Bachelor of Vocation Programme
Department of Information Technology

SYLLABUS

(FOR STUDENTS ADMITTED IN THE ACADEMIC YEAR 2021 – 2022)

Bishop Heber College (Autonomous)

Affiliated to Bharathidasan University

Reaccredited with 'A' Grade by NAAC with a CGPA of 3.58 out of 4
Recognized by UGC as "College of Excellence"
Tiruchirappalli – 620 017
South India

DEPARTMENT OF INFORMATION TECHNOLOGY
BISHOP HEBER COLLEGE (AUTONOMOUS)
TIRUCHIRAPPALLI – 620 017

VISION

The Department aims to produce globally competent and value oriented Information Technology Professionals equipped with quality education to meet the needs of the digital era and to serve the society at large.

MISSION

The Department provides effective teaching and training in a conducive learning environment with relevant curriculum and state-of-the-art infrastructure to meet the needs of the IT Sector and for the betterment of humanity.

OBJECTIVES

➢   To reach the heights of excellence in IT education by providing an environment conducive for learning with state-of-the-art infrastructure.

➢   To raise individuals equipped and motivated to face the challenges of the competitive world and to serve for the betterment of humanity with commitment.

DEPARTMENT OF INFORMATION TECHNOLOGY
BISHOP HEBER COLLEGE (AUTONOMOUS)
TIRUCHIRAPPALLI – 620 017

PROGRAMME OUTCOMES

PO1 – Disciplinary Knowledge
Disseminate and demonstrate appropriate understanding of facts, concepts, principles, theories and techniques in the disciplines of study by developing suitable applications.

PO2 – Analytical Reasoning
Ability to analyze, synthesize and interpret domain specific facts or data accurately to determine the right course of action.

PO3 – Critical Thinking
Critically think and develop new techniques, evaluate practices and theories by employing scientific approach to knowledge development.

PO4 – Problem Solving Skills
Apply the acquired competencies to solve diversified real life problems related with the area of study and its interlinked fields.

PO5 – Communication Skills and Digital Literacy
Able to communicate effectively and appropriately and be able to handle digital devices, tools and applications to accomplish professional responsibilities.

PO6 – Employability and Entrepreneurial Skills
Possess employability skills acquired through industrial training and internships on the opted NSQF (National Skill Qualification Framework) Job Roles or exhibit entrepreneurial skills to establish own businesses.

PO7 – Teamwork and Leadership Qualities
Able to work effectively with coordinated efforts as a team and be able to facilitate and motivate the members of the team to move forward in the right direction to reach the goal.

PO8 – Ethical, Moral and Social Awareness
Appreciate and embrace moral values in life and follow ethical practices in every social and professional ventures.

PO9 – Self-Directed and Lifelong Learning
Aptitude to handle every professional or personal role independently and efficiently by diligent acquisition of knowledge and skills throughout the life.

PROGRAMME SPECIFIC OUTCOMES

PSO1 – Foundational Knowledge

Make use of the fundamental principles of Information Technology, Computing Systems and Database Applications, Software Tools, Data Structures, Algorithms and Mathematical Aptitude to build solutions for real world problems.

PSO2 – Software Design and Application Development Skills

Utilize the concepts of Database, Networking, Multimedia and Operating Systems to design and develop Software Applications for a variety of environments using programming languages and tools such as C, C++, Java, PHP, MySQL, Python etc. employing Software Engineering principles and practices

PSO3 – Technical Skills

Able to work with confidence on areas of current technological developments involving Internetworking, Information Security, Mobile Computing, Distributed Computing and Internet of Things along with their standards, protocols, architectures and services.

PSO4 – Personal and Professional Attributes

Exhibit effectiveness in communicating and promoting services and products and be able to handle personal and professional responsibilities ethically, restricting all activities within the legal boundaries.

Programme Structure for Students Admitted in the year 2021 – 2022

Semester I – NSQF Level 4

Component	Course Title	Course COURSE CODE	QP	Credits	Course Type			HOURS/ WEEK	MARKS		
					T	P	I		CIA	ESE	Total
General Component	Language – 1 (Tamil / Hindi / French)	U21TMI01	SSC/Q 0508	4	T			4	25	75	100
	Communication Skills in English – 1	U21EGI01		2	T	-	-	2	25	75	100
	Fundamentals of Information Technology	U21IT101		2	T	-	-	2	25	75	100
	Programming with C and C++	U21IT102		2	T	-	-	2	25	75	100
	Value and Life Oriented Education	U15VL1:1/ U15VL 1:2		2	T			2	25	75	100
TOTAL (General Components)				**12**				**12**			
Skill Component	English Language Lab – 1	U21EGIP1		3		P		3	40	60	100
	PC Software Packages Lab	U21IT1P1		4		P	-	4	40	60	100
	C and C++ Programming Lab	U21IT1P2		5		P	-	5	40	60	100
	Project Work – 1	U21ITPJ1		6	-	-	I	6	40	60	100
		18		**18**	-			**18**			
TOTAL (Skill Components)				**30**	**-**			**30**	**-**		

Semester II – NSQF Level 5

Component	Course Title	Course COURSE CODE	QP	Credits	Course Type			HOURS/ WEEK	MARKS		
					T	P	I		CIA	ESE	Total
General Component	Language – 2 (Tamil / Hindi / French)	U21TMI02	SSC/Q08 01	4	T	-	-	4	25	75	100
	Communication Skills in English-2	U21EGI02		2	T	-	-	2	25	75	100
	Java Programming and Database Management Systems	U21IT203		2	T	-	-	2	25	75	100
	Data Communication Networks	U21IT204		2	T	-	-	2	25	75	100
	Environmental Studies	U16EST21		2	T	-	-	2	25	75	100
TOTAL (General Component)				**12**				**12**			
Skill Component	English Language Lab – 2	U21EGIP2		3				3	40	60	100
	Java and DBMS Lab	U21IT2P3		5	-	P	-	4	40	60	100
	Computer Hardware and Networking Lab	U21IT2P4		4	-	P	-	5	40	60	100
	Project Work – 2	U19ITPJ2		6	-	-	I	6	40	60	100
		18		**18**	-			**18**			
TOTAL (Skill Component)				**30**	**-**			**30**	**-**		

Semester III – NSQF Level 6

Component	Course Title	Course COURSE CODE	QP	Credits	Course Type			HOURS/WEEK	MARKS		
					T	P	I		CIA	ESE	Total
General Component	.Net Programming	U21IT305	SSC/Q0509	3	T	-	-	3	25	75	100
	Data structures and Algorithms	U21IT306		3	T	-	-	3	25	75	100
	Digital Principles and Computer Organization	U21IT307		4	T	-	-	4	25	75	100
	Personal Effectiveness	U21IT308		2	T			2	25	75	100
TOTAL (General Components)				**12**				**12**			
Skill Component	Mathematics for Competitive Examinations-1	U2IT309		4	-	P	-	4	40	60	100
	.Net Programming lab	U21IT3P5		4				4			
	Data structures and Algorithms Lab	U21IT3P6		4	-	P	-	4	40	60	100
	Project Work – 3	U21ITPJ3		6	-	-	I	6	40	60	100
		18		**18**	-			**18**			
TOTAL (Skill Components)				**30**	**-**			**30**	**-**		

Semester IV – NSQF Level 6

Component	Course Title	Course COURSE CODE	QP	Credits	Course Type T	P	I	HOURS/WEEK	MARKS CIA	ESE	Total
General Component	Operating System	U21IT410		3	T	-	-	3	25	75	100
	Mobile Computing Technologies	U21IT411		3	T	-	-	3	25	75	100
	Microprocessor s and its applications	U21IT412		3	T	-	-	4	25	75	100
	Professional Ethics and Cyber Laws	U21IT413	SSC/Q0509	2	T	-	-	2	25	75	100
	NSS, NCC, ROTRACT, LEO CLUB	U16ETA41		1				-			
TOTAL (General Component)				**12**				**12**			
Skill Component	Mathematics for competitive examination-II	U21IT414		4				4			
	Operating System Lab	U21IT4P7		4	-	P	-	4	40	60	100
	Mobile Application Development Lab	U21IT4P8		4	-	P	-	4	40	60	100
	Project Work – 4	U21ITPJ4		6	-	-	I	6	40	60	100
		18		**18**	-			**18**			
TOTAL (Skill Component)				**30**	**-**			**30**	-		

