPVz_i7W4)
- ❖ <https://youtu.be/7s3xDfdqfDw>

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<b>Programme Code:</b>	B. Sc. - IT		<b>Programme Title:</b>	Information Technology	
<b>Course Code:</b>	24UIT205		<b>Title</b>	<b>Batch:</b>	2024 - 2027
			CC- IV: Data Structures	<b>Semester:</b>	II
<b>Lecture Hrs/Week:</b>	5	<b>Tutorial Hrs./Sem.</b>	-	<b>Credits:</b>	4

### Course Objective

To have adequate knowledge about linear data structures, queues, linked list, trees, searching, sorting and hashing.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To recollect basic concepts of data handle.	K1
CO2	To comprehend data structures like stack, queue, linked list and trees..	K2
CO3	To implement data structure techniques in problem solving	K3
CO4	To analyze space and time complexity of algorithms and to evaluate various data structures.	K4
CO5	To evaluate different algorithm results through the program outputs	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H				L	M						
CO2	M				M	H	M		M			
CO3	H	M		M			M					
CO4	H			H		H	M		H			L
CO5	H		M		M	M						L

Units	Content	Hrs.
Unit I	<b>Arrays:</b> Introduction to Linear and Non Linear Data Structures - Arrays in C – Single Dimensional Arrays - Array Operations. <b>Linked List:</b> Introduction to List and Linked Lists - Dynamic Memory Allocation - Basic Linked List Operations-Doubly Linked List - Circular Linked List - Atomic Node Linked List - Linked List in Arrays - Linked List versus Arrays.	16
Unit II	<b>Stacks:</b> Introduction to Stacks - Stack as an Abstract Data Type - Representation of Stacks Through Arrays - Representation of Stacks Through Linked List - Applications of Stacks - Stacks and Recursion.	14
Unit III	<b>Queues:</b> Introduction - Queue as an Abstract Data Type - Representation of Queues - Circular Queues - Double Ended Queues - Dequeue - Priority Queues - Application of Queues.	14
Unit IV	<b>Binary Trees:</b> Introduction to nonlinear Data Structure - Introduction to Binary Trees - Types of Trees - Definitions - Properties - Representation - Operations – Traversal - Reconstruction - Counting Number - Applications. <b>Searching:</b> An Introduction - Binary Search-Indexed Sequential search.	16
Unit V	<b>Graph:</b> Traversal – Spanning trees. <b>Sorting:</b> Sorting - An Introduction - Efficiency of sorting Algorithms - Bubble sort - Selection sort - Quick sort - Insertion sort - Merge sort - Binary Tree Sort - Radix sort - Shell sort – Heap sort. <b>Hashing:</b> An Introduction - Hash functions.	15
	<b>Total Contact Hrs.</b>	75

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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## Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD/ Roll Play /APS)
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## Text Book



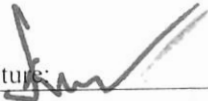

- ❖ ISRD group. (2010). Data structure using C. Seventh Reprint. Tata McGraw-Hill.

## Reference Books

- ❖ Aaron .M. Tanenbaum, YedidyeLangsam, Moshe .J. Augenstein. (2007). *Data Structure using C*. 3<sup>rd</sup> Edition. PHI Pub.
- ❖ Ashok. N. Kamthane. (2004). *Programming And Data Structures*. First Indian Print. Pearson Education. ISBN 81-297-0327-0.

## Web Reference

- ❖ [https://www.tutorialspoint.com/data\\_structures\\_algorithms/index.htm](https://www.tutorialspoint.com/data_structures_algorithms/index.htm)
- ❖ <https://www.javatpoint.com/data-structure-tutorial>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: K. Vijayakumar Signature: 	Name: K. Vijayakumar Signature: 	Name: Mr. K. Srinivasan Signature: 	Name: Mr. K. Srinivasan Signature: 

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology	
<b>Course Code:</b>	24UIT2A1			<b>Title</b>	<b>Batch:</b>	2024 – 2027
				GE II – Allied : Mathematics II (Discrete Mathematics)	<b>Semester:</b>	II
<b>Lecture Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	10	<b>Credits:</b>	4	

### Course Objective

On successful completion of this subject the students should know Set theory, Mathematical logic, Relations, Graph theory, Languages and Grammars

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the basic concepts of set theory, mathematical logic, relations and graph theory.	K1
CO2	To infer the basic terminology of discrete mathematics	K2
CO3	To construct discrete notations in the programs	K3
CO4	To analyze discrete concepts through programs	K4
CO5	To determine languages and grammars for programming	K5

### Mapping

CO \ PO/PSO	PO/PSO											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	L	L	L	H	M	M	-	M	-	M
CO2	-	M	M	M	-	M	M	L	L	L	-	M
CO3	M	M	M	M	-	M	-	L	-	-	-	M
CO4	M	L	L	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-

Units	Content	Hrs. L+T
Unit I	<b>Set Theory:</b> Introduction-Set & its Elements-Set Description-Types of sets-Venn-Euler Diagrams - Set operations & Laws of set theory - Fundamental products - partitions of sets - min sets - Algebra of sets and Duality – Inclusion and Exclusion principle	10+2
Unit II	<b>Mathematical Logic:</b> Introduction - Propositional Logic –Introduction, Proofs –Basic logical operations – Tautologies – Contradiction - Predicate calculus.	10+2
Unit III	<b>Relations:</b> Binary Relations – Set operation on relations -Types of Relations – Partial order relation – Equivalence relation – Composition of relations. <b>Functions:</b> Types of functions – Invertible functions – Composition of functions.	10+2
Unit IV	<b>Graph Theory:</b> Basic terminology – paths, cycle & Connectivity – Sub graphs – Types of graphs – Representation of graphs in computer memory - Trees - Properties of trees – Binary trees – Computer Representation of general trees.	10+2
Unit V	<b>Number Theory:</b> Introduction – properties of integer – Greatest Common Divisor – Euclidean algorithm – Least Common Multiple – testing for Prime number. <b>Language and Grammar:</b> Introduction –The set theory of strings – Languages – Regular expressions and Regular languages – Grammar – Finite state machine.	10+2
	<b>Total Contact Hrs.</b>	<b>60</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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## Assessment Methods:

Test, Seminar, Assignments
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## Text Book

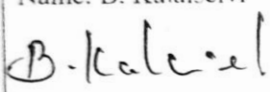
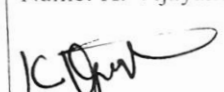


- ❖ Sharma. J.K. (2005). *Discrete Mathematics*. 2<sup>nd</sup> Edition. Macmillan India Ltd.

## Reference Books

- ❖ Kenneth H. Rosen. (2003). *Discrete Mathematics and Its Applications*, 5<sup>th</sup> Edition, McGraw Hill Pub.
- ❖ Dr. Venkataraman. M. K. Dr. Sridharan. N, Chandarasekaran. N. (2000). *Discrete Mathematics*. The National publishing Company Chennai.

## Web Reference

- ❖ <https://www.youtube.com/watch?v=itrXYg41-V0>
- ❖ <https://www.youtube.com/watch?v=tyDKR4FG3Yw>
- ❖ <https://www.youtube.com/watch?v=HmQR8Xy9DeM>
- ❖ [https://www.youtube.com/watch?v=19SW3P\\_PRHQ](https://www.youtube.com/watch?v=19SW3P_PRHQ)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: B. Kalaiselvi 	Name: K. Vijayakumar 	Name: Mr. K. Srinivasan 	Name: Mr. K. Srinivasan 
Signature:	Signature:	Signature:	Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology	
<b>Course Code:</b>	24UIT2A2			<b>Title</b>	<b>Batch:</b>	2024 – 2027
				GE II – Allied : Operations Research	<b>Semester:</b>	II
<b>Lecture Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	10		<b>Credits:</b>	4

### Course Objective

To enable the students to understand and to apply the resource management techniques available in OR including linear programming transportation assignment problem, inventory control, queuing theory and network problems.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the concepts of linear programming methods	K1
CO2	To understand the concepts of transportation, networking, replacement, etc.,	K2
CO3	To solve the problems optimization techniques to solve the computer based business problems	K3
CO4	To analyze the ability of critical thinking, to find shortest time duration	K4
CO5	To evaluate the Economic order quantity	K5

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	L	L	L	H	M	M	-	M	-	M
CO2	-	M	M	M	-	M	M	L	L	L	-	M
CO3	M	M	M	M	-	M	-	L	-	-	-	M
CO4	M	L	L	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-

Units	Content	Hrs. L+T
Unit I	Origin and development of OR – Applications of OR – Linear programming problem – Mathematical formulation of the problem – Graphical Method – Simplex Method – Big-M Method -Two Phase Simplex Method	10+2
Unit II	<b>Transportation Problem:</b> Balanced Transportation problem and Un-Balanced Transportation problem-Row Minimum-Column Minimum-North-West Corner Matrix Minima Method-Vogel's Approximation Methods-MODI Method (U-V Method for OBFS). <b>Assignment Problem:</b> Balanced and Un-Balanced Assignment problem– Hungarian method – Routing problem	10+2
Unit III	<b>Network Scheduling:</b> Network and Basic components – Logical sequencing: Formation of a loop, Dangling, Redundancy-Network Construction- Rules of Network construction –Time calculation in Network-Numbering the events– Critical Path Method (CPM)– PERT: PERT Tabulation and Calculations.	10+2
Unit IV	<b>Replacement Problem and System Reliability:</b> Model 1: Value of Money does not change with time. Model 2: Value of Money change with time. <b>Game and Strategies:</b> Introduction-Two-Person Zero-Sum games-Pure Strategies: Maximin-Minimax Principles-Saddle Point and Value of the Game-Rule for determining a Saddle Point- Mixed Strategies: Games without Saddle Points- 2x2 Rectangular Games.	10+2
Unit V	<b>Sequencing problem:</b> Problems with n jobs and 2 machines – Problems with 'n' jobs and 'k' machines. <b>Inventory control</b> – Types of inventory-Economic Order Quantity: Model 1: EOQ problem with no shortages Model 2: EOQ problem with no shortages and several production runs of unequal length Model 3: EOQ problem with shortages. <b>EOQ Problem with Price Breaks:</b> Model 1: EOQ Problem with one price breaks.	10+2
	<b>Total Contact Hrs.</b>	<b>60</b>

**Pedagogy:**

Direct Instruction, Digital Presentation, Flipped Class
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**Assessment Methods:**

Test, Seminar, Assignments
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## Text Book

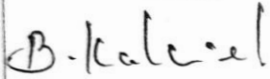



- ❖ KantiSwarup, PK Gupta, Man Mohan. (2020). *Operations Research*. Sultan Chand and Sons & Company Ltd. New Delhi.

## Reference Books

- ❖ S. DharaniVenkatakrishnan. (2015), *Operations Research*. Keerthi Publishing P.Ltd.
- ❖ G. Srinivasan. (2017), *Operations Research: principles and Applications* 2 nd Edition.

## Web Reference

- ❖ <https://rb.gy/6m3df>
- ❖ <https://rb.gy/mq3k4>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: B. Kalaiselvi  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT206			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Practical Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	-	CC Lab.-II: Programming in Java with Data Structures	<b>Semester:</b>	II	
					<b>Credits:</b>	2	

### Course Objective

To apply various concepts of java like inheritance, multithreading, exception handling, AWT, applet, package for improving the programming skills in Java.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To apply basic object oriented programming concepts in Java	K3
CO2	To analyze the usage of packages, exceptions in program development	K4
CO3	To prove the need of Applets in internet applications development	K5
CO4	To verify the database connectivity using Java	K5
CO5	To create forms using AWT components	K6

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PSO 1	PSO2
CO1	H	H	M	L	M	H	H	L	L	L	M	M
CO2	H	H	H	M	M	M	M	L	M	M	L	L
CO3	H	H	H	L	L	L	H	L	M	H	M	M
CO4	H	H	H	M	M	M	M	L	M	M	L	L
CO5	H	H	H	L	L	L	H	L	M	H	M	M

Content	Hrs.
<p style="text-align: center;"><b>SAMPLE PROGRAM LIST</b></p> <p><b>Test I</b></p> <ol style="list-style-type: none"> <li>1. Develop a class using constructor.</li> <li>2. Develop a Program using method overloading.</li> <li>3. Develop a Program using method overriding.</li> <li>4. Apply single and multi-dimensional array in assessing students performance</li> <li>5. Apply multiple inheritance using interfaces.</li> <li>6. Develop a Program using packages and sub packages.</li> <li>7. Create a class to implement the data structure STACK. Write a constructor to initialize the TOP of the stack to 0. Write a member function POP ( ) to delete an element. Check for overflow and underflow conditions.</li> <li>8. Create a class ARITH which consists of a FLOAT and an integer Variable. Write member ADD( ) , SUB ( ) , MUL ( ) , DIV ( ) , MOD ( ) to perform addition, multiplication ,division and modulus Respectively . Write member functions to get and display values.</li> <li>9. 3. Create a class MAT has a 2-d matrix and R&amp;C represents the rows and columns of the matrix. Overload the operators +,-,* to add subtract and multiply two matrices. Write member functions to get and display MAT object values.</li> <li>10. Create a class STRING. Write member function to initialize, get and display strings. Overload the operator + to concatenate two strings, == to compare two strings and a member function to find the length of the string.</li> <li>11. Create a class which consists of EMPLOYEE detail like eno, ename, dept, basic-salary, and grade. Write member functions to get and display them. Derive a class PAY from the above class and write a member function to calculate da, hra, pf depending on the grade and Display the Payslip in a neat format using console I/O.</li> </ol> <p><b>Test II</b></p> <ol style="list-style-type: none"> <li>12. Develop a Program using threads.</li> <li>13. Test for inter-thread communication in program</li> <li>14. Test for Exception Handling in program</li> <li>15. Develop a Program for designing shapes using applets.</li> <li>16. Develop a Program to handle events.</li> <li>17. Compose a form using AWT Components.</li> <li>18. Develop a Program to generate files.</li> <li>19. Create a class SHAPE which consist of two VIRTUAL FUNCTIONS Cal_Area( ) and Cal_PERI to calculate AREA and PERIMETER of various figures. Derive three Classes SQUARE, RECTANGLE and TRIANGLE from the class SHAPE and calculate AREA and PERIMETER of each class separately and Display the result.</li> <li>20. Create two classes which consist of two private variables, one float and one integer variables in each class. Write member functions to get and display them. Write FRIEND function common to arguments And the integer and float values of both the objects separately and Display the</li> </ol>	60

result.

21. Write a user defined function USERFUN ( ) which has the formatting commands like setw( ) , showpoint , showpos precision ( ). Write a program which prints a multiplication table and uses USERFUN( ) for formatting.

22. Write a program to perform Insertion, Deletion and Updation using files.

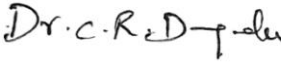

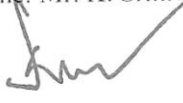

23. Write a program which takes a file as argument and copies in to another file with line numbers using Command Line Arguments.

### Pedagogy:

Direct Instruction, Digital Presentation

### Assessment Methods:

Test, Assignments, Group task (Group Discussion)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: C.R. Durga devi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT2S1			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Practical Hrs./Week</b>	2	<b>Tutorial Hrs./Sem.</b>	--	SEC - I :Naan Mudhalvan : Web Programming Lab.(PHP)	<b>Semester:</b>	II	
					<b>Credits:</b>	2	

### Course Objective

To know the various programming concepts of database, string functions, date & time functions, content navigation and creating web page.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To motivate the students to create dynamic website	K4
CO2	To test the various tags in the application.	K5
CO3	To create files in the website using database.	K6
CO4	To construct and upload a file to the server and create directory	K6
CO5	To choose and add the products that are selected from a web page	K6

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	H	H	H	M	M		M		H		
CO2	M	H	H	H	M	H	M	M	M	H		H
CO3			M	H		H	M	M	H	H		H
CO4	M	H	M	H	M	H		M	H	H		
CO5	M	H	H	H		H	M		H	H		





Content	Hrs.
<p align="center"><b>SAMPLE PROGRAM LIST</b></p> <ol style="list-style-type: none"> <li>1. Execute a PHP Program to print an array.</li> <li>2. Execute a PHP Program to sort elements in an array in ascending and descending order.</li> <li>3. Develop a PHP program to split a string as array elements based on delimiter.</li> <li>4. Execute a PHP Program to combine the array elements into a string with given delimiter.</li> <li>5. Develop a PHP Program to Program to create a Simple Calculator.</li> <li>6. Develop a PHP Programs to create simple Login and Logout using sessions.</li> <li>7. Develop a PHP Program to upload a file to the Server.</li> <li>8. Create a PHP Program to create a New Database.</li> <li>9. Create a PHP Program to connect to the server and selecting database.</li> <li>10. Create a PHP Program to insert records to the table in Database.</li> <li>11. Create a PHP Program to fetch records from the table in Database.</li> <li>12. Create a PHP Program to Store an image in Database.</li> <li>13. Create a PHP Program to Read image from Database.</li> <li>14. Create a PHP Program to create a simple Registration form.</li> <li>15. Create a PHP program for Contact form.</li> </ol>	30
<b>Total Contact Hrs.</b>	30

**Pedagogy:**

Direct Instruction, Digital Presentation
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**Assessment Methods:**

Test, Assignments, Group Discussion
-------------------------------------

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title :</b>	Information Technology		
<b>Course Code:</b>	24UIT307			<b>Title:</b>	<b>Batch :</b>	2024 - 2027	
<b>Lecture Hrs/Week:</b>	5	<b>Tutorial Hrs./Sem.</b>	-	CC -V: Operating Systems	<b>Semester :</b>	III	
					<b>Credits :</b>	4	

### Course Objective

On successful completion of this subject the students should know the basic concepts of operating system, memory management, process management, information management, deadlocks, parallel processing, distributed processing and Windows NT, XP, & 7.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To recollect fundamentals of operating system concepts.	K1
CO2	To understand basic principles and advanced concepts of the operating system.	K2
CO3	To apply the different mathematical foundations, algorithmic principles with approaches in computer based systems.	K3
CO4	To analyze the various architectural components involved in OS and its applications.	K4
CO5	To evaluate different operating system configurations	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1		L		L		H					L	
CO2	L	H	H	M		H	M		L	L		
CO3	H	M	L	M	M	M	M	M	M	M	M	H
CO4	M	H	M	H	M	H	M	M	H	M		M
CO5		H		M	H	H		M	H	H	M	M