Semester V – NSQF Level 7

Component	Course Title	Course COURSE CODE	QP	Credits	Course Type T	P	I	HOURS/WEEK	MARKS CIA	ESE	Total
General Component	Programming with PHP and MySQL	U21IT515		4	T	-	-	4	25	75	100
	Information Security	U21IT516		3	T	-	-	3	25	75	100
	Principles of Marketing	U21IT517		2	T	-	-	2	25	75	100
	Software Engineering / Software Project Management / Software Testing	U21IT5:1 U21IT5:A U21IT5:B		3	T	-	-	3	25	75	100
TOTAL (General Components)			SSC/Q0501	**12**				**12**			
Skill Component	Web development Lab	U21ITP09		4				4			
	PHP and MySQL Programming Lab	U21ITP10		4	-	P	-	4	40	60	100
	Information Security Lab	U21ITP11		4	-	P	-	4	40	60	100
	Project Work – 5	U21ITPJ5		6	-	-	I	6	40	60	100
TOTAL (Skill Components)				**18**	**-**			**18**	-		
GRAND TOTAL				**30**	**-**			**30**	-		

Semester VI – NSQF Level 7

Component	Course Title	Course COURSE CODE	QP	Credits	Course Type T	P	I	HOURS/WEEK	MARKS CIA	ESE	Total
General Component	Programming with Python	U21IT618		3	T	-	-	4	25	75	100
	Internet of Things	U21IT619		3	T	-	-	3	25	75	100
	Entrepreneurial Development	U21IT620		2	T	-	-	2	25	75	100
	Web Service Technologies / Open Source Technologies / Distributed Computing Technologies	U21IT6:2 U21IT6:A U21IT6:B	SSC/Q0501	3	T	-	-	3	25	75	100
	Gender Studies	U16GST61		1				-			
TOTAL (General Component)				**12**				**12**			
Skill Component	Multimedia lab	U21ITP12		4				4			
	Python Programming Lab	U21ITP13		4	-	P	-	4	40	60	100
	Interne of Things Lab	U21ITP14		4	-	P	-	4	40	60	100
	Project Work – 6	U21ITPJ6		6	-	-	I	6	40	60	100
TOTAL (Skill Component)				**18**	**-**			**18**	-		
GRAND TOTAL				**30**	**-**			**30**	-		

PROGRAMME ARTICULATION MATRIX

CO. No.	COURSE NAME	COURSE CODE	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4
			Correlation with Programme Outcomes and Programme Specific Outcomes												
1	Fundamentals of Information Technology	U21IT101	1	3	1	3	3	3	3	3	3	2	2	2	2
2	Programming with C and C++	U21IT102	3	3	3	3	2	3	3	3	3	2	3	2	3
3	PC Software Packages Lab	U21IT1P1	3	3	3	3	3	3	3	3	3	3	3	3	1
4	C and C++ Programming Lab	U21IT1P2	3	3	3	3	3	2	3	2	3	3	3	3	3
5	Java Programming and Database Management Systems	U21IT203	3	3	3	2	3	3	2	3	3	3	3	2	3
6	Data Communication Networks	U21IT204	1	2	1	1	2	1	1	1	2	3	3	2	1
7	Java and DBMS Lab	U21IT2P3	3	3	2	3	3	3	2	3	3	3	3	3	3
8	Computer Hardware and Networking Lab	U21IT2P4	1	2	1	3	1	2	1	1	1	2	2	2	1
9	.Net Programming	U21IT305	3	3	2	2	3	3	3	2	1	2	3	2	2
10	Data structures and Algorithms	U21IT306	3	3	3	2	2	3	2	2	3	3	2	2	1
11	Digital Principles and Computer Organization	U21IT307	2	3	2	2	1	3	3	2	2	3	2	1	3
12	Personal Effectiveness	U21IT308	3	3	3	2	2	3	3	3	3	1	1	1	3
13	.Net Programming lab	U21IT3P5	3	3	3	1	3	2	1	2	3	3	2	2	2
14	Data structures and Algorithms Lab	U21IT3P6	3	3	3	2	2	1	1	2	3	2	2	2	1
15	Operating System	U21IT410	3	3	3	2	2	3	3	3	3	2	2	2	1
16	Mobile Computing Technologies	U21IT411	2	2	2	3	3	3	3	1	1	2	3	3	1
17	Microprocessor s and its applications	U21IT412	3	2	2	3	2	2	1	2	3	3	3	3	2
18	Professional Ethics and Cyber Laws	U21IT413	2	2	1	3	3	3	2	2	2	2	1	3	1
19	Operating System Lab	U21IT4P7	3	2	2	2	2	2	2	3	2	2	3	3	1
20	Mobile Application Development Lab	U21IT4P8	3	3	3	3	3	3	2	2	2	2	3	3	1
21	Programming with PHP and MySQL	U21IT515	3	3	3	3	1	3	2	1	2	3	3	2	2
22	Information Security	U21IT516	2	2	2	3	3	3	1	1	1	2	2	3	1
23	Software Engineering /	U21IT5:1	3	3	3	3	2	2	1	1	1	3	3	3	1
24	Software Project Management /	U21IT5:A	3	3	3	3	3	3	3	2	3	2	3	3	3
25	Software Testing	U21IT5:B	2	2	3	3	2	2	1	3	2	2	3	1	2
26	Web development Lab	U21ITP09	2	3	3	3	2	2	2	1	2	2	3	2	1
27	PHP and MySQL Programming Lab	U21ITP10	2	3	2	2	2	1	3	2	2	3	1	2	1
28	Information Security Lab	U21ITP11	2	3	2	2	2	2	1	2	1	1	3	2	1
29	Programming with Python	U21IT618	2	3	3	3	3	3	2	3	3	2	3	3	3
30	Internet of Things	U21IT619	3	3	3	3	2	2	3	2	2	3	3	3	3
31	Web Service Technologies /	U21IT6:2	3	3	3	3	3	3	2	1	2	3	3	3	2
32	Open Source Technologies /	U21IT6:A	2	3	2	2	2	2	2	2	3	3	2	3	2
33	Distributed Computing Technologies	U21IT6:B	3	3	3	3	3	3	1	1	1	3	3	3	1
34	Multimedia lab	U21ITP12	2	3	2	2	2	3	2	2	2	3	2	3	2
35	Python Programming Lab	U21ITP13	3	2	3	3	2	2	2	2	3	2	3	3	3
36	Internet of Things Lab	U21ITP14	3	3	3	3	1	3	2	1	2	3	3	2	2

KANINI TAMIL
கணினித் தமிழ்

அலகு - I   **(6 Hours)**

கணினியின் வரலாறு - தொடக்ககாலப் பயன்பாடு - முதல், இரண்டாம், மூன்றாம், நான்காம் தலைமுறைக் கணினி - கணினியின் அமைப்பு - கணினித் தமிழ் வரலாறு - கணினித் தமிழ் வளர்ச்சியில் அரசு - தன்னார்வ அமைப்பு மற்றும் தனிநபர் பங்களிப்புகள்.

அலகு - II   **(6 Hours)**

தமிழ் அச்சுப்பதிப்பு பரிமாற்றம் - எம். ஏஸ். வேர்டு, எக்ஸல், பவர்பாய்ண்ட், - கணினித் தமிழ் கலைச் சொற்கள் அறிமுகம் - கலைச்சொல் பயன்பாட்டுச் சிக்கல்களும் தீர்வுகளும்.

அலகு - III   **(6 Hours)**

தமிழ் விசைப்பலகை அறிமுகம் - பல்வேறு தமிழ் விசைப்பலகைகள்- தமிழ் எழுத்துரு அறிமுகம் - ஒருங்குறி எழுத்துரு அறிமுகம் - பலவித விசைப்பலகைகளால் நேர்ந்த சிக்கல்களும் அவற்றுக்கான தீர்வும் - ஒருங்குறி எழுத்தமைப்பின் தேவையும் அதன் நிறைகுறைகளும்.

அலகு - IV   **(6 Hours)**

பல்வேறு தமிழ் மென்பொருள்கள் - பல்வேறு தமிழ் எழுத்துருக்கள் - தமிழ் எழுத்துரு மாற்றி - இலக்கணத் திருத்தி - சொற்பிழை திருத்தி - சந்திப்பிழை திருத்தி - தமிழ் ஒலிமாற்றி.

அலகு - V   **(6 Hours)**

மின் தமிழ் - மின்னூல் - மின்னூல் வரலாறும் அதன் பயன்பாடுகளும் - மின்னூல் வகைகள் - மின்னூல் உருவாக்கம் - மின் நூலகம் : அறிமுகமும் பயன்பாடும் - இந்திய மின்னூலகம்.

<u>பாட நூற்கள்</u>

1.   இல. சுந்தரம், - 'கணினித் தமிழ்''
2.   எம். வி. எம். முத்து மணிகண்டன், - 'கணிப்பொறி அறிவியல் கற்பித்தல்''
3.   மா. ஆன்டோ பீட்டர், 'தமிழும் கணிப்பொறியும்'
4.   துரையரசன், - 'இணையமும் இனிய தமிழும்''
5.   துரை மணிகண்டன், - 'தமிழ்க் கணினி இணையப் பயன்பாடுகள்''
6.   பொன்ன வைக்கோ, - 'இணையத் தமிழ் வரலாறு''
7.   மூ. புழனியப்பன், ''இணையமும் தமிழும்''

ENGLISH FOR COMMUNICATION – I

SEMESTER-1   **COURSE CODE: U21EGI01**
        CREDITS :2   **HOURS/WEEK:2**

Objectives:

- *To acquire skills of listening, reading and speaking.*
- *To understand the elements of language and establish the appropriate relationship among linguistic components.*

UNIT I   **(6 HOURS)**
Grammar
Correction of common errors
Transformation of Sentences

UNIT II   **(6 HOURS)**
Types of Communication
Reading Comprehension

UNIT III   **(6 HOURS)**
Word Building
Vocabulary-I
Vocabulary-II

UNIT IV   **(6 HOURS)**
Notices, Agendas and Minutes
Business Correspondence

UNIT V   **(6 HOURS)**
Listening Skills
Teamwork Skills
Emotional Intelligence Skills

TEXT BOOKS
1.   Board of Editors, **"Synergy-Communication in English and Study Skills"**, Orient Blackswan. Pvt. Ltd., 2008.
2.   G. M. Sundaravalli, A.S. Kamalakar, P. Kusuma Harinath, **"Communication and Soft Skills"**, Orient Blackswan Pvt. Ltd., 2015.
3.   Bikram K. Das, **"Functional Grammar and Spoken and Written Communication in English"**, Orient Blackswan Pvt. Ltd., Kolkatta, 2006.

FUNDAMENTALS OF INFORMATION TECHNOLOGY

SEMESTER-1   **COURSE CODE: U21IT101**
CREDITS :2   **HOURS/WEEK :2**

1.COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO. No.	COURSE OUTCOMES	Level	Unit
CO1	Illustrate the basic concepts of computers, classification, generations of computers and architecture of computers.	K2	I
CO2	Develop hardware, Software and Database Management system principles.	K3	II
CO3	Discover the recent advancements in the field of computing and telecommunications Internet and Intranet.	K4	III
CO4	Criticize computer Security, virtual reality and Multimedia Content Creation.	K5	IV
CO5	Recommend the techniques of Artificial Intelligence, Business Intelligence and Data warehouse in Information Technology.	K5	V
CO6	Build applications on computers in the field of education, training, science, engineering and other Recent Technologies.	K6	V

2. A. SYLLABUS

Unit I: Introduction to Computer Systems   9 Hours
Introduction to Computer Systems: Introduction to Computers – Generations of Modern Computers – Classification of Digital Computer Systems – Anatomy of a Digital Computer – Computer Architecture – The Number System – Central Processing Unit and Memory Units – Secondary Storage Devices – Input Devices – Output Devices.

Unit II: Computer Software and Software Development   9 Hours

Computer Software and Software Development: Introduction to Computer Software & Software Development – Programming Languages – Operating Systems – General Software Features and Trends.

Unit III: Telecommunications   9 Hours

Telecommunications: Introduction– Computer Networks – Communication Systems – Distributed Data Processing – Internet and Intranets: Internet & WWW – Overview of Electronic mail – Introduction to Intranets – Introduction to E-Commerce and E-Business – Introduction to Web Design – Overview of Web Technologies.

Unit IV: Security   9 Hours

Security: Introduction to Computer Security – Cryptography – Computer Viruses, Bombs, and Worms – Multimedia and Virtual Reality: Introduction to Multimedia – Multimedia and its applications – Introduction to Virtual Reality.

Unit V : New Technologies in Information Technology   **9 Hours**

New Technologies in Information Technology: Introduction to Hypermedia – Artificial Intelligence and Business Intelligence – Knowledge Discovery in Database – Data Warehouses and Data Marts – Data Mining and OLAP – ERP. Applications of Information Technology: Computers in Business and Industry – Home – Education and Training – Entertainment, Science, Medicine and Engineering – Mobile computing and Business on the Internet.

2.B. Topics for Self Study:

S.No.	Topics	Web Links
1	Artificial Intelligence	https://www.youtube.com/watch?v=oV74Najm6Nc
2	Machine learning	https://www.youtube.com/watch?v=ukzFI9rgwfU
3	Augmented Reality	https://www.youtube.com/watch?v=XLP4YTpUpBI
4	Robotics Process Automation.	https://www.youtube.com/watch?v=9URSbTOE4YI

2.C. Text Book(s):
1. Alexis Leon, Mathews Leon, "**Fundamentals of Information Technology**", Second Edition, Vikas Publishing House Pvt. Ltd., Chennai, 2009.

2.D. Reference Books:

1. Pradeep K Sinha, Priti Sinha," **Information Technology: Theory and Practice**", Kindle Edition, PHI Learning, 2016.

2.E. Web Links:
1.   www.tutorialspoint.com
2.   www.sophia.com
3.   https://www.youtube.com/watch?v=awLnur5Yt9o
4.   https://www.youtube.com/watch?v=On6dsIp5yw0

3.SPECIFIC LEARNING OUTCOMES (SLO):

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Introduction to Computer Systems**		
1.1	Introduction to Computer Systems: Introduction to Computers – Generations of Modern Computers – Classification of Digital Computer Systems – Anatomy of a Digital Computer – Computer Architecture	Explain the characteristics of computers.(K2) Classify the generations of computers.(K2) Illustrate the anatomy of a digital computer.(K2)	K2

1.2	The Number System – Central Processing Unit and Memory Units – Secondary Storage Devices	Compare Decimal and Hexadecimal number systems.(K2)	
		Classify the different types of DRAM.(K2)	
		Discuss the advantages of secondary storage devices.(K6)	
1.3	Input Devices – Output Devices.	Explain the types of scanners.(K2)	
		Discuss the characteristics of Impact printers.(K6)	
		Elaborate the characteristics of input devices.(K6)	
II	**Computer Software and Software Development**		
2.1	Introduction to Computer Software & Software Development – Programming Languages	Identify the basic types of application software.(K3)	K3
		Develop a program for addition of two numbers.(K3)	
		Explain the advantages of high-level languages.(K5)	
2.2	Operating Systems – General Software Features and Trends.	Make use of mail enabled applications.(K3)	
		Discuss the advantages of embedded systems.(K6)	
		Explain the functions of the operating system.(K5)	
III	**Telecommunications, Internet and Intranets**		
3.1	Introduction– Computer Networks – Communication Systems – Distributed Data Processing.	List the advantages and disadvantages of fiber optic systems.(K4)	K4
		Discuss the types of network topologies with a neat diagram.(K6)	
		Explain the distributed data processing.(K5)	
3.2	Internet and Intranets: Internet & WWW – Overview of Electronic mail – Introduction to Intranets – Introduction to E-Commerce and E-Business – Introduction to Web Design – Overview of Web Technologies.	Discuss the basic mailing features.(K6)	
		Compare the merits and demerits of Internet and Intranets.(K4)	
		Illustrate web searching method.(K2)	
IV	**Security, Multimedia and Virtual Reality**		