Units	Content	Hrs.
Unit I	<b>Operating System-Functions and Structure:</b> Operating System Definition- Different services of Operating System- Uses of System Calls- Issue of Portability-Operating System Structure- Virtual machine- Booting. <b>Information Management:</b> Introduction - The File System- Introduction - Block and Block numbering scheme - Relationship between OS and DMS - File Directory entry - Open/Close Operations. <b>Device Driver (DD):</b> The Basics, I/O Procedure, I/O Scheduler.	15
Unit II	<b>Process Management:</b> Introduction – States – Transitions – Operations on a Process – Process Scheduling – Multithreading. <b>Inter Process Communication</b> -The Producer Consumer Problem. <b>Solutions to the Producer Consumer problems:</b> Interrupt Disabling/Enabling - Lock-flag – Primitive for mutual exclusion - Alternating Policy – Semaphores - Classical IPC Problems.	15
Unit III	<b>Deadlocks:</b> Introduction - Graphical Representation of Deadlock - Deadlock Prerequisites - Deadlock Strategies. <b>Memory Management:</b> Introduction - Single Contiguous Memory Management - Fixed Partition Memory Management - Variable Partitions - Non Contiguous Allocation General Concepts: Paging, Segmentation. <b>Virtual Memory Management System:</b> Jargon – Page Replacement Policies.	15
Unit IV	<b>Parallel Processing:</b> Introduction - Difference between Distributed and Parallel Processing - Advantages of Parallel Processing - Machine Architectures supporting Parallel Processing - Operating System for Parallel Processing. <b>Distributed Processing:</b> Introduction - Distributed Processing - Process Migration – RPC - Distributed Processes - Distributed File Management - Cache Management.	15
Unit V	<b>Windows NT/2000:</b> History – Programming: Native NT API – Win32 API – Registry. Structure – Booting – Processes and Threads – Memory Management – NTFS – Security. <b>Windows XP &amp; 7:</b> Introduction – Design principles - Architecture.	15
	<b>Total Contact Hrs.</b>	<b>75</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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## Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD/ Roll Play /APS)
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## Text Book

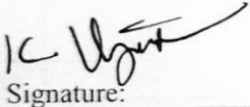
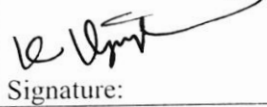
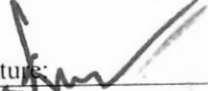
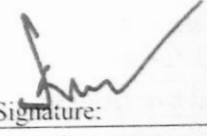
- ❖ Achyut S Godbole. (2005). *Operating Systems*, 2<sup>nd</sup> Edition, TMH Publications (Units I – IV).

## Reference Books

- ❖ H. M Deitel. (2003). *Operating Systems*, 2<sup>nd</sup> Edition, Pearson Education Publication.
- ❖ Abraham Silberschatz, Peter B. Galvin, Greg Gagne (2018), *Operating System Concepts*, 10<sup>th</sup> edition, Abridged Print Companion.

## Web References:

- ❖ [https://www.tutorialspoint.com/operating\\_system/index.htm](https://www.tutorialspoint.com/operating_system/index.htm) (Unit V)
- ❖ <https://www.os-book.com/OSE1/slide-dir/PDF-dir/ch16.pdf>
- ❖ <http://cc.ee.ntu.edu.tw/~farn/courses/OS/slides/ch24.pdf>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: K. Vijayakumar Signature: 	Name: K. Vijayakumar Signature: 	Name: Mr. K. Srinivasan Signature: 	Name: Mr. K. Srinivasan Signature: 

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT308			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				CC- VI : Relational Database Management System	<b>Semester:</b>	III	
<b>Lecture Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	-		<b>Credits:</b>	4	

### Course Objective

To provide better understanding of various concepts of DBMS, Oracle, Normalization, Data Management and retrieval, PL/SQL Commands, Operations and Security.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To keep in mind the basic concepts of database	K1
CO2	To get the idea of a database from SQL statements	K2
CO3	To execute different forms of queries using SQL and PL/SQL statements	K3
CO4	To analyze various data models which describe the structure of database	K4
CO5	To interpret PL/SQL commands in programming	K5

### Mapping

PO / PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	-	L	L	L	H	-	H	L	L	H
CO2	H	L	M	L	-	L	L	H	M	M	-	H
CO3	H	L	M	H	-	L	L	M	H	M	-	H
CO4	L	M	L	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-

Units	Content	Hrs.
Unit I	<b>Database Concepts: A Relational approach:</b> Database – Relationships – DBMS– Relational Data Model – Integrity Rules – Theoretical Relational Languages. <b>Database Design: Data Modeling and Normalization:</b> Data Modeling – Dependency – Database Design – Normal forms – Dependency Diagrams - Demoralization – Another Example of Normalization. <b>DFD:</b> Definition – example – Rules- Decomposition.	12
Unit II	<b>Oracle9i: Overview:</b> Introduction. <b>SQL *Plus:</b> Environment – SQL – Commands – Errors & Help – Alternate Text Editors - Worksheet - <b>iSQL *Plus.</b> <b>Oracle Tables:</b> DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.	12
Unit III	<b>Working with Table:</b> DML – adding a new Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. <b>Functions and Grouping:</b> Built-in functions – Grouping Data.	12
Unit IV	<b>Multiple Tables: Joins and Set operations:</b> Join – Set operators. <b>Sub queries:</b> Sub query - Correlated Sub query. <b>PL/SQL:</b> Introduction – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. <b>Control Structures and Embedded SQL:</b> Control Structures – Nested Blocks – SQ L in PL/SQL – Data Manipulation – Transaction Control statements.	12
Unit V	<b>PL/SQL Cursors and Exceptions:</b> Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions. <b>PL/SQL: Composite Data Types:</b> Records – Tables – V arrays. <b>Named Blocks:</b> Procedures – Functions – Packages –Triggers –Data Dictionary Views.	12
	<b>Total Contact Hrs.</b>	<b>60</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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## Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD)
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## Text Book

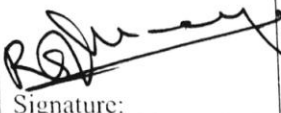
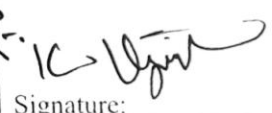

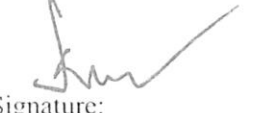
- ❖ Nilesh Shah. (2009), *Database Systems Using Oracle*, 2nd edition, PHI.

## Reference Books

- ❖ Ivan Bayross (2017), *SQL, PL/SQL the Programming Language of ORACLE*, 4<sup>th</sup> Edition, BPB Publications.
- ❖ ArunMajumdar&Pritimoy Bhattacharya. (2001). *Database Management Systems*, TMH.
- ❖ Jeffrey A. Hoffer, Joey F. George, Joseph S. Valacich, ( 2009). *Modern Systems Analysis and Design*. 2<sup>nd</sup> Edition. 5<sup>th</sup> Edition. Pearson Education Pub's.
- ❖ Gerald V. Post. (2005). *Database Management Systems*, 3<sup>rd</sup> Edition, TMH.

## Web References

- ❖ <https://intellipaat.com/blog/tutorial/sql-tutorial/rdbms/>
- ❖ <https://www.youtube.com/watch?v=J5wjlf4gdq4>
- ❖ <https://www.youtube.com/watch?v=DEwgEFHh0M>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: R. Sekar  Signature:	Name:K. Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT3A1			<b>Title</b>	<b>Batch:</b>	2024 – 2027	
<b>Lecture Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	-	GE III – Allied : Microprocessor	<b>Semester:</b>	III	
					<b>Credits:</b>	4	

### Course Objective

Understand the evolution of microprocessor, Addressing modes, pin diagrams of various processors, Other Microprocessors, Advanced Microprocessor, Mobile Processors, Interfacing A/D converter and Applications.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Recall in mind the various microprocessor and microcontrollers manufacturer name, year, versions, bit-size, etc	K1
CO2	To Understand the basic concepts of 16 bit and 32 bit microprocessors.	K2
CO3	To apply the instructions in the Assembly Language Programs.	K3
CO4	To analyze the various products of processors and controllers.	K4
CO5	To Conclude the various products of processors and controllers.	K5

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	H	H	H	H	M	H	H	H	M	M
CO2	H	M	H	H	M	M	H	M	H	M	M	H
CO3	M	H	H	H	M	H	H	M	M	H	H	M
CO4	M	M	M	M	M	M	M	H	H	M	M	M
CO5	M	M	L	H	M	M	M	M	M	L	M	M

<b>Units</b>	<b>Content</b>	<b>Hrs.</b>
<b>Unit I</b>	<b>Introduction to Microprocessors:</b> Evolution of microprocessors – Single- chip Microcomputer – Embedded Microprocessors – Bit - Slice processors – Microprogramming – RISC and CISC Processors – Scalar and Superscalar Processors – Vector Processors – Array Processors – Symbolic Processors – Digital Signal Processors Intel 8086 – Pin Description of Intel 8086 – Operating modes of 8086 – Register organization of 8086 – BIU and EU – Interrupts – 8086 based computer system – Addressing Modes of 8086.	13
<b>Unit II</b>	<b>8086 Instruction Set</b> – Instruction Groups – Addressing Mode Byte – Segment Register Selection – Segment Override – 8086 Instructions. <b>Intel 386 and 486 Microprocessors:</b> Intel 386 and 486 Microprocessor – 486DX Architecture – Register Organization of 486 Microprocessor – Memory Organization .	12
<b>Unit III</b>	. <b>Intel 386 and 486 Microprocessors:</b> Operating Modes of Intel 486 – Virtual Memory – Memory Management Unit – Gates – Interrupts and Exceptions – Addressing Modes of 80486 – Pin Configuration - Input devices – Output devices.	11
<b>Unit IV</b>	<b>Other Microprocessors:</b> Pentium – Pentium Pro – PentiumII, III, IV - Alpha – Cyrix – MIPS – AMD Processors. <b>Advanced Core Processors:</b> Dual Core - Core2 Duo - i3 - i5 - i7 – i9 - Quad – Octa - Penta – Comparison.	13
<b>Unit V</b>	<b>Mobile Processors:</b> Introduction – Models – Architecture. <b>Interfacing of A/D Converter and Applications:</b> Introduction – Interfacing of ADC 0808 or ADC 0809 to Intel 8086 – Bipolar to Unipolar Converter – Sample and Hold Circuit, LF 398 – Microprocessor-based Measurement and Control of Physical Quantities	11
	<b>Total Contact Hrs.</b>	<b>60</b>

**Pedagogy:**

Digital Presentation, Chalk and talk, Flipped class
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**Assessment Methods:**

Seminar, Quiz, Assignment, Group task.
--

## Text Book

- ❖ Badri Ram, (2007), *Advanced Microprocessors and Interfacing*. Tata McGraw-Hill Publishing Company Limited, Fourteenth reprint.

## Reference Books





- ❖ A.K. Ray, K.M. Bhurchandi, (2007), *Advanced Microprocessors and Peripherals*. Tata McGraw-Hill Publishing Company Limited, 2<sup>nd</sup> Edition.p
- ❖ Ramesh S. Gaonkar, (1997), *Microprocessor Architecture, Programming, and Applications with the 8085*. 3<sup>rd</sup> Edition. PRI India.

## Web References:

- ❖ <https://www.geeksforgeeks.org/introduction-of-microprocessor>
- ❖ <https://www.slideshare.net/shehrevard/advanced-microprocessor>
- ❖ [https://www.tutorialspoint.com/microprocessor/microprocessor\\_io\\_interfacing\\_overview.htm#:~:text=The%20interfacing%20process%20includes%20some,the%20signals%20of%20the%20microprocessor.](https://www.tutorialspoint.com/microprocessor/microprocessor_io_interfacing_overview.htm#:~:text=The%20interfacing%20process%20includes%20some,the%20signals%20of%20the%20microprocessor.)

## (Unit IV)

- ❖ [https://en.wikipedia.org/wiki/List\\_of\\_Intel\\_Core\\_i9\\_microprocessors](https://en.wikipedia.org/wiki/List_of_Intel_Core_i9_microprocessors)
- ❖ <https://images-eu.ssl-images-amazon.com/images/I/C1Ip5bIG39S.pdf>
- ❖ <https://www.intel.com/content/dam/www/public/us/en/documents/datasheets/8th-gen-core-family-datasheet-vol-1.pdf>
- ❖ <https://timestech.in/all-about-mobile-phone-processors>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: R. Sekar  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT3A2			<b>Title</b>	<b>Batch:</b>	2024 – 2027	
<b>Lecture Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	-	GE III – Allied : Embedded Systems	<b>Semester:</b>	III	
					<b>Credits:</b>	4	

### Course Objective

Understand the concepts of embedded systems, device drivers, interrupt servicing mechanism and embedded programming in C and C++.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Recall in mind the various units of the processors	K1
CO2	To Understand the basic concepts of device drivers and interrupt servicing mechanism.	K2
CO3	To apply the instructions in C and C++ Programs.	K3
CO4	To analyze the various real time operating systems.	K4
CO5	To conclude the performance of various operating systems.	K5

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	H	-	H	H	M	H	-	H	M	M
CO2	H	M	H	H	M	M	H		-	M	M	H
CO3	M	H	H	-	M	H		M	-	H	H	M
CO4		M	M	L	M	M	M	H	-	M		M
CO5	M	M	L	-	M	M	M	M	-	L	M	M



Units	Content	Hrs.
Unit I	<b>Introduction to Embedded System:</b> An Embedded System – Processor in the System – Other Hardware units – Software embedded into a system – Exemplary embedded system – Embedded system on chip and in VLSI circuit.	11
Unit II	<b>Processor and Memory organization:</b> Structural units in a processor – Processor selection – Memory devices – Memory selection – Allocation of memory – DMA – Interfacing processor, memories and I/O devices. <b>Devices and buses for device networks:</b> I/O devices – Timer and counting devices – Serial communication – Host system.	13
Unit III	<b>Device drivers and Interrupts servicing mechanism:</b> Device drivers – Parallel port device drivers – Serial port device drivers – Device drivers for IPTD – Interrupt servicing mechanism – Context and the periods for context-switching, dead-line and interrupt latency.	12
Unit IV	<b>Programming concepts and embedded programming in C and C++:</b> Software programming in ALP and C – C program elements – Header and source files and processor directives – Macros and functions – Data types – Data structures – Modifiers – Statements – Loops and pointers – Embedded programming in C++ – Java – C program compiler and cross compiler – Source code for engineering tools for embedded C/ C++ – Optimization of memory needs	12
Unit V	<b>Inter - process communication and synchronization of processes, Tasks and threads:</b> Multiple processor – Problem of sharing data by multiple tasks and routines – Inter process communication. <b>Real time operating systems:</b> Operating system services – I/O subsystem – Network operating systems – Real time and embedded operating systems – Interrupt routine in RTOS environment – RTOS task scheduling – Performance metric in scheduling.	12
	<b>Total Contact Hrs.</b>	<b>60</b>

**Pedagogy:**

Digital Presentation, Chalk and talk, Flipped class
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**Assessment Methods:**

Seminar, Quiz, Assignment, Group task.
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## Text Book

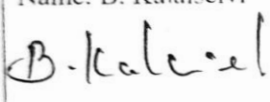
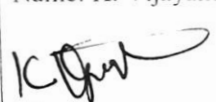


- ❖ Raj Kamal, (2007) “Embedded Systems – Architecture, Programming and Design”, TMH.

## Reference Books

- ❖ Daniel w. Lewis, (2007) “Fundamentals of Embedded Software”, PHI Education Publications, ISBN, 81-7808-604-2.

## Web References:

- ❖ [https://www.tutorialspoint.com/embedded\\_systems/es\\_overview.htm](https://www.tutorialspoint.com/embedded_systems/es_overview.htm)
- ❖ <https://www.youtube.com/watch?v=uFhDGagZzjs>
- ❖ <https://www.youtube.com/watch?v=JO4AEkOVF2M>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: B. Kalaiselvi  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT309			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				CC Lab.- III : RDBMS	<b>Semester:</b>	III	
<b>Practical Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	-		<b>Credits:</b>	2	

### Course Objective

To understand, learn and apply the various programming concepts in ORACLE (Basic commands, Trigger, Functions, etc.)

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To apply appropriate queries in oracle	K3
CO2	To apply various commands in SQL and PL/SQL and tags and concepts in the application.	K3
CO3	To analyze various database applications.	K4
CO4	To verify different forms of queries using SQL and PL/SQL statements	K5
CO5	To create various data models which describe the structure of database	K6

### Mapping

PO / PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	M	M	-	H	-	M	-	-	-	L
CO2	M	M	H	L	L	M	L	H	-	-	-	L
CO3	-	M	L	H	L	M	-	-	-	M	-	-
CO4	M	M	H	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-



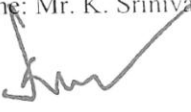
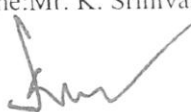
Content	Hrs.
<b>SAMPLE PROGRAM LIST</b>	
<b>Test I</b>  1. Experiment with DDL commands. 2. Make use of Constraints 3. Experiment with DML commands. 4. Make use of Arithmetic operations on tables. 5. Determine where clause usage 6. Experiment with Case structures 7. Make use of Built-in functions 8. Determine Group functions usage 9. Make use of Joins and set operations 10. Test for Sub queries usage.	<b>60</b>
<b>Test II                    PL/SQL Block structure</b>  1. Test for Control Structures in PL/SQL. 2. Make use of Embedded SQL 3. Test for Cursors usage 4. Make use of Exceptions 5. Experiment with PL/SQL Records and Tables. 6. Make use of Procedures and Functions 7. Experiment with Packages and Triggers. 8. Experiment Java as Front end and connect the oracle tables.	

### Pedagogy

Direct Instruction, Digital Presentation

### Assessment Methods:

Test, Assignments, Group Task.(GD)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT310			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				CC Lab. – IV: Excel Lab.	<b>Semester:</b>	III	
<b>Practical Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	-		<b>Credits:</b>	2	

### Course Objective

To use functions and productivity tools to assist in developing worksheets and to manipulate data lists using various functions.

### Course Outcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Knowledge
CO1	To apply different features of excel	K3
CO2	To apply concept of different formulas used in excel	K4
CO3	To verify Formatting techniques and presentation styles.	K5
CO4	To verify Manipulation of data using data names and ranges, filters and sort, and validation lists	K5
CO5	To create clip art to enhance ideas and information in Excel worksheets.	K6

### Mapping

CO \ PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	M	M	L	L	M	M	L	L	H	L	M
CO2	L	M	L	L	L	L	H	L	H	H	L	M
CO3	L	M	M	L	L	M	M	M	H	H	L	M
CO4	L	M	L	L	L	L	H	L	H	H	L	M
CO5	L	M	M	L	L	M	M	L	L	H	L	M

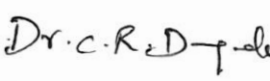

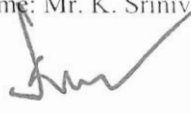
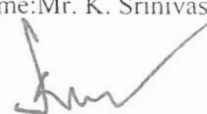
Content	Hrs.
<b>SAMPLE PROGRAM LIST</b>	
<b>Test I</b> Merge or Split Cells Create a Formula with Function Create a Chart Automatically Fill Data Apply Cell Borders	
<b>Test II</b>  Create filters and sort, and validation lists of student data Create clip art to enhance ideas Create different Excel templates Organizing and displaying large amounts and complex data in graph	<b>60</b>

**Pedagogy:**

Direct Instruction, Digital Presentation

**Assessment Methods:**

Test, Assignments, Group Task(GD)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: C.R. Durga devi  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT3N1			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	2	<b>Tutorial Hrs./Sem.</b>	-	Non-Major Elective – I : Social Networks	<b>Semester:</b>	III	
					<b>Credits:</b>	2	

### Course Objective

To provide the overall view of various concepts of Social Networks such as history, classification of social media, services, pros and cons.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To keep in mind basics of Social Networks	K1
CO2	To understand the classification of Social Media	K2
CO3	To deploy various data privacy feature in social media platforms	K3
CO4	To analyze the security aspects in social media.	K4
CO5	To judge the pros and cons of various types of social media platforms	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	-	M	H	M	H	-	L	H	H	M	-	M
CO2	-	M	H	M	H	-	L	M	H	M	-	M
CO3	-	H	H	H	H	-	M	M	H	H	-	M
CO4	-	H	H	H	H	-	M	M	H	H	-	M
CO5	-	L	H	M	H	M	M	M	H	H	-	M

Units	Content	Hrs.
Unit I	Social Networks: Introduction – Definition - History	6
Unit II	Impact of social media - Privacy and Identity : Data Sharing and Safety	6
Unit III	Types of services – Platforms - Building and Strengthening of social media.	8
Unit IV	Spamming in social networks – social aspects- Design Issues	6
Unit V	Growing Constituency through Social Media – A glance at social media Do's and Don'ts.	4
	<b>Total Contact Hrs</b>	<b>30</b>

### Pedagogy

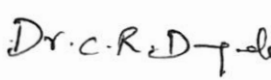


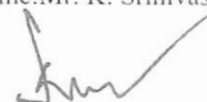
Direct Instruction, Digital Presentation, Flipped Class

### Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.( Roll Play)

### Web Reference

- ❖ <https://www.usaid.gov/sites/default/files/documents/1866/SMGuide4CSO.pdf>
- ❖ [https://www.symantec.com/content/en/us/.../the\\_risks\\_of\\_social\\_networking.pdf](https://www.symantec.com/content/en/us/.../the_risks_of_social_networking.pdf)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: C.R. Durga devi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name:Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT3N2			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	2	<b>Tutorial Hrs./Sem.</b>	-	Non-Major Elective -I : Hardware & Networking	<b>Semester:</b>	III	
					<b>Credits:</b>	2	

### Course Objective

To make understand various concepts of processors, input / output hardware, communication channels, networks with their types etc.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To recollect the basics of I/O hardware.	K1
CO2	To understand about working of processors.	K2
CO3	To implement a network operating system.	K3
CO4	To analyze different types of networks and topologies.	K4
CO5	To Determine the concepts of Hardware and Networks.	K5

### Mapping

PO/PSO CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	M	H	H	H	H	M	H	H	H	H	H
CO2	L	M	H	H	M	M	H	M	H	M	M	H
CO3	M	M	H	M	M	M	H	H	M	H	M	M
CO4	M	M	M	L	M	L	M	H	H	M	M	M
CO5	M	L	L	M	M	L	M	M	M	L	M	M

Units	Content	Hrs.
Unit I	<b>Processors:</b> Microchips, Miniaturization and Mobility - CPU and Main Memory - Microcomputer System Unit.	4
Unit II	<b>Input and Output Hardware:</b> Input Hardware - Keyboard Input- Pointing Devices - Output Hardware - Display Screens	6
Unit III	<b>Communication Channels:</b> Electromagnetic Spectrum -Twisted Pair - Coaxial Cable - Fiber Optic Cable – Microwave and Satellite Systems - Wireless Communications - Next Generation Wireless Communications.	8
Unit IV	<b>Communication Networks:</b> Types of Networks - Network Operating System - Host and Node - Servers and Clients – Advantages of Networks.	6
Unit V	<b>Local Networks:</b> N/W Types - Types of LAN's – Components – Topology - Impact of LAN.	6
	<b>Total Contact Hrs.</b>	<b>30</b>

### Pedagogy:

Digital Presentation, Chalk and talk, Flipped class

### Assessment Methods:

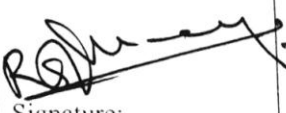
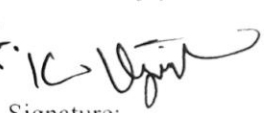
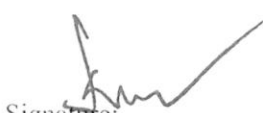

Seminar Quiz, Assignments

### Text Book

- ❖ Williams, Sawyer and Hutchinson, (2001), *Using Information Technology - A Practical Introduction to Computers & Communications*. 3<sup>rd</sup> Edition. Tata McGraw Hill.

### Web Reference

- ❖ <https://www.usaid.gov/sites/default/files/documents/1866/SMGuide4CSO.pdf>
- ❖ [https://www.symantec.com/content/en/us/.../the\\_risks\\_of\\_social\\_networking.pdf](https://www.symantec.com/content/en/us/.../the_risks_of_social_networking.pdf)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: R. Sekar	Name:K. Vijayakumar	Name: Mr. K.Srinivasan	Name: Mr. K. Srinivasan
 Signature:	 Signature:	 Signature:	 Signature:

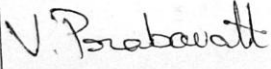

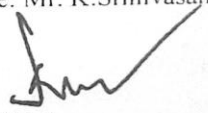
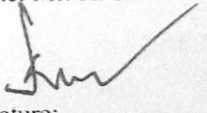
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Contents	Hrs.
<ol style="list-style-type: none"> <li>1. Form: Collecting data through customizable online surveys, quizzes, and feedback forms.</li> <li>2. Sheets: Collaboratively creating, analyzing, and managing spreadsheets for various data-driven tasks.</li> <li>3. Slides: Creating visually engaging presentations for proposals, sales pitches, marketing materials, or training sessions.</li> <li>4. Meet and Chat: Facilitating video meetings and real-time collaboration through instant messaging for remote teamwork.</li> <li>5. Gmail: Efficiently managing email communication, scheduling, and organizing messages for professional correspondence.</li> <li>6. Drive: Organizing, storing, and sharing files securely, facilitating collaborative work and easy access to documents from any device.</li> <li>7. Docs: Collaboratively creating, editing, and sharing documents in real-time for efficient team collaboration and document management.</li> <li>10. Calendar: Managing schedules, events, and appointments, facilitating efficient time management and coordination among individuals or teams.</li> <li>11. Translate: Facilitating instant translation of text between languages for communication and comprehension across diverse linguistic contexts.</li> <li>12. Google News: Aggregating and presenting news articles from various sources, allowing users to stay informed about current events and topics of interest.</li> </ol>	30

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT411			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-	CC -VII : Data Communication and Networks	<b>Semester:</b>	IV	
					<b>Credits:</b>	4	

### Course Objective

To provide basic concepts of networking like data transmission, topology, OSI model, TCP/IP, transmission media, X.25 protocol, frame relay, ATM and accessing the internet.

### Course Outcomes

On the successful completion of the course, students will be able

CO Number	CO Statement	Knowledge Level
CO1	To recall basics of data communication and networking	K1
CO2	To demonstrate various types of networks and topologies	K2
CO3	To make use of routing algorithms	K3
CO4	To categorize different ways of accessing the internet	K4
CO5	To Compare various types of protocols(X.25,Frame relay,ISDN,ATM)	K4

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H		M	M	H	H		H				
CO2	H	M	M	M	M	H		H	H	H		H
CO3	M	M	H	M	H	H	H	H				H
CO4	M	H	H	H	M	H	H	H	H	H		H
CO5	H		M	H	H	H	H	H		H		

<b>Units</b>	<b>Content</b>	<b>Hrs.</b>
<b>Unit I</b>	Introduction to Data Communications and Networking – Information Encoding - Analog and Digital Transmission Methods – Modes of Data Transmission and Multiplexing.	14
<b>Unit II</b>	<b>Transmission Errors:</b> Detection and Correction – <b>Transmission Media:</b> Guided Media, Unguided Media. <b>Network Topologies:</b> Mesh, Star, Tree, Ring, Bus topology. Switching- Circuit, Message, Packet switching. Routers and Routing – Factors affecting Routing Algorithms – Routing Algorithms – Approaches to Routing.	15
<b>Unit III</b>	Network Protocols and OSI Model – TCP/IP - Local Area Networks (LAN), Metropolitan Area Networks (MAN) and Wide Area Networks (WAN) – Integrated Services Digital Network (ISDN).	15
<b>Unit IV</b>	<b>X.25 Protocol:</b> Working principle-Characteristics – Packet format – operations. <b>Frame Relay:</b> Need – Working principle – Frame format-congestion & traffic control – FRAD & Features. <b>Asynchronous Transfer Mode:</b> Introduction- Packet size- Virtual circuits – Cells- Switching, Layers.	16
<b>Unit V</b>	Internetworking Concepts, Devices, Internet Basics, History and Architecture. <b>Ways of Accessing the Internet:</b> Introduction- Dial- up access- Leased lines- DSL- Cable modems.	15
	<b>Total Contact Hrs.</b>	<b>75</b>

**Pedagogy:**

Direct Instruction, Digital Presentation, Flipped Class

**Assessment Methods:**

Test, Seminar, Quiz, Assignments, Group Task(GD/ Roll Play /APS)

## Text Book

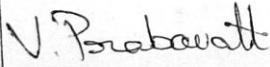

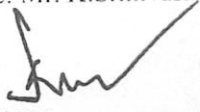
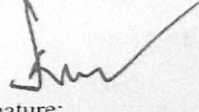
- ❖ Achyut S.Godbole. (2007). *Data Communications and Networks*. Tata McGraw-Hill Publishing Company Limited, Ninth reprint

## ReferenceBooks

- ❖ Behrouz A. Forouzan. (2007). *Data Communications and Networking*, 2<sup>nd</sup> Edition Update. Tata McGraw-Hill Publishing Company Limited, Nineteenth reprint.
- ❖ Andrew S. Tanenbaum. (2000). *Computer Networks*. 3<sup>rd</sup> Edition, Prentice Hall of India.

## Web References:

- ❖ [https://www.cisco.com/c/en\\_in/solutions/small-business/resource-center/networking/networking-basics.html](https://www.cisco.com/c/en_in/solutions/small-business/resource-center/networking/networking-basics.html)
- ❖ <https://www.techopedia.com/definition/7776/internet-access>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Units</b>	<b>Content</b>	<b>Hrs. L+T</b>
<b>Unit I</b>	<b>Swing Basic Concepts:</b> JFC- The Swing and the AWT - Swing Packages - Structure of A Swing Application – Top - Level Swing Containers - Lightweight Swing Container - JComponent Class - Basic Swing Components - Swing Text Components. <b>Exploring Swing:</b> Menu Components -Space Saving Lightweight Containers - Advanced Components – Virtual Desktop Components -Advanced Text Component - New Layout Managers.	12+1
<b>Unit II</b>	<b>Java Beans:</b> Definition - Advantages - Application Builder Tools - Using The Bean Development Kit (BDK) - JAR Files - Developing a Simple Bean Using the BDK - Using Bound Properties - Using the Bean info Interface - Constrained Properties - Persistence - Customizers - The Java Bean API - Using Bean Builder.	10+1
<b>Unit III</b>	<b>JDBC:</b> Architecture - JDBC-ODBC Relationship – Types of Drivers – Components - Interfaces and classes - Steps for Querying the Database with JDBC - Creating an ODBC Data source - Querying and updating Database Tables - passing parameters to a statement. <b>Servlets:</b> Introduction-Architecture - Designing - Servlet generating Plain Text, HTML - Handling GET Request.	11+1
<b>Unit IV</b>	<b>Cookies:</b> Overview of cookies – Servlet cookie API – Read, Use, Send cookies in a Servlet, Get client’s address in a Servlet – Hit counterexample. <b>JSP:</b> Introduction – Scripting elements - life cycle.	10+1
<b>Unit V</b>	<b>JSTL Tags:</b> Overview – EL Support – i18n support - Database Support (SQL Tags) – XML support. <b>AJAX:</b> Introduction – working concepts - Benefits - Role of Ajax in enhancing the user experience on the web - Rich internet application - What can Ajax do? - Impact of Ajax on user experience - on mobile - Traditional means of web application development - Web application development - Data exchange - Advantages and disadvantages - Web framework XML HTTP request object – Examples (First Program and Login Form).	12+1
	<b>Total Contact Hrs.</b>	<b>60</b>

### **Pedagogy :**

Digital Presentation, Chalk and talk, Flipped class.
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### **Assessment Methods:**

Seminar, Test, Assignment, Group task.
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## Text Books:


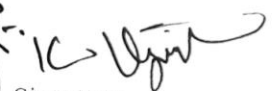


- ❖ ISRD Group, (2007), *Introduction to Object Oriented Programming through Java*, Tata McGraw-Hill Publishing Company Limited, New Delhi. (Units I, III).
- ❖ Herbert Schild, (2002), *Java Complete Reference*, 5<sup>th</sup> Edition, Tata McGraw Hill Pub (Unit II).
- ❖ S. Padma Priya, (2011), *Web Technology*, Scitech Pub (Units IV, V).

## Reference Book:

- ❖ Rashim Mogha, V.V. Preetham, (2010), *Java Web Services Programming*, Willy India Pub.

## Web References:

- ❖ <https://www.javatpoint.com/servlet-tutorial/>
- ❖ <https://www.softwaretestinghelp.com/java-components-java-platform-jdk/>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: R. Sekar  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT4A1			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-	GE IV – Allied : Software Engineering	<b>Semester:</b>	IV	
					<b>Credits:</b>	4	

### Course Objective

Understand the software development life cycle, process models, requirements analysis, design concepts, software quality and testing techniques

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To recollect the various process models, requirements, Designs, Quality, Testing.	K1
CO2	To Understand the software development phases.	K2
CO3	To apply concepts into the testing lab.	K3
CO4	To evaluate the expected result with testing output.	K4
CO5	To justify the concepts of software development and testing phase.	K5

### Mapping

PO / PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	H	H	H	H	M	H	H	H	M	M
CO2	H	M	H	H	M	M	H	M	H	M	M	H
CO3	M	H	H	H	M	H	H	M	M	H	H	M
CO4	M	M	M	M	M	M	M	H	H	M	M	M
CO5	M	M	L	H	M	M	M	M	M	L	M	M

Units	Content	Hrs.
<b>Unit I</b>	<b>Software and Software Engineering:</b> The Nature of software-The Unique Nature of WebApps-Software Engineering-The software process-Software Engineering practice- Software Myths. <b>Process Models:</b> A Generic process model-Process Assessment and Improvement-Perspective process model-Specialized process models-The Unified process- Personal and team process models-process Technology-Product and Process. <b>AGILE Development:</b> Agility – Cost of change - Process - <b>Extreme programming:</b> Values – Process – Industry – Debate.	16
<b>Unit II</b>	Requirement analysis-Scenario based modeling-UML Models-Data modeling concepts-Class based modeling. <b>Requirements Modeling:</b> Flow (DFD, Activity, ER), Behavior, Patterns - and WebApps.	14
<b>Unit III</b>	<b>Design concepts:</b> The design process-Design concepts-Design model. <b>User Interface Design:</b> The golden rule-User Interface Analysis and Design-Interface Analysis-Interface Design Steps-WebApp Interface Design-Design evaluation.	15
<b>Unit IV</b>	<b>Quality Concepts:</b> Software Quality-Dilemma-Achieving Software Quality. <b>Software Quality Assurance:</b> Elements – Tasks, Goals and metrics – Statistical SQA – Software reliability – SQA plan.	15
<b>Unit V</b>	<b>Software Testing strategies:</b> Strategic Approach to Software Testing-Strategic Issues-Unit Testing-Integration Testing-Validation Testing-System Testing. <b>Testing conventional Applications:</b> Software Testing Fundamentals-Internal and External view of Testing-White Box Testing-Basis Path Testing - Control Structure Testing-Black Box Testing. <b>Case study:</b> Draft an ER & DFD for a unique problem.	15
	<b>Total Contact Hrs.</b>	<b>75</b>

**Pedagogy:**

Digital Presentation, Chalk and talk, Flipped class
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**Assessment Methods:**

Seminar, Quiz, Assignment, Group task.
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## Text Books


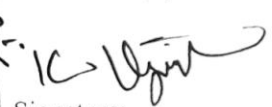


- ❖ Roger S. Pressman ,(2019), *Software Engineering-A Practitioner's Approach*, 8<sup>th</sup> Edition, McGraw-Hill International Pub.
- ❖ Jeffrey A. Hoffer, Joey F. Georgr, Joseph S. Valacich , (2000), “*Modern Systems Analysis and Design*”, 2<sup>nd</sup> Edition, Pearson Education publications. (Unit II – DFD, ER).