4.1	Introduction to Computer Security – Cryptography – Computer Viruses, Bombs, and Worms	Criticize security and privacy issues. (K5)	K5
		List out the limitations of cryptography.(K4)	
		Discuss the characteristics of viruses.(K6)	
4.2	Introduction to Multimedia – Multimedia and its applications – Introduction to Virtual Reality.	Explain the elements of multimedia.(K5)	
		Prioritize the applications of Multimedia in entertainment.(K5)	
		Justify the need of virtual reality in gaming.(K5)	
V	**New Technologies in Information Technology, Applications of IT**		
5.1	: Introduction to Hypermedia – Artificial Intelligence and Business Intelligence	Compare the features of AI and BI.(K5)	K6
		Define the term hypermedia.(K2)	
		Discuss the application areas well suited for Hypermedia.(K5)	
5.2	Knowledge Discovery in Database – Data Warehouses and Data Marts – Data Mining and OLAP – ERP	Build a data warehouse for an organization.(K6)	
		Define ERP.(K1)	
		Compare the features Data warehouses and Data Marts.(K2)	
		Discuss KDD techniques.(K6)	
5.3	Computers in Business and Industry – Home – Education and Training – Entertainment, Science, Medicine and Engineering – Mobile computing and Business on the Internet.	Imagine how computers play a major role in communication and education.(K6)	
		Discuss the role computers play in the film industry.(K6)	
		Explain the enabling technologies in Mobile computing.(K5)	

4. MAPPING (CO, PO, PSO)

U21IT101	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO3	PSO4
CO1	H	H	H	M	M	M	L	L	L	H	M	M	L
CO2	M	M	M	H	H	H	H	L	L	M	H	H	L
CO3	M	M	M	H	H	H	H	L	L	M	H	H	L
CO4	L	L	L	L	L	L	H	H	H	L	L	L	M
CO5	L	L	L	L	L	L	H	H	H	L	L	L	M
CO6	L	L	L	L	L	L	H	H	H	L	L	L	M

L-Low   **M-Moderate**   **H- High**

5. **COURSE ASSESSMENT**

METHODS DIRECT*:*

1.   Continuous Internal Assessment Test: 1, 2(Theory & Practical Components): Closed Book.
2.   Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, Project Report, Poster Presentation, Seminar, Quiz(written).
3.   Pre-Semester & End Semester Theory Examination.
INDIRECT:
1.   Course-end survey.

PROGRAMMING WITH C AND C++

SEMESTER: I
CREDITS:2

COURSE CODE: U21IT102
HOURS/WEEK: 2

1.COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO. No.	COURSE OUTCOMES	Level	Unit
CO1	Define the basic structure of the program and concepts of programming languages.	K2	I
CO2	Explain the representation of Arrays, Functions, Structures and Unions	K2	II
CO3	Experiment with the usage of pointers and files	K3	III
CO4	Examine the concept of Object-Oriented Programming	K3	IV
CO5	Build the object instantiation using constructors and destructors	K4	IV
CO6	Construct the hierarchy and reusability of the concepts	K5/K6	V

2.A. SYLLABUS

UNIT I: Overview of C   **9 Hours**

Overview of C: History - Importance of C – Sample Programs - Basic Structure of C programs- Character Set – C tokens – keywords and Identifiers – Constants – Variables – Data types – Declaration of variables – Assigning values to variables – Symbolic constants. - Operators and Expressions: Introduction – Arithmetic operators – Relational Operators – Logical operators – Assignment Operators –Increment and Decrement operators – Conditional operators- Bitwise Operators – Special Operators – Expressions – Decision making and Branching: If statement, Switch Statement – goto Statement – Decision Making and Looping: While – Do-while – For loop.

UNIT II: Arrays   **9 Hours**

Arrays: One, Two and Multidimensional arrays – Functions: User defined functions –Mathematical and String Handling functions- Category of functions – Recursion – Scope and lifetime of variables in functions. - Structures and Unions: Introduction – Structure definition – Giving values to members – Structure Initialization – Comparison of Structure variables – Arrays of structures – Arrays within structures – Structures within structures – Structures and functions – Unions.

UNIT III: Pointers   **9 Hours**

Pointers: Introduction – Understanding pointers – Accessing the address of a variable through input pointer – Pointer expressions – Pointer Increments and Scale factor – Pointers and Arrays – Pointers and character strings File Management: Introduction – Defining and opening a file – Closing a file – Input or Output operations on files – Error handling during I/O operations – Random access to files – Command line arguments – Preprocessors.

UNIT IV: Introduction to Object Oriented Programming   **9 Hours**

Introduction to Object Oriented Programming: OOP Paradigm - OOP Concepts – Benefits of OOP – OOP Languages – Functions in C++ - Classes and Objects – Constructors and Destructors – Operator Overloading.

UNIT V: Inheritance   **9 Hours**

Inheritance – Virtual Functions – Polymorphism – Managing Console Operations – Working with Files.

2.B. Topics for Study:

S. No.	Topics	Web Links
1	Dynamic Memory Allocation in C	https://www.geeksforgeeks.org/dynamic-memory-allocation-in-c-using-malloc-calloc-free-and-realloc/
	Dynamic Memory Allocation in C++	https://www.geeksforgeeks.org/new-and-delete-operators-in-cpp-for-dynamic-memory/
2	Memory Fragmentation in C & C++	https://www.design-reuse.com/articles/25090/dynamic-memory-allocation-fragmentation-c.html
3	Types of Linked list in C	https://www.tutorialspoint.com/data_structures_algorithms/linked_list_algorithms.htm
4	Encryption and Decryption of String	https://www.geeksforgeeks.org/encryption-and-decryption-of-string-according-to-given-technique/?ref=leftbar-rightbar

2.C. Text Book(s):

1.   E. Balagurusamy, "**Programming in ANSI C**", Tata McGraw-Hill Publishing Company Ltd.
2.   E. Balagurusamy, "**Object Oriented Programming with C++**", 5th Edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2011.

2.D. Reference Book(s):

1.   Ashok N. Kamthane, "**Programming with ANSI and TURBO C**", Pearson Education, 2004.
2.   Herbert Schildt, "**C++ The Complete Reference**", 5th Edition, McGraw Hill Education, 2012.

2.E. Web Links:

1.   https://www.programiz.com/c-programming
2.   http://www.cprogramming.com/
3.   http://www.tutorialspoint.com
4.   https://www.studytonight.com//

3.SPECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Overview of C**		
1.1	History -Importance of C – Sample Programs – Basic structure of C programs.	Recall Language Computer History(K1)	K2
		List the Importance of C(K1)	
		Explain the Basic Structure of C(K2)	
1.2	**Character Set**: C Tokens – Keywords and Identifiers – Constants – Variables – Data types – Declaration of variables – Assigning values to variables – Symbolic constants	Recall the key features of c language(K1)	
		Define Constants and variables(K1)	
		List the various data types(K4)	
		Explain how to assign values to variables(K2)	
		Identify symbolic constants(K3)	
1.3	**Operators and Expressions:** Introduction – Arithmetic operators – Relational Operators – Logical operators – Assignment Operators – Increment and Decrement operators – Conditional operators- Bitwise Operators – Special Operators – Expressions	Label various operators(K1)	
		List various operators(K1)	
		Demonstrate various operators with sample program(K2)	
		Examine the operators and operands(K4)	
		Evaluate an expression using operator precedence(K6)	
1.4	**Decision making and Branching** If statement, Switch Statement – go to Statement	Define branching statements(K1)	
		Name various Branching statements(K1)	
		Explain if statement with sample programs(K2)	
		Demonstrate switch and go to statement with sample programs(K2)	
1.5	**Decision Making and Looping:** While – Do-while – For loop.	Define looping(K1)	
		List the looping statements(K1)	
		Explain while and do..while statements with example(K2)	
		Illustrate For loop statement with example(K2)	
II	**Arrays**		
2.1	One, Two and Multidimensional arrays	Define Array(K1)	K2