## Reference Books

- ❖ Richard Fairley, (2010), *Software Engineering Concepts*, 33<sup>rd</sup> Reprint, Tata McGraw-Hill Publishing Company Limited.
- ❖ PankajJalote , (2001), *An Integrated Approach to Software Engineering*, 3<sup>rd</sup> Edition Narosa Publication.

## Web Reference:

- ❖ <https://www.roberthalf.com.au/blog/employers/6-basic-sdlc-methodologies-which-one-best>
- ❖ [https://www.tutorialspoint.com/software\\_engineering/software\\_testing\\_overview.htm#:~:text=Software%20Testing%20is%20evaluation%20of,comprises%20of%20Validation%20and%20Verification.](https://www.tutorialspoint.com/software_engineering/software_testing_overview.htm#:~:text=Software%20Testing%20is%20evaluation%20of,comprises%20of%20Validation%20and%20Verification.)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: R. Sekar  Signature:	Name:K. Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT4A2			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-	GE IV – Allied : Software Project Management	<b>Semester:</b>	IV	
					<b>Credits:</b>	4	

### Course Objective

To Understand the Project Management and project evaluation, Effort estimation, Resource allocation, contract management and software quality.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To recollect the various activities of Software Project Management.	K1
CO2	To Understand the Activity plan and Risk Management.	K2
CO3	To apply concepts of Resource Allocation.	K3
CO4	To evaluate the Management contracts and Organizing Terms.	K4
CO5	To justify the Quality of the software development.	K5

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	H	H	H	H	M	H	H	H	M	M
CO2	H	M	H	H	M	M	H	M	H	M	M	H
CO3	M	H	H	H	M	H	H	M	M	H	H	M
CO4	M	M	M	M	M	M	M	H	H	M	M	M
CO5	M	M	L	H	M	M	M	M	M	L	M	M

Units	Content	Hrs.
Unit I	<b>Introduction to Software Project management:</b> Introduction –Importance – Meaning of a Project – Software project versus other types of project – Contract Management and technical project management – Activities covered – plans, methods, and methodologies – some ways of categorizing software projects. Stepwise: an overview of project planning. <b>Programme Management and Project Evaluation:</b> Programme Management – Managing the Allocation of resources within programmes – strategic programme management – creating a programme – aids to programme management – Benefits Management – Evaluation of Individual projects – technical assessment – cost-benefit analysis - cash flow forecasting – cost-benefit evaluation techniques – risk evaluation.	16
Unit II	<b>Software Effort Estimation:</b> Estimation – Problem with over and Under-estimates – basis for software estimating – software effort estimation techniques – Expert judgment – estimating by analogy. <b>Activity Planning:</b> The objectives – planning – Project schedules – project and activities – sequencing and scheduling activities – <b>Network:</b> Planning models – formulating a network model – adding time dimension – forward pass – backward pass. <b>Risk Management:</b> Risk – Categories – Dealing with risk – Risk identification, assessment, planning and management – Evaluating risk to schedule.	14
Unit III	<b>Resource Allocation:</b> Introduction - Nature of resources – identifying the resource requirements – scheduling resources – creating critical path – counting the cost – being specific – publishing the resource schedule – cost schedules – scheduling the sequence. <b>Monitoring and Control:</b> Creating framework – collecting the data – visualizing progress – cost monitoring – earned value analysis – prioritizing monitoring – getting the project back to target – change control.	15
Unit IV	<b>Managing Contracts:</b> ISO 12207 approach – supply process – types of contract – stages in contract placement, management – acceptance. <b>Managing People and Organizing Terms:</b> understanding behavior – organizational behavior – selecting the right person for the job – instruction in the best methods – Motivation – Working in groups – becoming a team – decision making – Leadership – organizational structures – dispersed and virtual teams - influence of culture – stress – health and safety.	15
Unit V	<b>Software Quality:</b> The place of software quality in project planning – importance of software quality – defining software quality – ISO 9126 - practical software quality measures – product vs process quality management – external standards – techniques to help enhance software quality- quality plans. Small Projects: Introduction – Some problems with student projects – content of a project plan – conclusion.	15
	<b>Total Contact Hrs.</b>	<b>75</b>

### Pedagogy:

Digital Presentation, Chalk and talk, Flipped class
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### Assessment Methods:

Seminar, Quiz, Assignment, Group task.
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## Text Books

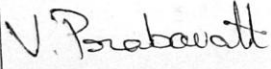


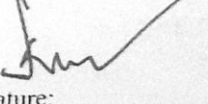
- ❖ Bob Hughes & Mike Cotterell,(2005). *SOFTWARE PROJECT MANAGEMENT*, 4<sup>th</sup> Edition, PHI Publications.

## Reference Books

- ❖ PankajJalote, (2002), *SOFTWARE PROJECT MANAGEMENT IN PRACTICE*, Pearson Education Asia.
- ❖ 2. Kieron Conway, (2000). *SOFTWARE PROJECT MANAGEMENT FROM CONCEPT TO DEPLOYMENT*, Dream Tech Press.

## Web Reference:

- ❖ <https://www.javatpoint.com/software-project-management>
- ❖ [https://en.wikipedia.org/wiki/Software\\_project\\_management](https://en.wikipedia.org/wiki/Software_project_management)

Course Designed by	Verified by HOD	Checked by	Approved by
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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT413			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				CC Lab. – V: Programming in Advanced Java	<b>Semester:</b>	IV	
<b>Practical Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-		<b>Credits:</b>	2	

### Course Objective

Understand the practical experience in various concepts of Swings, Beans, JDBC, Servlet, JSP, JSTL, AJAX, etc...

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To apply the different components of java programming.	K3
CO2	To analysis the concepts to enhance in the application level.	K4
CO3	To validate the user friendliness and desire performance implied for given input.	K5
CO4	To test the different components of Advanced Java using programs.	K6
CO5	To create connectivity using database.	K6

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PSO 1	PSO2
CO1	H	H	M	L	M	H	H	L	L	L	M	M
CO2	H	M	H	M	H	M	M	L	H	M	L	L
CO3	H	H	M	L	L	L	H	L	M	H	L	M
CO4	H	H	H	M	M	M	M	L	M	M	L	L
CO5	H	H	M	L	L	L	H	L	M	H	H	M





Contents	Hrs.
<b>Test I</b> 1. Develop JCheckBox 2. Develop a Menu 3. Develop Program for swing 4. DevwlopJTabbedPane 5. Create Function of JTree 6. Create JScrollPane using swing <b>Test II</b> 7. Develop a Generic Servlet. 8. Implement JDBC using Servlet. 9. Develop a Javabean to create Juggler Bean. 10. Generate simple property Javabean	<b>75</b>

**Pedagogy:**

Direct Instruction, Digital Presentation

**Assessment Methods:**

Test, Quiz , Group task(GD/Role play/abs).

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT4S1			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Practical Hrs./Week</b>	2	<b>Tutorial Hrs./Sem.</b>	-	SEC II : Naan Mudhalvan : Advanced Excel Lab.	<b>Semester:</b>	IV	
					<b>Credits:</b>	2	

### Course Objective

To manipulate data lists using advanced functions to summarize and report results from multiple worksheets.

### Course Outcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Knowledge
CO1	To apply statistical functions	K3
CO2	To apply concept of date functions	K4
CO3	To verify Lookup and financial functions	K5
CO4	To verify Manipulation of database and pivot functions	K5
CO5	To create advanced filtering in excel	K6

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PSO 1	PSO2
CO1	L	M	M	L	L	M	M	L	L	H	L	M
CO2	L	M	L	L	L	L	H	L	H	H	L	M
CO3	L	M	M	L	L	M	M	M	H	H	L	M
CO4	L	M	L	L	L	L	H	L	H	H	L	M
CO5	L	M	M	L	L	M	M	L	L	H	L	M

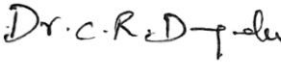

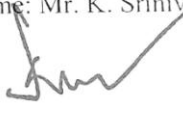
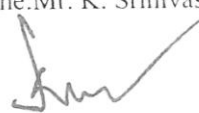
Content	Hrs.
<b>SAMPLE PROGRAM LIST</b>	
<b>Test I</b> 1. Inserting Basic Math And Statistics Functions 2. Using date functions 3. Logical Function- IF function 4. Look up Functions 5. Financial Functions	<b>30</b>
<b>Test II</b> 1. Large Datasets Freezing and Printing 2. Conditional Formatting 3. Pivot Table creation with chart 4. Advanced Filtering 5. Database functions	

**Pedagogy:**

Direct Instruction, Digital Presentation

**Assessment Methods:**

Test, Assignments, Group Task(GD)

Course Designed by	Verified by HOD	Checked by	Approved by
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<b>Course Code:</b>	24UIT4S2			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Practical Hrs./Week</b>	2	<b>Tutorial Hrs./Sem.</b>	-	SEC II : Naan Mudhalvan : Quantitative Aptitude.	<b>Semester:</b>	IV	
					<b>Credits:</b>	2	

### Course Objective

To enable the students to refine their mathematical, logical, and analytical skills, to answer real-life simple problems by using HCF and LCM.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To have fundamental <b>knowledge</b> of Mathematics about problems of numbers using Mathematical formulae.	K1
CO2	To <b>understand</b> the concepts of profit & loss related processing, simplification, etc.,	K2
CO3	To <b>apply</b> the formulae to real time problems on probability, Areas of surfaces and <b>apply</b> data visualization tool for any data set.	K3
CO4	To <b>analyze</b> the problems solving related to Age, Time and Distance and Time and Work etc.	K4
CO5	Use their logical thinking and analytical abilities to <b>evaluate</b> puzzle and decision making related questions from company specific and other competitive tests	K5 K6

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	M	M	L	H	M	M	M	M	M	M
CO2	H	L	H	M	M	M	L	M	M	M	M	M
CO3	H	H	M	M	L	H	H	H	L	H	M	H
CO4	H	M	H	H	H	M	H	H	H	H	L	H
CO5	M	M	L	H	M	H	M	M	M	M	H	M

Units	Content	Hrs
Unit I	Numbers-HCF And LCM of Numbers-Decimal Fractions- Comparison of Fractions - Simplification- Square Root and Cube Roots – Average.	6
Unit II	Time and Work - Time and Distance – Mixtures or Allegations - Problems on Numbers - Problems on Ages –Percentage - Profits and Loss.	6
Unit III	Ratio and Proportion - Time and Work - Time and Distance - Simple Interest - Compound Interest - Area-Volume and Surface Area.	6
Unit IV	Permutation and Combination - Probability, Height and Distances - Boats and Streams - Odd Man Out & Series.	6
Unit V	Interpretation: Tabulation, Bar Graphs, Pie Chart, Line Charts.	6
	<b>Total Contact Hrs</b>	<b>30</b>

**Pedagogy** Direct Instruction, Flipped Class, Digital Presentation

Seminar, Quiz, Assignments, GroupTask.

#### Assessment Methods:

#### Text Books



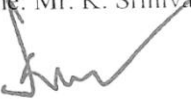
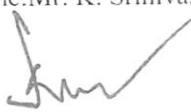
- ❖ R.S. Aggarwal(2018). Quantitative Aptitude for Competitive Examinations S.Chand& Company Ltd., New Delhi.

#### Reference Books

- ❖ Dinesh Khattar (2013). The Pearson Guide to Quantitative Aptitude for Competitive Examinations Pearson's Publications, New Delhi. 2nd Edition.
- ❖ Praveen R.V (2016). Quantitative Aptitude and Reasoning PHI Learning Pvt. Ltd., New Delhi. 3rd Edition

#### Web Reference:

- ❖ <https://www.javatpoint.com/aptitude/quantitative>
- ❖ [https://www.tutorialspoint.com/quantitative\\_apititude/index.htm](https://www.tutorialspoint.com/quantitative_apititude/index.htm)

Course Designed by	Verified by HOD	Checked by	Approved by
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<b>Programme Code:</b>	B.Sc. - IT		<b>Programme Title:</b>	Information Technology	
<b>Course Code:</b>	24UIT4N1		<b>Title</b>	<b>Batch:</b>	2024 - 2027
			Non Major Elective – II: Data Analytics	<b>Semester:</b>	IV
<b>Lecture Hrs./Week</b>	2	<b>Tutorial Hrs./Sem.</b>	-	<b>Credits:</b>	2

### Course Objective

To bestow an understanding of various concepts of data analytics, tools, applications and career opportunities in the field of data analytics.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To keep in mind the basic understanding of fundamentals of data analytics	K1
CO2	To understand the types of data analytics	K2
CO3	To apply the tools in various domain	K3
CO4	To identify career opportunities	K4
CO5	To interpret technical skill of data scientist	K5

### Mapping

PO / PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	H	-	L	L	L	H	-	H	L	L	H
CO2	H	L	M	H	-	L	L	H	H	M	-	L
CO3	H	L	M	M	-	L	L	M	H	M	-	H
CO4	L	M	L	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-

Units	Content	Hrs.
Unit I	Data analytics: Introduction – Importance - Types of analytics	6
Unit II	Common Terminologies - Tools and basic prerequisites	6
Unit III	Advanced Tools – Workflow	6
Unit IV	Applications: Industries – Business Functions	6
Unit V	Career in analytics: Data scientist - Life of a data scientist - become a data scientist - Technical skills - Career path in analytics.	6
	<b>Total Contact Hrs.</b>	<b>30</b>

## Pedagogy

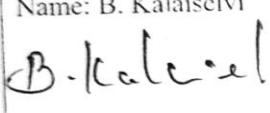
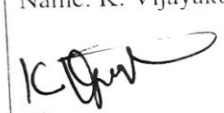
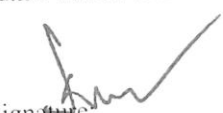

Direct Instruction, Digital Presentation

## Assessment Methods:

Test, Seminar, Quiz, Assignments

## Web References:

- ❖ <https://data36.com/data-analytics-basics-intro/>
- ❖ <https://blog.k2datascience.com/the-basics-of-data-analytics-77e5cc7ea741>
- ❖ [https://www.jigsawacademy.com/em/Beginners Guide to Analytics.pdf](https://www.jigsawacademy.com/em/Beginners%20Guide%20to%20Analytics.pdf)

Course Designed by	Verified by HOD	Checked by	Approved by
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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology	
<b>Course Code:</b>	24UIT4N2			<b>Title</b>	<b>Batch:</b>	2024 - 2027
				Non Major Elective - II : Computer Security		<b>Semester:</b>
<b>Lecture Hrs./Week</b>	2	<b>Tutorial Hrs./Sem.</b>	--	<b>Credits:</b>		2

### Course Objective

To understanding of various concepts of data security, cryptography, substitution techniques, encryption, decryption etc.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To find the basic fundamentals of data security	K1
CO2	To illustrate the concepts of ciphers and cryptography methods	K2
CO3	To organize the idea of encryption and decryption methods	K3
CO4	To discover basic issues in data security	K4
CO5	To compare substitution and Transposition techniques	K5

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	-	-	M	-	H	H	H	M	H	M	-	H
CO2	M	-	H	-	H	H	M	M	M	-	-	H
CO3	-	M	H	H	-	H	M	H	M	M	-	H
CO4	-	M	H	-	H	H	H	H	H	M	-	H
CO5	M	-	M	H	-	H	M	M	-	M	-	-

Units	Content	Hrs.
Unit I	Introduction-The need for security- Security Approaches: Trusted system.	6
Unit II	Security models-Security management practices- Principles of security.	6
Unit III	Cryptography : Concepts and Techniques - Introduction-Plain text and Cipher text	6
Unit IV	Substitution Techniques : Caesar cipher-Mono Alphabetic cipher-Homophonic substitution cipher-Polygram substitution cipher	6
Unit V	Transposition Techniques: Rail fence-Simple Columnar. Encryption and Decryption	6
	<b>Total Contact Hrs.</b>	<b>30</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class

## Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD/ Roll Play /APS)

## Text Book

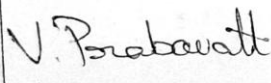


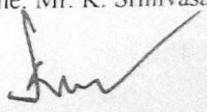
- ❖ Atul Kahate. (2009). *Cryptography and Network Security*, 2<sup>nd</sup> Edition.

## Reference Books

- ❖ William Stallings. (2006). *Cryptography and Network Security Principles and Practices*. 4<sup>th</sup> Edition. PHI Education Asia.
- ❖ Behrouz A. Forouzan. (2007). *CRYPTOGRAPHY and NETWORK SECURITY*. Tata McGraw Hill Pub.

## Web References

- ❖ [www.tutorialspoint.com](http://www.tutorialspoint.com)
- ❖ <https://vivadifferences.com/difference-between-substitution-cipher-technique-and-transposition-cipher-technique/>

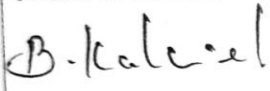



Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

**K.VIJAYAKUMAR, MCA., M.P.H.,**  
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Content	Hrs.
1. Introduction to various Data Visualization tools 2. Introduction to Tableau and Installation 3. Connecting to Data and preparing data for visualization 4. Perform Data Aggregation 5. Apply Data Visualization using Pie and bar chart 6. Create Basic Dashboards 7. Basic Visualization charts using scatter plot 8. Create a Histogram and Line chart 9. Perform Statistical functions 10. Apply Data Visualization using Bubble chart	
<b>Total Contact Hrs.</b>	<b>30</b>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: B. Kalaiselvi  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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 POLLACHI - 642 001.

<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT514			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-	CC - IX : Python Programming	<b>Semester:</b>	V	
					<b>Credits:</b>	4	

### Course Objective

To understand various concepts of Python and expertise in Python programming knowledge

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To recollect basic programming concepts	K1
CO2	To understand and familiar with the basic coding in python	K2
CO3	To apply python terminologies for developing applications in small scale	K3
CO4	To figure out advanced concepts in python for developing web based applications	K4
CO5	To assess the data analysis tools usage in python.	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	L	L	L	M	M	L	L	M	M	M
CO2	H	H	L	L	L	M	M	L	L	M	M	M
CO3	H	H	L	L	L	M	H	M	L	L	L	L
CO4	H	H	H	L	L	L	H	H	H	H	M	M
CO5	L	L	M	H	M	L	M	L	H	H	M	M

Units	Content	Hrs.
Unit I	<b>Python Basics – I:</b> Introduction –Basic Concepts . <b>Python Basics – II :</b> Introduction – Data types – Mutable Vs Immutable-Input to python-Modular Programming and python Modules.	14
Unit II	<b>Operators in python- Functions:</b> Introduction-Need-Basics-Defining functions- Passing Variables- Function Arguments-Additional note on Modules-Special functions.	14
Unit III	<b>Flow control – Strings:</b> Creation, Initialization and Accessing elements- Traversing – String Operations-Difference between function, method and Attributes – <b>Lists:</b> Introduction-Basic concepts-Creating, Traversing and slicing Lists- List Functions and Methods- Nested list and using them as matrix.	16
Unit IV	<b>Dictionaries:</b> Introduction- Basics- Concepts-Functions and Methods-Dictionary Methods-View Objects. <b>Tuples:</b> Introduction-Basic concepts-Additional topics- <b>Regular Expression:</b> Basic concepts- Special characters, Groups of characters and Anchors-Understanding Re Module- Match object-Important Methods.	16
Unit V	<b>File Operations:</b> Introduction – Basics –Reading and Writing- <b>Advanced concepts. Pandas: Open Source Data Analysis and Manipulation Tool:</b> Introduction- Basics- Using Pandas for files.	15
	<b>Total Contact Hrs.</b>	<b>75</b>

**Pedagogy :**

Direct Instruction, Digital Presentation, Flipped Class
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**Assessment Methods:**

Test, Seminar, Quiz, Assignments
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**Text Book:**



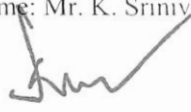
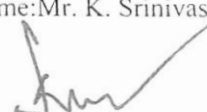
- ❖ Anurag Gupta, G. P. Biswas, (2020), Python Programming – Problem Solving, Packages And Libraries, McGraw Hill Publications.

**Reference Books:**

- ❖ SheetalTaneja and Naveen Kumar, (2018) “Python programming A Modular Approach with Database, Mobile, and Web Applications“ Pearson India Education Services.
- ❖ Chris Meyers Allen Downey, Jeffrey Elkner. (2015). Learning with Python DreamTech Press, Kindle Edition.

**Web References:**

- ❖ <https://www.youtube.com/watch?v=ApMSoHn1cM4>
- ❖ <https://www.youtube.com/watch?v=eaXiOpnRYDE>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: C.R. Durga devi  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT515			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	5	CC – X : Visual Programming	<b>Semester:</b>	V	
					<b>Credits:</b>	4	

### Course Objective

To understand the various concepts of C#.Net and Visual Basic .Net (Data types, Properties, Components, Inheritance, Polymorphism, Database Connectivity and Web Services).

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To recall various statements, data types, properties, components, Indexes, Events and Attributes, etc.	K1
CO2	To Understand the basic structure of VB.Net& C#.Net and features of IDE.	K2
CO3	To make use of the basic concepts of Methods, Arrays, I/O Streams, Database Connectivity and Web Services.	K3
CO4	To analyze the various controls of OOPs, Windows Applications and Web Services.	K4
CO5	To prove the concepts into the Lab. programs.	K5

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	M	-	-	M	M	-	-	M	-	-
CO2	M	H	M	-	-	M	M	-	-	M	-	H
CO3	H	H	H	H	-	M	H	M	H	H	-	-
CO4	H	H	M	-	M	M	M	-	-	H	-	H
CO5	H	H	H	H	M	M	H	M	H	H	-	H



Units	Content	Hrs. L+T
Unit I	<b>Visual C#.Net:</b> Introduction - Features – Data types and console I/O. <b>Methods:</b> (value, ref, out, params). <b>Properties, Indexes and Operator Overloading:</b> Introduction – Properties – Indexes – Operator overloading – Conversion operators. <b>Inheritance and Polymorphism:</b> Virtual methods – Abstract Classes and Abstract Methods – Sealed classes.	14
Unit II	<b>Namespaces and Components</b> – Namespaces – Components – Components and Namespaces – Access modifiers. <b>Delegates, Events and Attributes. I/O Streams:</b> Introduction – Streams – Binary Data files – Text files – Data files – File and Directory Operations.	14
Unit III	<b>Windows applications - I. Windows applications-II. Database connectivity. Basic Web controls. Validation and list web controls:</b> Introduction – validation – list. <b>User and Custom web controls:</b> Introduction – User controls – controls and custom properties, controls. <b>Web services:</b> Introduction – concepts – creation – Creating a web service that use data source.	15+1
Unit IV	<b>VB.NET:</b> Essentials – Operators - conditionals and loops – Procedures, Scope and Exception handling – Windows Forms - Text Boxes, Rich Text Boxes, Labels and Link Labels – Buttons - Checkboxes, Radio buttons, Panels and Group boxes.	15
Unit V	List boxes, Checked List Boxes, Combo boxes and Picture boxes – Scroll bars, Splitters, Track Bars, Pickers, Notify Icons, Tool Tips and Timers– Menus, Built-in Dialog boxes and printing– Image lists, Tree and List views, Toolbars, Status and progress Bars and tab. <b>Database Access with ADO.Net.</b> <b>Case Study:</b> Develop a unique application using this course.	15+1
	<b>Total Contact Hrs.</b>	<b>75</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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## Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD/ Roll Play /APS)
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## Text Book

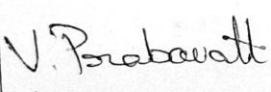
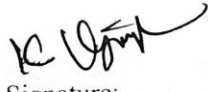
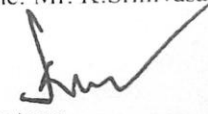
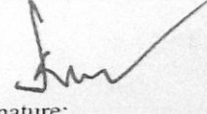
- ❖ Muthu C. (2008). *Visual C#.Net*. First Reprint. Tata Mc-Graw Hill Pub.
- ❖ Steven Holzner (2008) *Visual Basic.Net Programming Black Book*- -Dream Tech Publication.

## Reference Books

- ❖ Kogent learning solutions (2011) *ASP.NET 4.0 in Simple Steps*- -Dream Tech Press Publication.
- ❖ Padmapriya .S (2011) *Web Technology* - Scitech Publications.

## Web References

- ❖ <https://www.tutorialsteacher.com/csharp/first-csharp-program>
- ❖ <https://www.tutorialspoint.com/vb.net/index.html>.

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT5E1			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-	DSE- I : Data Mining	<b>Semester:</b>	V	
					<b>Credits:</b>	4	

### Course Objective

To give a better understanding of various concepts of Data mining includes KDD, Association rules, Classification, Clustering, different types of mining, etc.,

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To keep in mind the various basic concepts of data mining	K1
CO2	To understand different types of data mining to be applied in various domain areas	K2
CO3	To execute data mining algorithms for finding hidden interesting patterns in data.	K3
CO4	To evaluate various data mining algorithms to solve real world problems	K5
CO5	To judge the pros and cons in handling Mining types.	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	L	M	H	H	H	M	H	H
CO2	L	M	M	H	L	M	M	L	H	L	H	H
CO3	M	M	M	H	L	L	L	L	H	L	M	M
CO4	H	H	H	H	L	M	M	M	H	L	M	M
CO5	L	M	M	M	H	L	M	H	H	M	M	M

Units	Content	Hrs
Unit I	<b>Data mining and the data warehouse:</b> Introduction- Data warehouse – Needs - Designing decision support system-integration with data mining-client server and data warehousing-multi processing machines-cost justification-KDD Process-setting up of KDD Environment-ten golden rules. <b>Data mining:</b> Introduction – Motivations.	15
Unit II	<b>Mining frequent patterns, association and correlations:</b> Basic concepts-market basket analysis-frequent itemset-closed item set and association rules -frequent pattern mining-Efficient and scalable mining methods-Apriori algorithm-generating association rule from frequent item set-improving efficiency of Apriori - mining frequent itemset without candidate generation –using vertical data format-mining closed frequent itemset.	16
Unit III	<b>Classification and prediction:</b> Definition –Issues-classification by Decision tree Induction –Bayesian classification-rule based classification-classification by back propagation- support vector machine.	15
Unit IV	<b>Cluster analysis:</b> Definition -types of data in cluster analysis-categorization of major clustering methods-partitioning methods-hierarchical methods-density based methods.	15
Unit V	Spatial data mining-multimedia data mining-text mining-mining the www- data mining Applications.	14
	<b>Total Contact Hrs</b>	<b>75</b>

**Pedagogy:**

Direct Instruction, Digital Presentation, Flipped Class
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**Assessment Methods:**

Test, Seminar, Quiz, Assignments, Group Task.(GD/ Roll Play /APS)
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## Text Book

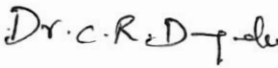



- ❖ Jiawei Han and Micheline Kamber (2005) Data Mining concepts and techniques, Elsevier publication.

## Reference Books

- ❖ Vikram Pudi, P.Radha Krishna (2009), *Data Mining*, Oxford University Press, 1<sup>st</sup> Edition.
- ❖ Anand Rajaraman and Jeffry David Ullman (2012), “Mining of Massive Datasets”, Cambridge University Press.

## Web References

- ❖ <https://youtu.be/m5c27rQtD2E>
- ❖ <https://youtu.be/6FWIez4IP68>

Course Designed by	Verified by HOD	Checked by	Approved by
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Name: C.R. Durga devi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT5E2			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-	DSE - I : Cloud Computing	<b>Semester:</b>	V	
					<b>Credits:</b>	4	

### Course Objective

To understand various concepts of cloud computing and learn types of cloud services, usage of cloud etc.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To recollect cloud networking concepts	K1
CO2	To understand and familiar with the basic concepts of cloud computing and python	K2
CO3	To apply the terminologies in designing cloud based applications	K3
CO4	To figure out security issues in cloud computing	K4
CO5	To judge the pros and cons of various types of cloud providers	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	M	M	M	M	H	H	H	H	H
CO2	H	H	H	M	L	M	M	H	H	H	H	H
CO3	M	H	H	H	M	L	M	H	H	H	H	H
CO4	L	M	H	H	H	L	M	H	H	H	H	H
CO5	L	H	H	L	M	L	M	H	M	M	M	M

Units	Content	Hrs.
Unit I	<b>Introduction to Cloud Computing:</b> Characteristics – Models – Services Examples – Services and Applications. <b>Cloud concepts and technologies:</b> Virtualization – Load balancing – scalability and elasticity – Deployment – Replication – Monitoring – Software defined Networking – Network function virtualization – MapReduce – Identity and access management - Service level agreements – Billing.	16
Unit II	<b>Cloud services and Platforms:</b> Compute – Storage – Database – Application – Content Delivery – analytics – Deployment and Management – Identity and access Management – Open source Private Cloud Software. <b>Hadoop and MapReduce:</b> Apache Hadoop – MapReduce Job execution – Schedulers – Cluster setup.	14
Unit III	<b>Cloud Application Design:</b> Introduction – Design considerations – Reference Architectures – Design methodologies – Data storage approaches. <b>Cloud Application Benchmarking and Tuning:</b> Introduction – Workload Characteristics – Application Performance Metrics – Design Considerations – Benchmarking Tools – Deployment prototyping – Load Testing and Bottleneck Deduction – Hadoop Benchmarking.	16
Unit IV	<b>Cloud Security:</b> Introduction – CSA Cloud Security Architecture – Authentication – Authorization – Identity and Access Management – Data Security – Key Management – Auditing. <b>Cloud For Industry, Health Care and Education:</b> Health Care – Energy systems – Transportation systems – Manufacturing Industry – Education.	15
Unit V	<b>Python Basics:</b> Introduction – Installation – Data types and Data structures –Control flow – Functions – Modules – Packages – File handling – Date/Time – Operations – Classes. <b>Python for Cloud:</b> Amazon web services – Google Platform – Windows Azure – MapReduce – Packages – Web Application Framework – Designing a RESTful Web API.	14
	<b>Total Contact Hrs.</b>	<b>75</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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## Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.( Roll Play)
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## Text Book

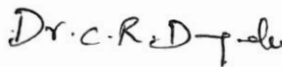



- ❖ ArshdeepBahga, Vijay Madiseti. (2016). Cloud Computing – A Hands-on Approach. Universities Press Pvt. Ltd.

## Reference Books

- ❖ Anthony T.Velte, Toby J.Velte, Robert Elsenpeter. (2013). Cloud Computing - A Practical Approach. McGraw Hill Publications. Fourteenth reprint.
- ❖ Michael Miller. (2009). Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing.

## Web Reference

- ❖ <https://www.youtube.com/watch?v=RziNWUIBPPM>
- ❖ <https://www.youtube.com/watch?v=rjY59WLMK2o>

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology	
<b>Course Code:</b>	24UIT5E3			<b>Title</b>	<b>Batch:</b>	2024 - 2027
<b>Lecture Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-	DSE - I : Wireless Networks	<b>Semester:</b>	V
					<b>Credits:</b>	4

### Course Objective

To understand various concepts transmission techniques, adhoc networks and wireless sensor networks

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To recollect analog and digital transmission	K1
CO2	To understand and familiar in wireless LAN and WPAN	K2
CO3	To apply sensor network in various scenarios	K3
CO4	To figure out challenges in wireless networks	K4
CO5	To judge design principles of wireless networks	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	M	M	M	M	H	H	H	H	H
CO2	H	H	H	M	L	M	M	H	H	H	H	H
CO3	M	H	H	H	M	L	M	H	H	H	H	H
CO4	L	M	H	H	H	L	M	H	H	H	H	H
CO5	L	H	H	L	M	L	M	H	M	M	M	M

<b>Units</b>	<b>Content</b>	<b>Hrs.</b>
<b>Unit I</b>	Evolution of wireless networks – Challenges - Transmission fundamentals: Analog and digital data transmission - Transmission media - Modulation techniques for wireless systems - Multiple access for wireless systems - Performance increasing techniques for wireless networks.	16
<b>Unit II</b>	Introduction to Wireless LANs – WLAN Equipment, Topologies, Technologies, IEEE 802.11 WLAN – Architecture and Services - Physical Layer - MAC Sub Layer –MAC Management Sub Layer, Other IEEE 802.11 Standards.	14
<b>Unit III</b>	Introduction – Bluetooth: Architecture - Protocol Stack - Physical Connection – Mac mechanism – Frame format – Connection management –Low Rate and High Rate WPAN, ZigBee Technology IEEE 802.15.4: Components – Network topologies – PHY – MAC.	16
<b>Unit IV</b>	Introduction- Characteristics of Adhoc Networks - Classifications of MAC Protocols: Connection Based protocols, Reservation Mechanism - Table driven Routing protocols: DSDV, WRP - On Demand routing protocols: DSR,AODV,TORA –Routing Protocol with Efficient Flooding Mechanism: OLSR - Hierarchical routing protocols – CBRP, FSR.	15
<b>Unit V</b>	Introduction - Challenges for wireless sensor networks - Comparison of sensor network with ad-hoc network - Single node architecture: Hardware components - Energy consumption of sensor nodes - Network architecture: Sensor network scenarios - Design principles – Operating systems.	14
	<b>Total Contact Hrs.</b>	<b>75</b>

### Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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### Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.( Roll Play)
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## Text Book

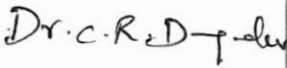

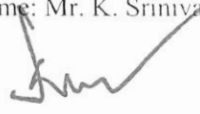
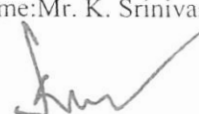
- ❖ Nicopolitidis P. (2010). Wireless Networks. John Wiley and Sons, New York.
- ❖ Vijay K Garg, (2010). Wireless Communication and Networking, Morgan Kaufmann Publishers.
- ❖ Siva Ram Murthy C, Manoj B S. (2012). Ad Hoc Wireless Networks: Architectures and Protocols, Prentice Hall.

## Reference Books

- ❖ Holger Karl and Andreas Willig. (2011) Protocol and Architecture for Wireless Sensor Networks, John Willey Publication.
- ❖ Kaveh Pahlavan. (2013). Principles of wireless networks. Prentice-Hall of India.

## Web Reference

- ❖ <https://www.youtube.com/watch?v=HjAxGPd0Oto>
- ❖ [https://www.youtube.com/watch?v=pH\\_ip22R6xE](https://www.youtube.com/watch?v=pH_ip22R6xE)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: C.R. Durga devi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT516			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Practical Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-	CC Lab - VI : Visual Programming	<b>Semester:</b>	V	
					<b>Credits:</b>	2	

### Course Objective

To understand the practical experience in various concepts of C#.Net and VB.NET (Data types, Statements, Properties, Inheritance, Polymorphism, Multithreading, and Database Connectivity and Web Services).