		Explain the array representation with example(K2)	
		Extend the dimensionality of an array with example(K2)	
2.2	**Functions:** User defined functions –Mathematical and String Handling functions- Category of functions – Recursion – Scope and life time of variables in functions.	Explain the user defined function(K2)	
		Demonstrate the mathematical and String handling functions(K2)	
		Experiment with recursion(K3)	
		Classify the scope and life time of variables(K2)	
2.3	**Structures and Unions:** Introduction – Structure definition – Giving values to members – Structure Initialization – Comparison of Structure variables – Arrays of structures – Arrays within structures – Structures within structures – Structures and functions – Unions.	Define Structure and Structure variables(K1)	
		Interpret Structure Concepts(K2)	
		Relate the Structure Concepts with Union(K2)	
		Compare structure and union(K5)	
III	**Pointers**		
3.1	Introduction – Understanding pointers – Accessing the address of a variable through input pointer – Pointer expressions – Pointer Increments and Scale factor – Pointers and Arrays – Pointers and character strings	Define pointers(K1)	K4
		Explain the basics of pointers(K2)	
		Build the program using Pointer concepts(K3)	
		Inspect the chain of pointers(K4)	
3.2	**File Management:** Introduction – Defining and opening a file – Closing a file – Input or Output operations on files – Error handling during I/O operations – Random access to files – Command line arguments. Preprocessors.	Organize the Input and Output operations on files(K3)	
		Experiment with the File handling mechanism(K3)	
		Explain Error handling mechanism with sample programs(K5)	
		Construct Command line arguments and Pre-processors(K6)	
IV	**Introduction to Object Oriented Programming**		
4.1	OOP Paradigm - OOP Concepts – Benefits of OOP – OOP Languages	Examine the functionality of OOPs Paradigm(K4)	K5
		List the benefits of OOPs(K4)	
		Categorize various OOP Languages(K4)	
4.2	**Functions in C++:** The Main function – Function Prototyping – Call By Reference – Return By	Examine the function prototype(K4)	

	Reference – Inline Functions – Default Arguments – Function Overloading – Friend and Virtual Functions	Distinguish Call and Return by reference(K4)	
		Construct Inline function and function overloading(K6)	
		Build programs with friend and virtual function(K6)	
4.3	**Classes and Objects**: C++ program with class – Nesting of Member function – Private member functions – Arrays within a class – Memory allocation for objects – Array of Objects	Explain the basic structure of class(K2)	
		Develop the nesting member function(K3)	
		Examine the memory allocation for objects(K4)	
		Discuss the array of objects with sample programs(K6)	
4.4	**Constructors and Destructors:** Constructors – parameterized constructors – constructors with default arguments – Copy constructors – dynamic constructors – Destructors	Define Constructors and Destructors(K1)	
		Explain the parameterized Constructors with example(K2)	
		Examine the memory allocation for objects(K4)	
4.5	**Operator Overloading**: Defining operator overloading – overloading unary, binary operators – Manipulation of strings using operators – Rules for overloading operators	Define Operator Overloading(K1)	
		Illustrate unary and binary operator overloading with sample programs(K2)	
		Distinguish the unary and binary operators.(K4)	
		Explain string manipulation with example(K5)	
		List out the rules for overloading operators(K4)	
V	**Inheritance**		
5.1	Defining derived classes – Single, Multilevel, Multiple, Hierarchical and Hybrid Inheritance	Define Inheritance(K1)	K6
		Categorize the types of Inheritance(K4)	
		Explain the concept of inheritance with sample programs(K5)	
5.2	**Virtual Functions and Polymorphism**: Virtual Functions – Pure Virtual Functions - Managing Console and Working with Files	Define Virtual Functions and Polymorphism(K1)	
		Build programs with virtual function(K3)	
		Experiment with formatted and Unformatted I/O operations(K3)	
		Construct the programs with I/O operations(K6)	

4. MAPPING (CO, PO, PSO)

U21IT102	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	H	H	M	H	H	H	H	M	H	M
CO2	H	H	M	H	M	H	H	H	H	L	H	M	H
CO3	M	H	M	L	H	H	H	M	H	H	M	L	H
CO4	H	M	H	H	H	H	H	H	M	H	H	L	H
CO5	H	H	H	H	L	M	H	H	H	M	H	H	H
CO6	H	L	H	H	H	M	M	H	H	L	M	H	L

L – Low   **M** – Moderate   **H** – High

5.COURSE ASSESSMENT

 METHODS DIRECT:

1.   Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2.   Assignment, Group Presentation, Group Discussion, Project Report, Field Visit Report, Poster Presentation, Seminar, Quiz (written).
3.   Pre-Semester & End Semester Theory Examination
INDIRECT:
1.Course end survey (Feedback)

VALUE AND LIFE ORIENTED EDUCATION

SEMESTER: I   **COURSE CODE: U15VL1:1/U15VL1:2**
CREDITS: 2   **HOURS/WEEK: 2**

Objectives:
- *To understand Indian culture and heritage and envisage a transformed India*
- *To have a better insight of self-worth*
- *To equip to face challenges and march towards implementation of personal goals*
- *To forge and nurture healthy relationships*
- *To appreciate and maintain the sanctity of marriage*

UNIT I
Shaping "Incredible India"
Glorious past – cultural heritage and values - Present scenario – Indian constitution with respect to human values – Shaping new India

UNIT II
Human Values Development and Transformation of Self
Principles and values – Values of concern-three dimensions – self, interpersonal and social activities – Strategizing values – Self-identity – Self-discovery and Self-acceptance – Self-esteem – Personality development.

UNIT III
Life Enrichment Skills
Purpose for life – mission and vision – Goal setting- characteristics of goals - Time management – levels of time management – categories of stress – factors leading to stress - stress management

UNIT IV
Dynamics of Interpersonal Relationships
Building relationships- types of interpersonal relationship – Hints towards improving relationships - conflict management in relationship – emotional management

UNIT V
Gender, Human Sexuality and Marriage
Gender concepts – gender sensitivity – human sexuality – sexually transmitted diseases - marriage – purpose – complementary responsibilities and commitment – building a happy home (do's and don'ts)

TEXT BOOK
1. Human Values", All India Association for Christian Higher Education (AIACHE), New Delhi.

Objectives:
- *To obtain practical training to enhance the listening, reading and speaking skills.*

1. Tenses and Connected Speech Listening
2. Speech Sounds and Intonations
3. Spoken English in day-to-day practical context
4. Loud and Silent Reading
5. Presentations
6. Discussions
7. Conversations and Role Plays

PC SOFTWARE PACKAGES LAB

SEMESTER: I **COURSE CODE: U21IT1P1**
CREDITS: 4 **HOURS/WEEK: 4**

1.COURSE OUTCOMES

After the successful completion of this course, the students will be able to

CO. No.	1.COURSE OUTCOMES	Level	Exercise
CO1	Create document to perform manipulate with table, paragraph and in mail merge in MS WORD	K6	1-5
CO2	Build spreadsheets to perform calculation, display data, conduct analysis and data manipulation MS EXCEL.	K3	7-10
CO3	Develop technical and scientific presentations which use charts and visual aids to share data in MS POWERPOINT	K6	11-15
CO4	Design and construct to store databases extract and analyze scientific and real-world data.	K3	16-21
CO5	Interpret data processing charts using excel and word.	K5	6
CO6	Identify, access and evaluate information to solve real world problems	K6	22

2.A SYLLABUS

Ex. No.	Exercises
I	**MS-WORD**
. 1.	Creating Documents and Performing the Basic Operations (i) Cutting, copying, and Pasting text. (ii) Bullets and Numbering
2.	Manipulating Documents (i) Font Type, Font Size, Font Color. (ii) Using Auto Shapes (iii)Working with Smart Art and Clip Art
3.	Working with Tables (i) Table Background Color, Border Color, Border Style. (ii) Modifying Table Style, Caption. (iii) Merging, Splitting Columns, Inserting, Deleting Rows, Columns.
4.	Working with Paragraph (i) Paragraph Columns, Drop Cap, Indentation and Underlining Styles. (ii) Inserting Pictures, Page Borders and Shading. (iii) Using Water mark, Header and Footer (iv) Implementing Document Password. (v) Setting Page Orientation and Margins.
5.	Working with Mail Merge.
	Employing Excel chart in Ms Word.
II	**MS-EXCEL**
7.	Creating new Spreadsheet

	(i) Opening, Saving Worksheets. (ii) Formatting Cells.

8.	Manipulate with Function
	    (i) Student Mark List.
	    (ii) Electricity Bill.
	    (iii) Salary Bill Preparation
	    (iv) Perform Sorting (Ascending, Descending, Custom.)

9.	Data Analysis
	    (i) Splitting Text into Cell.
	    (ii) Data Filtering.
	    (iii) Data Validation.
	    (iv) Data Consolidation.