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To experiment the concepts of web oriented programs.	K3
CO2	To motivate to create menu based program for basic manipulation	K4
CO3	To create applications using database connectivity	K6
CO4	To Test the field elements using validator control	K6
CO5	To design the data in grid control	K6

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	M	H	M	M	H	M	M	H		
CO2	H	H	M	H	M	M	H	M	H	H		H
CO3	M	M	M	M			M	M				H
CO4	H	H	M		M		M	M				H
CO5	H	H	M	M		M	M	M		H		

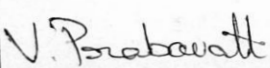

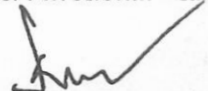
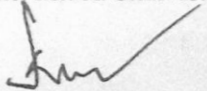
Content	Hrs.
<b>Sample Program List</b> <b>TEST I (C#.NET)</b> 1. Execute Switch Statement Display the employ details. 2. Create method overloading. 3. Create constructor overloading 4. Create student mark list using inheritance 5. Create User-Defined exception. 6. Create an application using button controls (check box, radio). 7. Generate Month calendar. 8. Create applications using controls (trackbar,panel,treeview), 9. Create applications using controls (splitter, menu dialog boxes). 10. Experiment the student details using ADO.Net. <b>TEST II (VB.NET)</b> 1. Create string handling function. 2. Create exception handling. 3. Generate program using VB.Net operators. 4. Create window application using text box, Rich text box 5. Create an application using button controls (check, radio, Panel). 6. Create an application using List boxes, Checked List boxes, Combo boxes and picture boxes). 7. Create an application using form controls and perform basic Manipulations. 8. Create a window application with list box, tables and panels. 9. Create application using Scroll bars, Splitters, Track bars, Pickers, Timers). 10. Create application using Image lists, Tree and list views, tool Bars, Status and Progress Bars and tab).	75

**Pedagogy**

Direct Instruction, Digital Presentation

**Assessment Methods:**

Test, Assignments, Group task (Group Discussion)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT517			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Practical Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-	CC Lab. - VII: Python Programming	<b>Semester:</b>	V	
					<b>Credits:</b>	2	

### Course Objective

To apply various concepts like string handling, mathematical functions, control structure and files in Python language.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To deploy the list and tuple using control structures	K3
CO2	To examine need of files and its related functions	K4
CO3	To choose various packages suitable for the application	K5
CO4	To verify the usage of various in built functions and packages	K5
CO5	To create an application using python as a developing tool	K6

### Mapping

CO \ PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	L	L	L	M	M	L	M	L	L	L
CO2	L	M	L	L	L	M	M	L	M	M	L	L
CO3	L	M	L	L	L	M	H	H	H	L	L	L
CO4	M	M	L	M	L	M	H	H	M	L	L	L
CO5	L	M	L	L	L	M	H	H	H	M	L	L

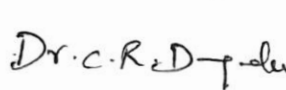



Content	Hrs.
<p style="text-align: center;"><b>SAMPLE PROGRAM LIST</b></p> <ol style="list-style-type: none"> <li>1. Develop a program to read a number n and print an inverted star pattern of the desired size.</li> <li>2. Develop a program to search the number of times a particular number occurs in a list.</li> <li>3. Develop a program to read a list of words and return the length of the longest one</li> <li>4. Develop a program to take a string and replace every blank space with a hyphen</li> <li>5, Develop a program to check if a given key exists in a dictionary or not</li> <li>6. Create a program to check common letters in the two input strings</li> <li>7. Apply recursion to reverse a string</li> <li>8. Develop a program to read the contents of a file.</li> <li>9. Assess the area of a rectangle using classes.</li> <li>10. Test for reading a string from the user and appends it into a file.</li> </ol>	<b>75</b>
<b>Total Contact Hrs.</b>	<b>75</b>

**Pedagogy:**

Direct Instruction, Digital Presentation

**Assessment Methods:**

Test, Assignments, Group Task(GD)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: C.R. Durga devi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT5S1			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Practical Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	-	SEC III : Graphic Designing Lab. (Photoshop)	<b>Semester:</b>	V	
					<b>Credits:</b>	2	

### Course Objective

To Learn, Apply and create various editing techniques of Photoshop.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To deploy basic tools for designing photos.	K3
CO2	To examine various editing tools.	K4
CO3	To choose manipulation of text with photos.	K5
CO4	To verify filters and layers	K5
CO5	To create pdf document	K6

### Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	L	L	L	H	M	M	-	M	-	M
CO2	-	M	L	M	-	M	M	L	L	L	-	M
CO3	M	M	M	M	-	H	-	M	-	-	-	L
CO4	M	M	H	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-



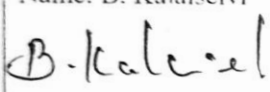



Content	Hrs.
<p><b>SAMPLE PROGRAM LIST</b></p> <ol style="list-style-type: none"> <li>1. Perform Scanning and simple image editing.</li> <li>2. Apply Color change, image extraction and merging of images.</li> <li>3. Create Smoothing of sharp edges.</li> <li>4. Draw and Paint with Colors.</li> <li>5. Placing a Photo inside Text.</li> <li>6. Remove red eyes from a photo.</li> <li>7. Apply Filters and layers.</li> <li>8. Create a PDF-document from MS-Office-programs.</li> </ol>	<b>60</b>

**Pedagogy:**

Direct Instruction, Digital Presentation

**Assessment Methods:**

Test, Assignments ,Group Task (GD)

Course Designed by	Verified by HOD	Checked by	Approved by
<b>Name and Signature</b>	<b>Name and Signature</b>	<b>CDC</b>	<b>COE</b>
Name: B. Kalaiselvi  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT5S2			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Practical Hrs./Week</b>	4	<b>Tutorial Hrs./Sem.</b>	-	SEC III : Graphic Designing Lab. (Canva)	<b>Semester:</b>	V	
					<b>Credits:</b>	2	

### Course Objective

To learn, apply and create various editing techniques of Canva.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To deploy basic tools for designing photos.	K3
CO2	To examine various editing tools.	K4
CO3	To choose manipulation of text with photos.	K5
CO4	To verify filters and layers	K5
CO5	To create PDF document	K6

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	L	L	L	H	M	M	-	M	-	M
CO2	-	M	L	M	-	M	M	L	L	L	-	M
CO3	M	M	M	M	-	H	-	M	-	-	-	L
CO4	M	M	H	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-




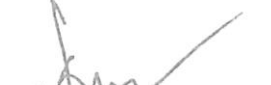
Content	Hrs.
<p><b>SAMPLE PROGRAM LIST</b></p> <ol style="list-style-type: none"> <li>1. Perform Scanning and simple image editing.</li> <li>2. Apply Color change, image extraction and merging of images.</li> <li>3. Create Smoothing of sharp edges.</li> <li>4. Draw and Paint with Colors.</li> <li>5. Placing a Photo inside Text.</li> <li>6. Remove red eyes from a photo.</li> <li>7. Apply Filters and layers.</li> <li>8. Create a PDF-document from MS-Office-programs..</li> </ol>	<b>60</b>
<b>Total Contact Hrs.</b>	<b>60</b>

**Pedagogy:**

Direct Instruction, Digital Presentation

**Assessment Methods:**

Test, Assignments ,Group Task (GD)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: R. Sekar  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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NGM College (Autonomous)  
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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT5AL			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				ALC - I Cyber Law (Optional) – Self Study	<b>Semester:</b>	V	
<b>Lecture Hrs./Week</b>	SS	<b>Tutorial Hrs./Sem.</b>	-		<b>Credits:</b>	2**	

### Course Objective

To cultivate knowledge on Technical aspects of Cyber Security and Evidence Aspects and to acquire knowledge on Information Technology Act and EDI

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the concepts of cyber law and cyber space	K1
CO2	To understand cyber security technical aspects	K2
CO3	To apply different types of technical evidence aspects	K3
CO4	To evaluate the electronic data interchange scenario	K4
CO5	To determine information technology act	K5

### Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	L	L	L	H	M	M	-	M	-	M
CO2	-	M	L	M	-	M	M	L	L	L	-	M
CO3	M	M	M	M	-	H	-	M	-	-	-	L
CO4	M	M	H	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-

Units	Content
Unit I	Cyber Law: Introduction- Concept of Cyberspace-E-Commerce in India-Privacy factors in E - Commerce-cyber law in E-Commerce-Contract Aspects.
Unit II	Security Aspects: Introduction-Technical aspects of Encryption-Digital Signature-Data Security. Intellectual Property Aspects: WIPO-GII-ECMS-Indian Copy rights act on soft propriety works Indian Patents act on soft propriety works.
Unit III	Evidence Aspects: Evidence as part of the law of procedures –Applicability of the law of Evidence on Electronic Records-The Indian Evidence Act1872.Criminal aspect: Computer Crime-Factors influencing Computer Crime- Strategy for prevention of computer crime Amendments to Indian Penal code 1860.
Unit IV	Global Trends- Legal frame work for Electronic Data Interchange: EDI Mechanism-Electronic Data Interchange Scenario in India
Unit V	The Information Technology Act 2000-Definitions-Authentication Of Electronic Records Electronic Governance-Digital Signature Certificates.

### Assessment Methods:

Test, Quiz, Assignments

### Text Books:

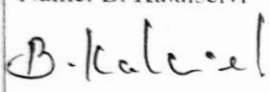
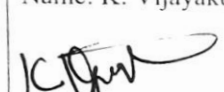
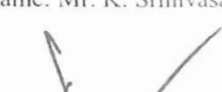

- ❖ Suresh T.Viswanathan, (2022), “The Indian Cyber Law”, 3<sup>rd</sup> Edition: Bharat Law House, New Delhi.

### Reference Books:

- ❖ Cory Altheide and Harlan Carvey, (2011) “Digital Forensics with Open Source Tools”, Elsevier.
- ❖ Bill Nelson, Amelia Philips,Chris Steuart (2015) “Guide to Computer Forensics and Investigations”, 5<sup>th</sup> Edition, CENGAGE Learning.

### Web References:

- ❖ <https://www.youtube.com/watch?v=KtuCsBIJXk8>
- ❖ <https://www.youtube.com/watch?v=6srnawS4PLQ&list=PLX0Im12KwTwlm-jOWfFqejg8go7JBj72J>
- ❖ <https://www.youtube.com/watch?v=SCgc55vtd6M>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: B. Kalaiselvi  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT618			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	6	<b>Tutorial Hrs./Sem.</b>	-	CC – XI : Information Security	<b>Semester:</b>	VI	
					<b>Credits:</b>	4	

### Course Objective

To endow with better knowledge on various concepts of Security, Symmetric and Asymmetric algorithms, Digital certificates, E-mail, WWW, 2G, 3G etc.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Recollect basic concepts of network security	K1
CO2	To Understand basic knowledge of cryptography	K2
CO3	To Apply diverse security mechanisms	K3
CO4	To Evaluate various security algorithms	K4
CO5	To Interpret different types of protocols	K5

### Mapping

PO / PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO												
CO1	H	H	-	L	L	L	H	-	H	L	L	H
CO2	H	L	M	L	-	L	L	H	M	M	-	H
CO3	H	L	M	H	-	L	L	M	H	M	-	H
CO4	L	M	L	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-

Units	Content	Hrs.
Unit I	<b>Security:</b> Introduction – Need – Approaches – Principles – <i>*Types of attacks.</i> <b>Cryptography:</b> Introduction – Plain text and Cipher text – Substitution & Transposition techniques – Encryption and Decryption – Symmetric and Asymmetric key Cryptography – Steganography – Key range and Key size - Possible types of attacks.	17
Unit II	<b>Symmetric Key Algorithms:</b> Introduction - <i>*Algorithm Types and modes</i> – Overview – DES– IDEA– RC4 & 5 – Blowfish – AES.	18
Unit III	<b>Asymmetric Key Algorithms:</b> Introduction – History – Overview - RSA algorithm – <i>*Symmetric and asymmetric cryptography.</i> <b>Digital Signatures:</b> Introduction – Message Digests - MD5 – Secure Hash Algorithm. Knapsack algorithm – Other algorithms.	18
Unit IV	<b>Digital Certificates:</b> Introduction – Concepts – <i>*Certification Authority</i> – Technical details – Creation – Cross certification – Revocations. <b>Private key management - PKIX model – PKCS.</b>	18
Unit V	<b>Internet Security Protocols:</b> Introduction – Concepts. <b>Secure Socket Layer (SSL): Transport Layer Security (TLS) – Secure Hyper Text Transfer Protocol (SHTTP) – Time Stamping Protocol (TSP). Secure Electronic Transaction (SET):</b> Introduction – Participants – Process – Internals. SSL Versus SET – 3-D secure Protocol. <b>Electronic Money:</b> Introduction – Security mechanisms – Types. <b>Email security:</b> Introduction – Privacy Enhanced Mail – Pretty Good Privacy. WAP Security - Security in GSM – Security in 3G.	19
	<b>Total Contact Hrs.</b>	<b>90</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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## Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD)
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## Text Book

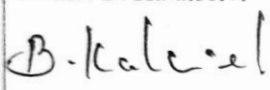
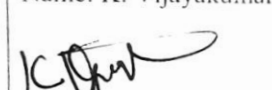

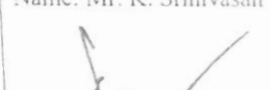
- ❖ ATUL KAHATE. (2013). *CRYPTOGRAPHY and NETWORK SECURITY*. 3<sup>rd</sup> Edition, McGraw-Hill Education Pvt Ltd.

## Reference Books

- ❖ William Stallings. (2006). *Cryptography and Network Security Principles and Practices*. 4<sup>th</sup> Edition. PHI Education Asia.
- ❖ Behrouz A. Forouzan. (2007). *CRYPTOGRAPY and NETWORK SECURITY*. Tata McGraw Hill Pub.

## Web References

- ❖ <https://www.youtube.com/watch?v=edQIJvaUhHg>
- ❖ <https://www.youtube.com/watch?v=9OjK9NNIXYY>
- ❖ <https://www.youtube.com/watch?v=NK5Z6Oj0YkM>

Course Designed by	Verified by HOD	Checked by	Approved by
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Name: B. Kalaiselvi  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT6E4			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				DSE – II : Machine Learning	<b>Semester:</b>	VI	
<b>Lecture Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-		<b>Credits:</b>	4	

### Course Objective

- To give a better understanding of various concepts of Data machine learning, evaluation models generated from data a build machine learning algorithms, prepare data, and use different techniques using Python

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the concept of Machine learning techniques and mathematical concepts in ML	K1
CO2	Understand a wide variety of learning algorithms.	K2
CO3	Understand how to evaluate models generated from data	K3
CO4	Provide a way to evaluate performance of machine learning algorithms.	K5
CO5	Apply the algorithms to a real-world problem and optimize the models learned.	K5

### Mapping

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	M	H	M	M	M	L	L	L	L	H	M
CO2	M	L	L	L	M	H	M	M	M	M	H	H
CO3	S	M	L	L	L	L	L	L	L	L	L	H
CO4	S	M	L	L	L	M	L	L	L	L	H	L
CO5	M	M	L	H	M	H	M	M	M	M	M	H

Units	Content	Hrs
Unit I	Introduction: Machine Learning Foundations – Overview – Design of a Learning System – Types of Machine Learning –Supervised Learning and Unsupervised Learning – Applications of Machine Learning - Overview of Tools for ML.	15
Unit II	Supervised Learning – I: Simple Linear Regression – Multiple Linear Regression – Polynomial Regression – Ridge Regression – Lasso Regression – Evaluating Regression Models – Model Selection – Bagging – Ensemble Methods.	16
Unit III	Supervised Learning – II: Classification – Logistic Regression – Decision Tree Regression and Classification – Random Forest Regression and Classification – Support Vector Machine Regression and Classification – Evaluating Classification Models.	15
Unit IV	Unsupervised Learning: Clustering – K-Means Clustering – Density-Based Clustering – Dimensionality Reduction – Collaborative Filtering.	15
Unit V	Association Rule Learning: Association Rule Learning – Concepts related to ARL – ARL Algorithms - Apriori – Eclat – Concepts and Algorithms.	14
	<b>Total Contact Hrs</b>	<b>75</b>

### Pedagogy:

Direct Instruction, Digital Presentation, Flipped Class

### Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD/ Roll Play /APS)

### Text Book

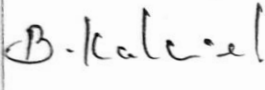



- ❖ Kevin P.Murphy (2012) Machine Learning: A Probabilistic Perspective , MIT Press

### Reference Books

- ❖ Ethem Alpaydin (2014), Introduction to Machine Learning, MIT Press, Third Edition
- ❖ Sebastian Raschka, Vahid Mirjalili (2018), Python Machine Learning and deep learning, kindle book, 2nd edition

### Web References

- ❖ <https://www.youtube.com/watch?v=bk12t0Xz5FM>
- ❖ [https://www.youtube.com/watch?v=i\\_LwzRVP7bg](https://www.youtube.com/watch?v=i_LwzRVP7bg)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: B. Kalaiselvi	Name: K. Vijayakumar	Name: Mr. K. Srinivasan	Name: Mr. K. Srinivasan
			
Signature:	Signature:	Signature:	Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT6E5			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				DSE – II :	<b>Semester:</b>	VI	
<b>Lecture Hrs./Week:</b>	5	<b>Tutorial Hrs./Sem.:</b>	-	Internet of Things	<b>Credits:</b>	4	

### Course Objective

Understand about the definition and usage of Internet of things and the key components of IoT system

### Course Outcome

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the various concepts of IoT.	K1
CO2	To Understand the basic concepts of M2M and sensors	K2
CO3	To apply the concepts into the embedded devices	K3
CO4	To analyze the various privacy issues.	K4
CO5	To evaluate software design for IoT applications	K5

### Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	L	L	L	H	M	M	-	M	-	M
CO2	-	M	L	M	-	M	M	L	L	L	-	M
CO3	M	M	M	M	-	H	-	M	-	-	-	L
CO4	M	M	H	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-

<b>Units</b>	<b>Content</b>	<b>Hrs.</b>
<b>Unit I</b>	<b>IoT: Overview</b> – Introduction – Conceptual Framework – Architectural View – Technology Behind – Sources – M2M Communication – Examples.	14
<b>Unit II</b>	<b>Design Principles for Connected Devices:</b> Introduction – IoT/M2M Systems Layers and Design Standardization – Communication Technologies – Data Enrichment, Consolidation and Device Management at Gateway – Designing and Affordability.	14
<b>Unit III</b>	<b>Data Acquiring, Organizing, Processing and Analytics:</b> Introduction – Data Acquiring and Storage – Organizing the data – Transactions, Business Processes, Integration and Enterprise Systems – Analytics – Knowledge Acquiring, Managing and Storing Processes.	15
<b>Unit IV</b>	<b>Sensors, Participatory Sensing, RFIDs, and Wireless Sensor Networks:</b> Introduction – Sensor Technology – Participatory Sensing, Industrial and Automotive IoT – Actuator – Sensor Data Communication Protocols – RF Identification Technology – Wireless Sensor Network Technology.	16
<b>Unit V</b>	<b>Prototyping and Designing the Software for IoT Applications:</b> Introduction – Prototyping Embedded Device Software – Devices, Gateways, Internet and Web/Cloud Services Software Development – Prototyping Online Component APIs and Web APIs. <b>IoT Privacy, Security and Vulnerabilities Solutions:</b> Introduction – Vulnerabilities, Security Requirements and Threat Analysis – IoT Security Tomography and Layered Attacker Model – Security Models, Profiles and Protocols.	16
	<b>Total Contact Hrs.</b>	<b>75</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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## Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD)
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## Text Book





- ❖ Raj Kamal, (2019), *Internet of Things Architecture and Design Principles*, 4<sup>th</sup> Reprint, McGraw Hill Education.