10.	Data Manipulation
	    (i) Usage of Dropdown Controls
	    (ii) Usage of Line, Column and Pie Charts
	    (iii) Importing and Exporting Text Files, Removing Duplicates

III	**MS-POWERPOINT**

11.	Creating a new presentation
	    (i) Opening and Saving Power Point Presentations.
	    (ii) Employing Header and Footer, Slide Number, Pictures
	    (iii) Equation and Symbols
	    (iv) Colors and Shapes
	    (v) Working with Flow Charts

12.	Build on Animation and Multimedia to slides
	    (i) Transitions and Animations
	    (ii) Creating Presentation as Slide Show and Video
	    (iii) Usage of Action and Link Buttons

13.	Designing the Presentation to slides
	    (i) Shapes; Callouts, Stars and Banners
	    (ii) Creating Master Slide
	    (iii) Using Outline View

14.	Applying Graphics
	    (i) Employing Smart Art
	    (ii) Employing Themes and Variants
	    (iii) Word Art and Clip Art

15.	Inserting Table using with various types of Charts into presentations
IV	**MS – ACCESS**

16.	Creating a new Database.
	    (i) Examine different file format
	    (ii) Save in a specified location

17.	Designing a table and performing Operations on table
	     (i) Create a field in Design View
	     (ii) Change the field properties and delete field.
	     (iii) Set the Primary and Foreign Key
	     (iv) Switching between the table design view and table datasheet views
	     (v) Enter values to a table

18.	Importing Data from External Data source
	     (i) Import a table from one Database to another Database
	     (ii) Import Excel data into Access table
	     (iii) Modify imported table's Design

19.	Defining Relationship between tables.
	     (i) Create tables with required field.
	     (ii) Connect table with different relationship

20.	Working with Queries
	     (i) Create a query using wizard (Insert, Update, Delete and Select)
	     (ii) Apply Aggregate functions on table data
	     (iii) Perform Logical Operations
	     (iv) Perform Join Operations
	     (v) Create and Modify multi table query

21.	Designing a Form
	     (i) Create and Split form
	     (ii) Create multiple items form
	     (iii) Enter Data via form
	     (iv) Modify the layout of a form

22.	Creating Report
	     (i) Create a report using report wizard
	     (ii) Modify a report view
	     (iii) Change the sorting in a report
	     (iv) Insert a picture in report header
	     (v) Add footer to a field
	     (vi) Set Validation Rule

2.B Topics for Self Study

S.No.	Topics	Web Links
1	Create student mark list using Word Document	https://www.youtube.com/watch?v=GEpw3f-iPfA/
2	Create bank account details using Excel Sheet	https://www.youtube.com/watch?v=anHYeUoal68/
3	Create a basic concept of powerpoint presentation using Powerpoint.	https://www.youtube.com/watch?v=eL0WhBWUxhc/
4	Create employee details using Word,Excel and powerpoint.	https://www.youtube.com/watch?v=untLDcPPdsw/
5.	MS Access 2016 - Create a Report	https://www.youtube.com/watch?v=3vZY1IetNfU/

3. SPECIFIC LEARNING OUTCOMES (SLO)

Ex. No.	Lab Exercises	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**MS-WORD**		
1.	Creating Documents and Performing the Basic Operations (i) Cutting, copying, and Pasting text. (ii) Bullets and Numbering	• Define Word Document (K1) • Illustrate the use of Document (K2) • Construct document and enterdata(K2) • Evaluate the data(K5) • Create a Document to enter student name with rollno(K6)	K6
2.	Manipulating Documents (i) Font Type, Font Size, Font Color. (ii) Using Auto Shapes (iii)Working with Smart Art and Clip Art.	• Define Font Type, Font Size, Font Color, Auto Shapes (K1). • Illustrate the use of Document(K2) • Construct Document and enter data(K2) • Inspect the Data Document(K4) • Evaluate Font (K5) • Create a Document to enter student name with rollno(K6)	K3
3	Working with Tables (i) Table Background Color, Border Color, Border Style. (ii) Modifying Table Style, Caption. (iii) Merging, Splitting Columns, Inserting, Deleting Rows, Columns.	• Define table in word Document(K1) • Illustrate the use of Document(K2) • Construct Document and enter data(K3) • Inspect the split table ,inser,dlete table(K4) • Evaluate the data(K5) • Create a Document to enter student name with rollno(K6)	K3
	Working with Paragraph (i) Paragraph Columns, Drop Cap, Indentation and Underlining Styles. (ii) Inserting Pictures, Page Borders and Shading. (iii) Using Water mark, Header and Footer (iv) Implementing Document Password. (v) Setting Page Orientation and Margins.	• Define Paragraph columns, word Document(K1) • Illustrate Dropcap,indentation(K2). • Construct Inser image data(K3) • Inspect the Data Document(K4) • Evaluate the data(K5) • Create a Document and implement document password (K6)	K4

5.	Working with Mail Merge.	• Define Mail merge word Document(K1) • Illustrate the use of Auto Shapes (K2). • Construct Document and enter data (K3) • Inspect the Data Document(K4) • Evaluate the data(K5) • Create a Document to enter student name with rollno(K6)	K4
6.	Employing Excel chart in Ms Word.	• Define Excl cha rword Document(K1) • Illustrate the use of Document(K2) • Construct Document and enter data(K3) • Inspect the Data Document(K4) • Construct Mail MergeCreate a Document to enter student name with rollno(K6)	K5
II	MS -EXCEL		
7.	Creating new Spreadsheet (i) Opening, Saving Worksheets. (ii) Formatting Cells.	• Define EcelSheet(K1) • Illustrate the use of MS Excel sheet(K2) • Construct Document and enter data(K3) • Inspect the Data Document(K4) • Evaluate the data(K5) • Create a Document to enter student name with rollno(K6)	K5
8.	Manipulate with Function (i) Student Mark List. (ii) Electricity Bill. (iii) Salary Bill Preparation (iv) Perform Sorting (Ascending, Descending, Custom.)	• Outline student mark List (K1). • Illustrate the Electricity Bill (K2) Construct Salary Bill Preparation • (K3) Evaluate Perform Sorting (Ascending, Descending, Custom.) (K5) • Create a Document to enter student name with roll no(K6)	K5
9.	Data Analysis (i) Splitting Text into Cell. (ii) Data Filtering. (iii) Data Validation. (iv) Data Consolidation. .	• Define data Anlysis(K1) • Illustrate Splitting Text into Cell. (K2) • Construct Data Filtering (K3) • Inspect the Data Validation. (K4) • Evaluate the data(K5) • Create Data Consolidation (K6)	K5
10.	Data Manipulation (i) Usage of Dropdown	• Define Data Manipulation (K1)	

	Controls (ii) Usage of Line, Column and Pie Charts (iii) Importing and Exporting Text Files, Removing Duplicates	• Illustrate the use of Usage of Line, Column and Pie Charts • Construct Document and enter data(K3) • Examine Importing and Exporting Text Files, Removing Duplicates (K4)	K6
III	**MS-POWERPOINT**		
11.	Creating a new presentation (i)Opening and Saving PowerPoint Presentations. (ii)Employing Header and Footer, Slide Number, Pictures (iii) Equation and Symbols (iv) Colors and Shapes (v) Working with Flow Charts	• Define Powerpoint presentation(K1). • Illustrate the use Saving PowerPoint Presentations. (K2) • Construct Header and Footer, Slide Number, Pictures (K3). • Inspect the Equation and Symbols (K4) • Evaluate Smart Art(K5). • Create a Document to enter student name with rollno(K6)	K6
12.	Build on Animation and Multimedia to slides (i)Transitions and Animations (ii) Creating Presentation as Slide Show and Video (iii) Usage of Action and Link Buttons	Build on Animation and Multimedia to slides (K1) • Illustrate the use Transitions and Animations K2) • Construct Excel chart in Ms Word (K3) • Inspect the Data Document(K4) • Usage of Action and Link Buttons	K6
13.	Designing the Presentation to slides (i) Shapes; Callouts, Stars and Banners (ii) Creating Master Slide (iii) Using Outline View	• Define Bullets and Numbering(K1) • Illustrate the use Bullets and Numbering(K2) • Construct Bullets and Numbering (K3) • Inspect the Bullets and Numbering(K4) • Evaluate the data(K5) • Create a Bullets and Numbering t to enter student name with roll no(K6)	K6
14.	Applying Graphics (i) Employing Smart Art (ii) Employing Themes and Variants (iii) Word Art and Clip Art	• Recall smart art(K1) • Apply the use of Themes and Variants • (K2) • Develop word art and Clip Art (K3) • Inspect the flow of control(K4). • Evaluate the results(K5). • Create a spreadsheet to maintain stock details and also check the reorder level(K6)	K6

15.	Inserting Table using with various types of Charts into presentations	• Recall Table(K1) • Demonstrate the Inserting Table using with various types of Charts (K2) • Develop a salary bill in excel spreadsheet (K3) • Inspect the flow of control(K4). • Evaluate the results(K5). • Create a spreadsheet to maintain stock details and also check the reorder level(K6)	K6
IV	**MS-ACCESS**		
16.	Creating a new Database. (i) Examine different file format (ii) Save in a specified location.	• Define database(K1) • Illustrate the use of different file format (K2). • Construct sheet and enter data(K3) • Inspect the Data entry(K4) • Evaluate the data(K5) Create a excel sheet to enter student name with roll no(K6)	K6
17.	Designing a table and performing operations on table (i) Create a field in Design View (ii) Change the field properties and delete field. (iii) Set the Primary and Foreign Key (iv) Switching between the table design view and table datasheet views (v) Enter values to a table	• Define table(K1). • Illustrate Design view(K2) • Build primary Key(K3) • Inspect the format order(K4). • Evaluate the data format(K5) • Create a primary key and forging key (K6)	K6
18.	Importing Data from External Data source (i) Import a table from one Database to another Database (ii) Import Excel data into Access table (iii) Modify imported table's Design	• Define import excel data into Access table ng(K1) • Demonstrate the use of spreadsheet(K2) • Develop an Access to prepare the student mark list(K3). • Inspect the data processing(K4) • Import Excel data into Access table (K5). •	K6
19.	Defining Relationship between tables. (i) Create tables with required field.	• Define Relationship(K1) • Explain table with required excel(K2) • Construct table in design view(K3) • Inspect connect criteria(K4).	K6

(ii) Connect table with different relationship	• Evaluate one to one ,and one to many relationships (K5).	
20. Working with Queries Working with Queries (i) Create a query using wizard (Insert, Update, Delete and Select) (ii) Apply Aggregate functions on table data (iii) Perform Logical Operations (iv) Perform Join Operations Create and Modify multi table query	• Recall queriesK1) • Explain the use of if statement(K2) • Develop a Excel sheet to prepare the electricity bill(K3) • Inspect the flow of control(K4). • Evaluate the results(K5). • Create a Access to prepare telephone bill(K6)	K6
21. Designing a Form (i) Create and Split form (ii) Create multiple items form (iii) Enter Data via form (iv) Modify the layout of a form	• Recall Form(K1) • Explain the use the table design view (K2) • Develop customer details using form (K3) • Evaluate the result(K5)s. • Create a modify the laylot (K6).	K6
22. Creating Report (i) Create a report using report wizard (ii) Modify a report view (iii) Change the sorting in a report (iv) Insert a picture in report header (v) Add footer to a field (vi) Set Validation Rule	• Recall Report(K1) • Demonstrate modify repot viewK2) • Select the text and split it into the cell(K3) • Inspect data to sorting in a report (K4) • Evaluate the results(K5) • Examine set validation rule(k4)	K6

4. MAPPING SCHEME FOR THE PO, PSOS AND COS

U19IT1P2	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	M	M	M	M	M	H	H	M	M	L
CO2	H	H	H	M	M	M	M	M	H	H	M	M	L
CO3	H	H	H	M	M	M	H	M	H	H	M	M	L

CO4	M	M	M	H	H	H	H	M	H	M	H	H	L
CO5	M	M	M	H	H	H	H	H	H	M	H	H	L
CO6	M	M	M	H	H	H	H	H	H	M	H	H	L

L – Low   **M** – Moderate   **H** – High

5. COURSE ASSESSMENT

METHODS DIRECT:

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2. Cooperative Learning Report, Assignment, Group Discussion, project Report, Field Visit Report, Seminar.
3. Pre/Post Test, Viva, Report for each Exercise.
4. Lab Model Examination & End Semester Practical Examination

INDIRECT:
1.Course end survey (Feedback)

C AND C++ PROGRAMMING LAB

1.COURSE OUTCOMES

After the successful completion of this course, the student will be able to

CO. No.	1.COURSE OUTCOMES	Level	Exercise
CO1	Construct the programs using operators, mathematical functions with branching and looping statements	K3	1 – 10
CO2	Inspect the array of strings and functions with simple programs	K4	11 – 14
CO3	Determine the usage of structures and unions	K5	15 – 18
CO4	Interpret different operations of file processing	K5	19 , 25
CO5	Create a program to explain the concept of classes and objects using constructors and destructors	K6	20 – 22
CO6	Test the code using inheritance and overloading	K6	23 – 24

2.A. SYLLABUS

Ex. No.	Exercise
C PROGRAMMING	
1	Develop C programs using Operators
2	Create C programs employing Mathematical functions
3	Write a C program to perform Type Conversion
4	Develop C programs employing different types of If statements
5	Create C programs using Switch Statement
6	Write a C program using Conditional Operator
7	Write a C program using Go to Statement
8	Write a C program using While Statement
9	Write a C program using Do-While Statement
10	Develop C programs employing For statements
11	Develop C programs employing Arrays
12	Create a C program to implement String Manipulations
13	Develop C programs employing Functions
14	Create a C program to implement Recursion
15	Develop C programs employing Structures
16	Develop C programs employing Arrays of Structures
17	Develop a C program employing Union
18	Develop a C program employing Array of Pointers
19	Develop C programs employing Input / Output Operations on Files
C++ PROGRAMMING	
20	Write a C++ program using Classes and Objects

21	Create a C++ program using Constructors and Destructors
22	Write a C++ program to perform Function and Operator Overloading
23	Develop a C++ program to implement the use of Inheritance
24	Create a C++ program employing Virtual Functions.
25	Create a C++ program to implement File Operations

2. B. Topics for Self Study:

S.No.	Topics	Web Links
1	Write a C program to Swap of two numbers	https://www.studytonight.com/c/programs/basic/swapping-two-numbers-program
2	Write a C program for pointer to pointer	https://www.studytonight.com/c/programs/pointer/pointer-to-a-pointer
3	Write a C++ program to implement Hash table	https://www.sanfoundry.com/cpp-program-implement-hash-tables/
4	Write a C++ program to implement chaining with doubly linked list	https://www.sanfoundry.com/cpp-program-hash-tables-doubly-linked-list/

3. SPECIFIC LEARNING OUTCOMES (SLO)

Ex. No.	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
C PROGRAMMING			
1	**Create a program using Operators and Expressions** 1. Convert days to months 2. Check odd/even	● Construct C program to use various types of Operators. ● Plan the flow of operands. ● Experiment with set of inputs and display the results.	K3
2	**Create a program using mathematical function** 1. Quadratic Equation	● Identify the variables ● Select the roots of an equation ● Plan the flow of control. ● Solve the equation with sample data.	K3
3	**Prepare a program using type conversion** 1. Evaluate the equation	● Develop a C program to print the sum of given equation. ● Organize the flow of operand. ● Experiment with sample inputs.	K3
4	**Create a program with if statement** 1. Smallest of two numbers 2. Largest of three numbers	● Utilize the comparison operator with branching statements. ● Model the flow of control. ● Solve the problem with set of	K3

	3. Student grade sheet Preparation	inputs.	
5	**Create a program to involve the switch statement** 1. Print names of a month	● Utilize the functions of C and print a name of the month using recursion. ● Plan the flow of control and display the results.	K3
6	**Create a program to Inspect Conditional Operator** 1. Check the eligibility for voting	● Identify the variables and construct COURSE CODE with conditional operators. ● Experiment with sample inputs and determine the results.	K3
7	**Create a program to Interpret Go to statement** 1. Evaluate the square root of 5 numbers	● Build the program with the relational operators and go to the statement. ● Choose mathematical functions accordingly. ● Solve the problem with test samples.	K3
8	**Prepare a program to demonstrate the while statement** 1. Sum of n digits	● Develop a program to print the sum of digits of a number until a single digit is occurred using looping ● Plan the flow of operand. ● Make use of the while statement, evaluate the sum and display the result.	K3
9	**Create a program to employ the do-while statement** 1. Multiplication table	● Build a C program to print a multiplication table. ● Organize the flow of operand and formulate the result.	K3
10	**Demonstrate the usage of for loop with the simple program** 1. Fibonacci series	● Apply the recursion function and looping constructs to print Fibonacci series of given integer values. ● Experiment with sample data and display the results.	K3
11	**Illustrate the usage of Arrays with the following program** 1. Reverse a string	● List the string ● Examine string methods. ● Inspect a reversed string with sample data.	K4
12	**Create a program to explain the usage of string** 1. Check palindrome	● Discover the usage of pointers. ● Infer the pointer and inspect the string with palindrome condition. ● Examine with sample string value.	K4