## Reference Books

- ❖ Vijay Madiseti and Arshdeep Bahga, (2014), *Internet of Things (A Hands-on-Approach)*, 1st Edition, VPT
- ❖ Margolis, Michael (2011) *Arduino Cookbook: Receipts to begin, Expand and Enhance Your Projects*. O'Reilly Media Inc.
- ❖ Monk, Simon. *Raspberry Pi (2016) Cookbook: Software and hardware problems and Solutions*. O'Reilly Media Inc.

## Web Reference

- ❖ [https://onlinecourses.swayam2.ac.in/aic20\\_sp06/preview](https://onlinecourses.swayam2.ac.in/aic20_sp06/preview)
- ❖ [https://onlinecourses.swayam2.ac.in/arp19\\_ap79/preview](https://onlinecourses.swayam2.ac.in/arp19_ap79/preview)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: B. Kalaiselvi  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT6E6			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	--	DSE – II : Digital Marketing	<b>Semester:</b>	VI	
					<b>Credits:</b>	4	

### Course Objective

To learn E-Business revenue models, E-marketing, E-security, CRM, online payment systems and sales.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember basic concepts of Digital Marketing	K1
CO2	To understand the role of E-marketing, E-security, E-payment systems in current scenario	K2
CO3	To apply mobile payments.	K3
CO4	To analyze various portals associated with e-commerce	K4
CO5	To justify legal and ethical issues in digital economy and phishing	K5

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	-	-	-	-	-	-	-	L	-	-	-
CO2	H	M	H	M	-	M	-	M	M	M	-	H
CO3	H	M	H	M	M	H	M	M	M	M	-	H
CO4	M	H	M	-	-	H	-	-	L	-	-	H
CO5	H	-	M	M	H	M	-	M	-	M	-	H

Units	Content	Hrs.
Unit I	<b>e-Commerce:</b> Introduction- Early Business information interchange efforts – Emergence of the internet – Milestones – <i>*Advantages – Disadvantages</i> – Online extension of BAM model – Transition to e-commerce in India – E-transition challenges for Indian corporate. <b>Business Models:</b> Introduction – E-Business models based on the relationship of transaction parties and transaction types.	15
Unit II	<b>E-Marketing:</b> Traditional Marketing – Identifying web presence goals – Online marketing – E-Advertising – Internet marketing trends – Target Markets – Marketing strategies.	14
Unit III	<b>E-Security:</b> Information system security – <i>*Security on the internet</i> . <b>E-Payment Systems:</b> Internet Banking – Digital payment requirements – Digital token based e-payment systems – Classification of new payment systems – Electronic cash – Risk and e-Payment system – Online financial services in India – Online stock trading.	15
Unit IV	<b>E-customer Relationship Management:</b> CRM – Typical Business Touch Points. <b>E-supply Chain Management:</b> CISCO – supply chain. <b>Information Systems for Mobile Commerce:</b> Introduction – Mobile payments – Mobile Commerce in India.	15
Unit V	<b>Portals for E-Business:</b> <i>*Portals</i> – Requirements of intelligent websites – portals for mass collaborations – portals for Enterprise Resource Planning – ERP – Intranet Portals – HRM – Various HRIS modules. <b>Legal and Ethical Issues:</b> Ethical issues in Digital economy – cyber stalking – Phishing – Application fraud – Skimming – Copyright – Internet Gambling – Threats to children – Special Nature of Computer Ethics.	16
	<b>Total Contact Hrs.</b>	75

### Pedagogy:

Direct Instruction, Digital Presentation, Flipped Class
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### Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD/ Roll Play /APS)
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## Text Book

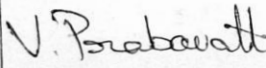


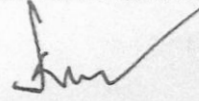
- ❖ P. T. Joseph S. J., (2017), *E - Commerce: An Indian Perspective*, 5<sup>th</sup> Edition, PHI.

## Reference Books

- ❖ Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, (2011), *E-commerce Fundamentals and Applications*, 1<sup>st</sup> Edition, Wiley India Pvt Ltd.
- ❖ Gary P Schneider, (2012), *E-Commerce Strategy, Technology And Implementation*, 9<sup>th</sup> Edition, Engage Learning Pub.

## WebReferences:

- ❖ <https://www.slideshare.net/sajidkhetani/digital-payments-india-perspective>
- ❖ <https://www.sampletemplates.com/marketing-templates/digital-marketing-presentation.html>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT6E7			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				DSE - III: Big Data Analytics	<b>Semester:</b>	VI	
<b>Lecture Hrs./Week</b>	6	<b>Tutorial Hrs./Sem.</b>	-		<b>Credits:</b>	4	

### Course Objective

To cultivate knowledge about big data analytics, technologies and to transform the business using Analytics.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the fundamentals of Big Data.	K1
CO2	To understand the concepts of Hadoop	K2
CO3	To apply different types of Analytics	K3
CO4	To evaluate the results and transform the business	K4
CO5	To improve business through social media analysis	K5

### Mapping

PO / PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	L	L	L	H	M	M	-	M	-	M
CO2	-	M	L	M	-	M	M	L	L	L	-	M
CO3	M	M	M	M	-	H	-	M	-	-	-	L
CO4	M	M	H	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-

Units	Content	Hrs.
Unit I	<b>Types Of Digital Data:</b> classification of digital data. <b>Introduction to Big Data:</b> Characteristics– Evolution – Definition – Challenges – Big Data Definition – Other Characteristics – Need of Big Data – Traditional Business Intelligence Versus Big Data – Data Warehouse Environment – Hadoop Environment – Big Data Today – Changing Realms Of Big Data. <b>Big Data Analytics:</b> Big Data Analytics – Classification Of Analytics – Greatest Challenges – Top Challenges – Importance – Kind Of Technologies to Meet The Challenges – Data Science – Data Scientist – Terminologies used in Big Data – BASE – Analytics Tools	19
Unit II	<b>The Big Data Technology Landscape:</b> NoSQL – Hadoop. <b>Introduction to Hadoop:</b> Introduction – Need- RDBMS Versus Hadoop – Distributed Computing Challenges – History – Overview – Use case – Distributors – HDFS – Processing Data with Hadoop – Managing Resources And Applications With Hadoop YARN – Interacting With Hadoop Ecosystem- <b>Few Interesting Differences.</b>	18
Unit III	<b>Apply Analytics :</b> Evolution of analytics-Text analytics-Speech analytics-Video/image analytics-Behavior analytics-Combined analytics-Transparency-Prediction vs. privacy	17
Unit IV	<b>Report Results :</b> Data visualization-New data visualization-Displaying behavior & emotions-Displaying connections-How to improve data visualization-Info graphics - Beware the self-service business intelligence tools-The ingredients of successful data visualization and info graphics - Management dashboards	18
Unit V	<b>Foundation for Social Media Analytics:</b> Foundation for Analytics: – Digital Gap – Social Media Data Sources – Defining Social Media Data –Data Sources – Estimated vs. Factual Data Sources – Data Gathering in Social Media Analytics. From Data to Insights: Actionable Analytics – Focus on objective – Plan to shape data to insights – Choosing a good analytics tool – Data Aggregation calculations and display – Data display – Social-Media and Big data – Potential Challenges. Data Identification: Professional networking sites - social sites – information sharing sites – micro blogging sites – blogs /wikis	18
	<b>Total Contact Hrs.</b>	<b>90</b>

## Pedagogy

Direct Instruction, Digital Presentation, Flipped Class
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## Assessment Methods:

Test, Seminar, Quiz, Assignments
----------------------------------

## Text Books:

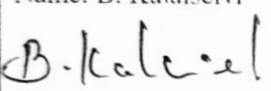



- ❖ Seema Acharya, Subashini Chellapan, (2019) “Big Data and Analytics” , 2<sup>nd</sup> Edition, Wiley Publications ( Unit – I, II )
- ❖ Bernard Marr, (2015) “ Big data : using smart big data, analytics and metrics to make better decisions and improve performance”, Wiley Publications ( Unit – III, IV )
- ❖ Alex Goncalves, Social Media Analytics Strategy (2017). - Using Data to Optimize Business Performance, Alex Goncalves, APress( Unit –V )

## Reference Books:

- ❖ M. Vijayalakshmi Radha Shankarmani (2016) “Big Data Analytics”, Kindle Edition, Wiley Publications
- ❖ Peter Mika. (2007). Social Networks and the Semantic Web, First Edition, Springer.

## Web References:

- ❖ <https://www.simplilearn.com/what-is-big-data-analytics-article>
- ❖ <https://searchbusinessanalytics.techtarget.com/definition/big-data-analytics>
- ❖ <https://www.youtube.com/watch?v=bY6ZzQmtOzk>
- ❖ <https://www.bmc.com/blogs/hadoop-introduction/>
- ❖ <https://www.bmc.com/blogs/hadoop-architecture/>
- ❖ <https://www.qualtrics.com/experience-management/research/social-media-analytics/>
- ❖ <https://www.ibm.com/topics/social-media-analytics>
- ❖ <https://cambridgesemantics.com/blog/semantic-university/intro-semantic-web/>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: B. Kalaiselvi  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT6E8			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				DSE - III: Artificial Intelligence	<b>Semester:</b>	VI	
<b>Lecture Hrs./Week</b>	6	<b>Tutorial Hrs./Sem.</b>	-		<b>Credits:</b>	4	

### Course Objective

To embed a deep knowledge about search techniques, reasoning, game playing, expert systems and prolog.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Understand the nature of AI problems and task domains of AI	K1
CO2	To Apply the appropriate search procedures to solve the problems by using best algorithms.	K3
CO3	To Analyze and select the suitable knowledge representation method.	K4
CO4	To Manipulate the acquired knowledge and infer new knowledge.	K4
CO5	To Demonstrate the development of AI systems by encoding the knowledge	K5

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	M	M	M	H	M	H	M	H	L	L
CO2	H	M	M	H	M	H	M	H	M	H	M	M
CO3	H	H	H	M	M	M	H	H	M	H	M	H
CO4	H	H	H	M	H	M	H	H	M	H	H	H
CO5	H	H	H	H	H	H	H	H	M	H	H	H

Units	Content	Hrs.
Unit I	<b>Introduction to knowledge-based Intelligent Systems:</b> Intelligent machines – History of AI from Dark ages to knowledge-based systems. <b>Introduction to AI:</b> AI Problems – AI techniques – Criteria for success. Problems, Problem Spaces, Search: State space search – Production Systems – Problem Characteristics – Issues in design of Search.	19
Unit II	<b>Heuristic Search techniques:</b> Generate and Test – Hill Climbing – Best-Fist, Problem Reduction, Constraint Satisfaction, Means-end analysis.	16
Unit III	<b>Knowledge representation issues:</b> Representations and mappings – Approaches to Knowledge representations – Issues in Knowledge representations – Frame Problem. <b>Predicate Logic:</b> Representing simple facts in logic – Representing Instance and Isa relationships – Computable functions and predicates – Resolution – Natural deduction.	18
Unit IV	<b>Representing knowledge using rules:</b> Procedural Vs Declarative knowledge – Logic programming – Forward Vs Backward reasoning – Matching – Control knowledge.	18
Unit V	<b>Rule-Based Expert Systems:</b> Introduction to knowledge – Rules as knowledge representation – Players – Structure – Characteristics – Forward chaining and Backward chaining – Media Advisor Demonstration – Advantages and Disadvantages.	19
	<b>Total Contact Hrs.</b>	90

### Pedagogy:

Direct Instruction, Digital Presentation, Flipped Class
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### Assessment Methods:

Test, Seminar, Quiz, Assignments, Group Task.(GD/ Roll Play /APS)
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### Text Book

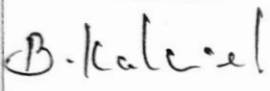
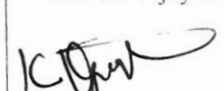


- ❖ Elaine Rich, Kevin Knight, (2009), *Artificial Intelligence*, 3<sup>rd</sup> edition, Tata McGraw Hill Publications. (Unit I, Unit II, Unit III & Unit IV)
- ❖ Michael Negnevitsky, (2020), *Artificial Intelligence*, 3<sup>rd</sup> edition, Pearson India Education services PVT. Ltd. (Unit I & Unit V)

### Reference Books

- ❖ Stuart Russell, Peter Norvig, (2009), *Artificial Intelligence: A Modern Approach*, 3<sup>rd</sup> Edition, Pearson New International Edition.
- ❖ Er. Rajiv Chopra, (2005), *Artificial Intelligence: A Practical Approach*, 1<sup>st</sup> Edition, S. Chand Publications.

### Web References

- ❖ [https://www.tutorialspoint.com/artificial\\_intelligence/artificial\\_intelligence\\_expert\\_systems.htm](https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_expert_systems.htm)
- ❖ <https://www.geektonight.com/artificial-intelligence-pdf>

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology	
<b>Course Code:</b>	24UIT6E9			<b>Title</b>	<b>Batch:</b>	2024 - 2027
				DSE - III	<b>Semester:</b>	VI
<b>Lecture Hrs/Week:</b>	6	Tutorial Hrs./ Sem.	-	Block Chain Technology	<b>Credits:</b>	4

### Course Objective

To understand the fundamentals of block chain and crypto currency, influence and role of block chain in various fields.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To keep in mind the fundamentals of block chain technology and crypto currency	K1
CO2	To understand the mining mechanism in block chain.	K2
CO3	To apply and identify security measures, and various types of services that allow people to trade and transact with bit coin.	K3
CO4	To analyze security, privacy, and efficiency of a given Block chain system.	K4
CO5	To explain the Block chain technology in various fields.	K5

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	H	H	H	-	H	M	-	H	H	H	H
CO2	M	-	H	M	M	-	M	M	H	-	M	-
CO3	M	H	-	H	H	M	-	H	-	H	H	H
CO4	H	-	H	H	H	-	H	-	M	M	H	-
CO5	H	H	-	H	-	H	M	H	-	H	-	H

<b>Units</b>	<b>Content</b>	<b>Hrs.</b>
<b>Unit I</b>	<b>Introduction to Block chain:</b> The big picture of the industry – size, growth, structure, players. Bitcoin versus Crypto currencies versus Block chain - Distributed Ledger Technology (DLT). Strategic analysis of the space – Block chain platforms, regulators, application providers. The major application: currency, identity, chain of custody.	<b>18</b>
<b>Unit II</b>	<b>Network and Security:</b> Advantage over conventional distributed database, Block chain Network, Mining Mechanism, Distributed Consensus, Block chain 1.0, 2.0 and 3.0 – transition, advancements and features. Privacy, Security issues in Block chain.	<b>19</b>
<b>Unit III</b>	<b>Crypto currency:</b> Crypto currency - History, Distributed Ledger, Bit coin protocols - Symmetric-key cryptography - Public-key cryptography - Digital Signatures -High and Low trust societies - Types of Trust model: Peer-to-Peer, Leviathan, and Intermediary. Application of Cryptography to Block chain.	<b>19</b>
<b>Unit IV</b>	<b>Crypto currency Regulation:</b> Crypto currency Regulation - Stakeholders, Roots of Bit coin, Legal views - exchange of crypto currency - Black Market - Global Economy. Crypto-economics – assets, supply and demand, inflation and deflation – Regulation.	<b>18</b>
<b>Unit V</b>	<b>Challenges in Block Chain:</b> Opportunities and challenges in Block Chain – Application of block chain: Industry 4.0 – machine to machine communication – Data management in industry 4.0 – future prospects. Block chain in Health 4.0 – Block chain properties - Healthcare Costs - Healthcare Quality - Healthcare Value - Challenges for using block chain for healthcare data.	<b>16</b>
	<b>Total Contact Hrs.</b>	<b>90</b>

**Pedagogy:**

Digital Presentation, Chalk and talk, Flipped class.
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**Assessment Methods:**

Seminar, Assignment, Group task
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**Text Books:**

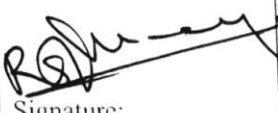
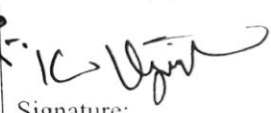


- ❖ Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, (2016), “*Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction*”, Princeton University Press.
- ❖ Antonopoulos, “*Mastering Bitcoin: Unlocking Digital Cryptocurrencies*”

**Reference Books:**

- ❖ Satoshi Nakamoto, “*Bitcoin: A Peer-to-Peer Electronic Cash System*”.
- ❖ Rodrigo da Rosa Righi, Antonio Marcos Alberti, Madhusudan Singh, (2020), “*Blockchain Technology for Industry 4.0*”, Springer.

**Web Reference:**

- ❖ <https://www.slideshare.net/Mithileysh/blockchain-technology-181440314>
- ❖ <https://www.slideshare.net/asrithak/blockchain-technology-ppt>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: R. Sekar  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology	
<b>Course Code:</b>	24UIT619			<b>Title</b>	<b>Batch:</b>	2024 - 2027
				CC Lab - VIII : Software Testing & Data Visualization Tools	<b>Semester:</b>	VI
<b>Practical Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	--		<b>Credits:</b>	2

### Course Objective

To gain the knowledge to apply the various programming concepts of Software testing like integration, unit, functional, non-functional testing and about product metrics.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To make use of properties for checking the values	K3
CO2	To justify the expected result with the obtained result.	K5
CO3	To create GUI based database applications to test	K6
CO4	To develop test cases for the testing programs	K6
CO5	To test websites using selenium controls	K6

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	M	H	-	-	M	-	M	H	-	H
CO2	-	H	-	H	-	M	-	M	H	H	-	H
CO3	H	H	M	H	-	H	-	-	-	H	-	H
CO4	-	H	-	H	-	H	M	M	M	M	-	-
CO5	H	H	M	H	-	M	-	-	M	M	-	-

Content	Hrs.
<b>SAMPLE PROGRAM LIST</b>	
<p><b>Test I: Using Winrunner</b></p> <ol style="list-style-type: none"> <li>1. Create a payroll system and test using the tool.</li> <li>2. Create a ration shop management system and test using the tool.</li> <li>3. Create airline reservation system and test using the tool.</li> </ol> <p><b>Using data visualization tool</b></p> <ol style="list-style-type: none"> <li>4. Using the Data sheet, create a vertical bar chart of the main sources of household light in a region.</li> <li>5. Using Data sheet, create a stacked bar chart of each district's main sources of cooking fuel.</li> <li>6. Once again using Data sheet, create a pie chart of the main sources of household light in a particular region.</li> </ol> <p><b>Test II: Using Selenium</b></p> <ol style="list-style-type: none"> <li>1. Write a simple test program that will launch Firefox browser and open "www.google.com".</li> <li>2. Write a simple test program that will launch Google chrome browser and open "www.ngmc.org" and then search Department of Information Technology .</li> <li>3. Write a simple test program that will launch Firefox browser and open "www.gmail.com".</li> <li>4. Write a simple test program that will launch Google chrome browser and open "www.amazon.com".and then search mobile accessories list.</li> <li>5. Write a simple test program that will launch Firefox browser and open "www.yahoo.com"and then search yahoo mail.</li> </ol> <p><b>Using data visualization tool</b></p> <ol style="list-style-type: none"> <li>6. Using the Data sheet, create a line graph of the infant mortality rate in a particular region.</li> <li>7. Using the Data sheet, create a scatter plot of the relationship between illiterate population and marginal workers for Indian towns.</li> <li>8. Create a word cloud of the incident locations in India between 1997 and 2015.</li> </ol>	75
<b>Total Contact Hrs.</b>	<b>75</b>

**Pedagogy:**

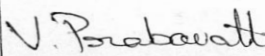

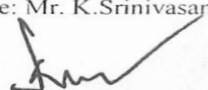
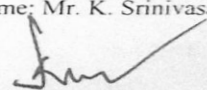
Direct Instruction, Digital Presentation

**Assessment Methods:**

Test, Assignments, Group Discussion

**Web references:**

- ❖ <https://www.educba.com/winrunner/>
- ❖ <https://www.slideshare.net/mansirajpara/win-runner-testing-tool>

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT620			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Practical Hrs./Week</b>	5	<b>Tutorial Hrs./Sem.</b>	-	CC Lab. – IX: Open Source Methodologies	<b>Semester:</b>	VI	
					<b>Credits:</b>	2	

### Course Objective

To obtain the practical knowledge about Open Source Methodologies commands, Administrative, Normal Commands and Basic Android Applications.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To apply the concepts of GNOME, shell and SDK.	K3
CO2	To analyze the various commands.	K4
CO3	To verify the results for the different input data.	K5
CO4	To create applications in Open Source Methodologies.	K6
CO5	To create various simple Android applications.	K6

### Mapping

PO / PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	M	M	-	H	-	M	-	-	-	L
CO2	M	M	H	L	L	M	L	H	-	-	-	L
CO3	-	M	L	H	L	M	-	-	-	M	-	-
CO4	M	M	H	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-





Content	Hrs.
<b>Sample Program List</b>	
<b>Test I: Using GNOME, perform the following</b> <ol style="list-style-type: none"> <li>1. Develop the Change of the Desktop Background and mouse pointer theme.</li> <li>2. Develop the Change the Root Password.</li> <li>3. Create the Add/Remove software.</li> <li>4. Create List and view all the files using Icon.</li> <li>5. Create an Archive file and Extract all Individual files from it.</li> <li>6. Develop and Perform character Mapping.</li> <li>7. Using Shell perform the following               <ol style="list-style-type: none"> <li>1. Execute the File manipulation commands</li> <li>2. Execute the Directory manipulation commands</li> <li>3. Execute the Utility commands</li> <li>4. Execute the Pipes &amp; Filter commands</li> </ol> </li> </ol>	75
<b>Test II : Using Android SDK perform the following</b> <ol style="list-style-type: none"> <li>1. Develop the phone dialer with the given number filled in.</li> <li>2. Develop a Google search using Intent.</li> <li>3. Create a Sending a text message and showing a picture (using extra attributes).</li> <li>4. Develop the Music player and play a song stored in SD card.</li> <li>5. Create a simple Android Application.</li> </ol>	
<b>Total Contact Hrs.</b>	<b>75</b>

**Pedagogy:**

Direct Instruction, Digital Presentation

**Assessment Methods:**

Test, Assignments, Group Task.(GD)

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: R. Sekar	Name: K. Vijayakumar	Name: Mr. K. Srinivasan	Name: Mr. K. Srinivasan
 Signature:	 Signature:	 Signature:	 Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT621			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				Project	<b>Semester:</b>	VI	
<b>Practical Hrs./Week:</b>	-	<b>Tutorial Hrs./Sem.</b>	-		<b>Credits:</b>	3	

### Course Objective

To learn depth knowledge about tools used in software application development, web designing & web technologies and understand the usage of front end and back end tools.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To create database, tables, coding	K6
CO2	To apply the coding into System side	K3
CO3	To apply various tools in real time Applications/Software	K3
CO4	To analyze the system requirements of the Application /Software	K4
CO5	To verify the developed Application with the customer requirements	K5
CO6	Evaluate the Applications/Softwares through the stake holder	K6

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	H	H	H	M	H	M	H	M	M	M
CO2	H	M	H	H	H	M	H	M	M	H	M	M
CO3	H	H	M	M	H	M	H	M	M	H	M	M
CO4	H	H	H	H	H	H	H	H	H	H	H	M
CO5	H	H	H	M	H	M	H	H	H	H	H	H
CO6	H	H	H	H	H	H	H	M	H	H	H	H

**Content****Using only the following Elective Tools (Not Limited to...)****Front end, Multimedia & Web based tools:**

1. Java & Advanced Java
2. Angular & JavaScript
3. PHP
4. Python
5. C#.NET & VB.NET
6. HTML 5.0
7. Flash, 3D Max
8. R - Programming

**Back end tools:**

1. MySQL
2. Oracle 8i & above
3. MS Access 2007
4. SQL Server 2000 and Above

**Note:** Project Internship (upto System Study) going to fourth semester Vacation and submit their report on fifth semester

**INFORMATION TECHNOLOGY PROJECT and VIVA VOCE****Guidelines****Introduction**

The title of the project work and the organization will be finalized at the end of the fifth Semester. Each student will be assigned with a Faculty for guidance. The Project work and coding will be carried by using the facility of the computer science lab as well as in the organization. The periodical review will be conducted to monitor the progress of the project work. The project report will be prepared and submitted at the end of the semester. An external examiner appointed by the Controller of Examination will conduct the viva voce examination along with a respective guide.

## **Area of Work**

- Web Based Development
- Mobile app development
- Website development
- IoT Projects
- Big Data and Data Mining Projects
- Cloud Computing Projects
- Networking Projects
- Artificial Intelligence and Machine learning Projects
- Data Analytics Projects using Python, R, Tableau etc..
- System Software
- Web Security Projects
- Image Processing

## **Methodology**

### **Arrangement of Contents:**

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

1. Cover Page & Title Page
2. Bonafide Certificates
3. Declaration
4. Acknowledgement
5. Synopsis
6. Table of Contents
7. Chapters
8. Appendix
9. References



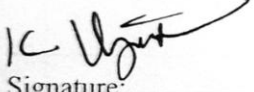
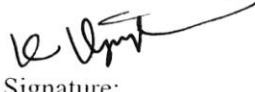
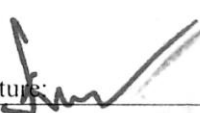

## Format of Table of Contents

### TABLE OF CONTENTS

Chapter No.	Title	Page No.
<b>i</b>	<b>Certificates</b>	
<b>ii</b>	<b>Declaration</b>	
<b>iii</b>	<b>Acknowledgement</b>	
<b>iv</b>	<b>Synopsis</b>	
<b>1.</b>	<b>Introduction</b>	
	1.1 Introduction	
	1.2 Objective of the Project	
	1.3 Company Profile	
	1.4 System Specification	
	1.4.1 Hardware Specification	
	1.4.2 Software Specification	
<b>2</b>	<b>System Study</b>	
	2.1 Existing System	
	2.1.2 Drawbacks	
	2.2 Proposed System	
	2.3 Planning and Scheduling	
<b>3</b>	<b>System Design</b>	
	<b>3.1 Overview of the Project</b>	
	3.2 Modules of the Project	
	3.3 Input Design Format	
	3.4 Output Design	
	3.5 Table Design	
	3.6 Supporting Diagrams (ER/DFD/Use Case)	
<b>4</b>	<b>Implementation and Testing</b>	
	4.1 Coding Methods	
	4.2 Testing Approach	
	4.3 Implementation and Maintenance	
<b>5</b>	<b>Project Evaluation</b>	
	5.1 Project Outcome	
	5.2 Limitations of the Project	
	5.3 Further Scope of the Project	
<b>6</b>	<b>Conclusion</b>	
<b>7</b>	<b>Appendix</b>	
	<b>7.1 Source Code</b>	
	<b>7.2 Screenshots and Reports</b>	
<b>8</b>	<b>References</b>	

## Size of the Project

The Project Report contents should be a maximum of not exceeding 70 pages.

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: K.Vijayakumar  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT6S1			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				SEC – IV : Naan Mudhalvan : Multimedia Lab. (Flash)			<b>Semester:</b>
<b>Practical Hrs./Week</b>	2	<b>Tutorial Hrs./Sem.</b>	--		<b>Credits:</b>	2	

### Course Objective

To know various animation techniques like as game creation, flying of butterfly, moving solar system etc.,

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To apply the ability to write script in flash to create 2D animations	K3
CO2	To motivate to create animated banners	K4
CO3	To create own 2D animation film	K5
CO4	To develop digital multimedia content	K6
CO5	To design animated pictures	K6

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	H	M	M	H	M	M	M	H	-	H
CO2	M	H	M	-	-	H	-	-	-	H	-	H
CO3	H	-	M	M	H	M	-	M	-	H	-	H
CO4	M	H	M	-	-	H	-		-	H	-	H
CO5	M	H	H	-	H	M	-	M	-	H	-	H

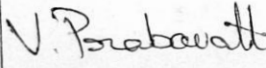


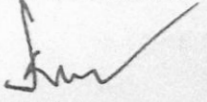
Units	Content	Hrs
Unit I	<ul style="list-style-type: none"> <li>❖ Develop a flash program to animate the Butterfly</li> <li>❖ Develop a flash program to animate the Solar system</li> <li>❖ Develop a flash program to animate the flag hoisting</li> <li>❖ Develop a flash program to animate any game play</li> <li>❖ Develop a flash program to animate traffic control</li> </ul>	30
Unit II	<ul style="list-style-type: none"> <li>❖ Create fish aquarium</li> <li>❖ Create walking with naturals</li> <li>❖ Create animation using any vehicle</li> <li>❖ Create a raining program effect using flash</li> <li>❖ Develop animate musical instrument play</li> </ul>	
Unit III	<ul style="list-style-type: none"> <li>❖ Create the flight land and takeoff animation</li> <li>❖ Create any animate cartoon character</li> <li>❖ Develop animation for reading a book (flip)</li> <li>❖ Create animation for the wall clock/ digital clock</li> <li>❖ Create banner using 2D animation</li> </ul>	
<b>Total Contact Hrs.</b>		<b>30</b>

### Pedagogy

Direct Instruction, Digital Presentation

### Assessment Methods:

Test, Assignments, Group discussion

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT6S2			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
				SEC – IV : Naan Mudhalvan : Multimedia Lab. (3Ds Max)	<b>Semester:</b>	VI	
<b>Practical Hrs./Week</b>	2	<b>Tutorial Hrs./Sem.</b>	--		<b>Credits:</b>	2	

### Course Objective

To know various animation techniques like as game creation, flying of butterfly, moving solar system etc.,

### Course Outcomes

On the successful completion of the course, students will be able to

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CO1	To apply the ability to write script in flash to create 2D animations	K3
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### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	H	M	M	H	M	M	M	H	-	H
CO2	M	H	M	-	-	H	-	-	-	H	-	H
CO3	H	-	M	M	H	M	-	M	-	H	-	H
CO4	M	H	M	-	-	H	-		-	H	-	H
CO5	M	H	H	-	H	M		M	-	H	-	H

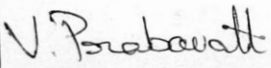

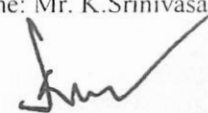
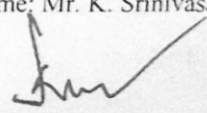
Units	Content	Hrs.
Unit I	<ul style="list-style-type: none"> <li>❖ Develop a program to animate the Butterfly</li> <li>❖ Develop a program to animate the Solar system</li> <li>❖ Develop a program to animate the flag hoisting</li> <li>❖ Develop a program to animate any game play</li> <li>❖ Develop a program to animate traffic control</li> </ul>	30
Unit II	<ul style="list-style-type: none"> <li>❖ Create fish aquarium</li> <li>❖ Create walking with naturals</li> <li>❖ Create animation using any vehicle</li> <li>❖ Create a raining program effect using 3Ds Max</li> <li>❖ Develop animate musical instrument play using 3Ds Max</li> </ul>	
Unit III	<ul style="list-style-type: none"> <li>❖ Create the flight land and takeoff animation</li> <li>❖ Create any animate cartoon character using 3Ds Max</li> <li>❖ Develop an animation for reading a book (flip)</li> <li>❖ Create an animation for the wall clock/ digital clock using 3Ds Max</li> <li>❖ Create banner using 2D animation</li> </ul>	
<b>Total Contact Hrs.</b>		<b>30</b>

**Pedagogy:**

Direct Instruction, Digital Presentation

**Assessment Methods:**

Test, Assignments, Group discussion

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: V.Prabavathi  Signature:	Name: K.Vijayakumar  Signature:	Name: Mr. K.Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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<b>Programme Code:</b>	B.Sc. - IT			<b>Programme Title:</b>	Information Technology		
<b>Course Code:</b>	24UIT6AL			<b>Title</b>	<b>Batch:</b>	2024 - 2027	
<b>Lecture Hrs./Week</b>	SS	<b>Tutorial Hrs./Sem.</b>	-	ALC - II Digital Forensics (Optional) – Self study	<b>Semester:</b>	VI	
					<b>Credits:</b>	2**	

### Course Objective

To cultivate knowledge on handling digital evidence, system artifacts and anti-forensic concepts.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the fundamentals of digital forensics.	K1
CO2	To understand about digital evidence	K2
CO3	To apply different types of system artifacts and anti-forensic concepts	K3
CO4	To evaluate the privacy search	K4
CO5	To determine mobile device forensics	K5

### Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	L	L	L	H	M	M	-	M	-	M
CO2	-	M	L	M	-	M	M	L	L	L	-	M
CO3	M	M	M	M	-	H	-	M	-	-	-	L
CO4	M	M	H	L	L	M	L	H	-	-	-	L
CO5	-	M	L	H	L	M	-	-	-	M	-	-

Units	Content
Unit I	Introduction – Uses of Digital Forensics – Organizations of Note – Locard’s Exchange Principles – Scientific Method. Key Technical Concepts: Bits, Bytes and Numbering Schemes – File Extensions and File Signatures – Storage and Memory – Computing Environments – Data Types – File Types – Allocated and Unallocated Space.
Unit II	Labs and Tools: Introduction – Forensic Laboratories - Policies and Procedures – Quality Assurance – Digital Forensic Tools – Accreditation. Collecting Evidence: Crime Scenes And Collecting Evidence - Documenting The Scene - Chain Of Custody – Cloning – Live System Versus Dead System – Hashing – Final Report.
Unit III	System Artifacts: Deleted Data - Hibernation File – Registry – Print Spooling Recycle Bin – Metadata - Restore Points And Shadow Copy –Link Files. Anti-Forensics: Introduction – Hiding Data – Password Attacks – Data Destruction.
Unit IV	Legal Aspect: Criminal Law-Searches Without a Warrant – Search with a Warrant – Electronic Discovery – Internet and E-mail: Internet Overview – Web Browsers – E-Mail – Social Networking Sites.
Unit V	Network Fundamentals – Network Security Tools – Network Fundamentals – Incident Responses – Network Evidence and Investigations – Mobile Cellular Networks – Operating Systems – Cell Phone Evidence - Cell Phone forensic tools - Global Positioning Systems. Challenges and Concerns: Standards And Controls - Cloud Forensics - Solid State Drives.

### Assessment Methods:

Test, Quiz, Assignments
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### Text Books:

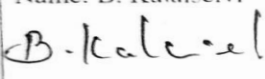
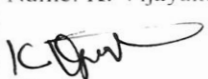


- ❖ John Sammons, (2012) “The Basics of Digital Forensics, The Primer for Getting Started in Digital Forensics”, Syngress.
- ❖ Tony Sammes, Brian Jenkinson, (2007) “Forensic Computing”, Second edition, Springer.

### Reference Books:

- ❖ Cory Altheide and Harlan Carvey, (2011) “Digital Forensics with Open Source Tools”, Elsevier.
- ❖ Bill Nelson, Amelia Philips, Chris Steuart (2015) “Guide to Computer Forensics and Investigations”, 5<sup>th</sup> Edition, CENGAGE Learning.

### Web References:

- ❖ <https://www.eccouncil.org/cybersecurity/what-is-digital-forensics/>
- ❖ <https://www.bluevoyant.com/knowledge-center/understanding-digital-forensics-process-techniques-and-tools>
- ❖ <https://www.guru99.com/digital-forensics.html>
- ❖ <https://www.lumatec.de/en/products/light-source-superlite-s04/>

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Name and Signature	Name and Signature	CDC	COE
Name: B. Kalaiselvi  Signature:	Name: K. Vijayakumar  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Mr. K. Srinivasan  Signature:

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