13	**Prepare a program to demonstrate the use of functions** 1. Display the position of minimum value	● Examine the user defined function. ● Discover the position of minimum value. ● Inspect with array concepts and display the result.	K4
14	**Create a program to explain the Recursion** 1. Factorial of n numbers	● Simplify the factorial of a given integer value using recursion function. ● List the flow of control. ● Examine the operation with sample data.	K4
15	**Construct the COURSE CODE to describe the usage of Structure** 1. Display book details	● Determine the program to print book details using structure. ● Explain the flow of control. ● Interpret with sample inputs.	K5
16	**Perform the operations of Array of Structures with the following program** 1. Display student registration details	● Explain the use of structure. ● Interpret a program to print student registration details. ● Evaluate the results with a set of inputs.	K5
17	**Create a program to employ the operation of Union** 1. Display the patient details	● Influence the use of structure. ● Determine the patient details. ● Interpret the flow of control. ● Evaluate the results.	K5
18	**Prepare a COURSE CODE to involve an Array of Pointers** 1. Display the classroom details	● Influence the use of structure. ● Determine the classroom details. ● Interpret the flow of control. ● Evaluate the results.	K5
19	**Create a program to explain file concepts** 1. Prepare Invoice	● Choose the FILE structure in C. ● Justify the use of FILE operations. ● Interpret a C program to prepare invoice bills using file processing. ● Evaluate and display the results with test samples.	K5
C++ PROGRAMMING			
20	**Create a C++ program to show the operation of Classes and Objects** 1. Student Mark list	● Create a class Student input and output variables. ● Create methods for process() which calculate the total and average of marks ● Formulate the results	K6
21	**Construct a COURSE CODE in C++ to express the use of**	● Create a class ● Create a constructor which has	

	Constructor and Destructor **1.** Matrix multiplication	the same name as class name ● Adapt constructor and destructor. ● Combine the number of objects created and destroyed. ● Formulate the process and test it with sample inputs.	K6
22	**Create a C++ program to demonstrate the concept of Overloading** 1. Addition of two complex numbers	● Choose two complex numbers ● Create a class complex with two fields real and imaginary. ● Compile with the addition of two complex numbers and display the result.	K6
23	**Construct a C++ program with different types of Inheritance** 1. Display staff details using Multilevel inheritance	● Create a base class person which is to be inherited by the derived class staff and student ● Design a base class named Person has name and address as fields and input() and display() as method ● Build a derived class named staff has staffno, exp, sal as variables and input1 () and display1 () as methods. ● Develop another derived class named student has student number, name, dept as variables and input2 () and display3 () as methods. ● Construct the COURSE CODE with the values of all the three classes	K6
24	**Employ virtual function in C++ with simple COURSE CODE** 1. Calculate the area of different shapes	● Choose the required input values ● Create a superclass shapes which is to be inherited into the subclass Rectangle and Triangle ● Build the Class shapes have val1 and val2 as variable and input() and calculate area ()as method. ● Construct Rectangle and Triangle class has calculate area() ● Solve the problem and display the result with corresponding classes	K6
25	**Prepare a C++ program using file concepts** 1. Prepare Paybill	● Determine the FILE structure in C++. ● Explain the use of FILE operations. ● Interpret a C++ program to	K5

		prepare pay bills using file processing. ● Determine the flow of control. ● Evaluate the result with test samples.	

4. MAPPING (CO, PO, PSO)

U21IT1P2	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	H	H	H	H	H	H	H	H	M	H
CO2	H	M	H	H	H	M	H	H	H	H	H	H	H
CO3	H	H	H	M	M	H	H	H	M	H	H	H	H
CO4	H	H	H	H	H	H	M	H	H	H	H	H	H
CO5	H	H	M	H	H	H	M	H	H	H	H	H	H
CO6	M	M	H	H	L	H	H	H	H	H	H	H	H

L – Low   **M** – Moderate   **H** – High

5. COURSE ASSESSMENT

METHODS DIRECT:

1.   Continuous Assessment Test: T1, T2 (Practical Components).
2.   Cooperative Learning Report, Assignment, Group Discussion, Project Report, Seminar.
3.   Pre/Post Test, Viva, Report for each Exercise.
4.   Lab Model Examination & End Semester Practical Examination

INDIRECT:
1.   Course end survey (Feedback)

INAIYAMUM TAMILUM
இணையமும் தமிழும;

SEMESTER: II   **COURSE CODE : U21TMI02**
CREDITS: 4   **HOURS/WEEK: 4**

அலகு - 1   **(6 Hours)**
இணையம் அறிமுகம் - இணையத்தின் வரலாறும் வளர்ச்சி நிலையும் - இணையப் பயன்பாடும் இன்றைய வாழ்வியலும் - தமிழ் இணைய வரலாறு - இணையத்தில் தமிழின் தடம்.

அலகு - 2   **(6 Hours)**
தமிழில் தகவல் பரிமாற்றம் - மின்னஞ்சல் உருவாக்கமும் அதன் பயன்பாடுகளும் - மின்னஞ்சலின் உள்ளடக்கம் - இணைய இயங்குதளங்கள் - இணையத்தில் தகவல் உலாவுதல், தகவல் தேடுதல் - தமிழ்த் தேடுபொறிகள் - இணையத்தில் தரவுகளைப் பதிவிறக்குதல், பதிவேற்றுதல்.

அலகு - 3   **(6 Hours)**
விக்கிப்பீடியா அறிமுகம் - விக்கிப்பீடியா பெயர் காரணம் - தோற்றம் வளர்ச்சி - தமிழ் விக்கிப்பீடியா - விக்கிப்பீடியா கணக்கு உருவாக்கம் - விக்கிப்பீடியாவில் தகுந்த சான்றாதாரங்களுடன் கட்டுரை எழுதுதல் மற்றும் புதுப்பித்தல் - விக்கிப்பீடியாவின் உள்ளடக்கக் கூறுகள் - உலக மொழிகளில் தமிழ் விக்கிப்பீடியா பெறும் இடம்.

அலகு - 4   **(6 Hours)**
வலைப்பூ அறிமுகம் - அதன் வளர்ச்சியும் வகைப்பாடும் - தமிழ் வலைப்பூக்கள் - வலைப்பூ உருவாக்கம் - வலைப்பூ தொடங்குவதற்கான அடிப்படைகள் - வலைப்பூத் தலைப்பும் முகவரியும் - பக்க வடிவமைப்புத் தெரிவு - வலைப்பூவின் உள்ளடக்கக்
கூறுகள் - வலைப்பூப் பதிவிடுகை.

அலகு - 5   **(6 Hours)**
இணையச் சேவைகள் அறிமுகமும் அதன் பயன்பாடும் - வங்கிச் சேவைகளுக்கு விண்ணப்பித்தல் - இரயில் பயணச்சீட்டு முன்பதிவு செய்தல் - போட்டித் தேர்வுகளுக்கு விண்ணப்பித்தல் - வேலை வாய்ப்பு அலுவலகப் பதிவு மற்றும் புதுப்பித்தல்.

பாட நூற்கள்
1. துரை மணிகண்டன், - 'இணையமும் தமிழும்"
2. துரையரசன், - 'இணையமும் இனிய தமிழும்"
3. துரை மணிகண்டன், - 'தமிழ்க் கணினி இணையப் பயன்பாடுகள்"
4. பொன்ன வைக்கோ, - 'இணையத் தமிழ் வரலாறு"
5. மூ. புழனியப்பன், "இணையமும் தமிழும்"
6. ஜெ. வீரநாதன், - 'இணையத்தை அறிவோம்"
7. இல. சுந்தரம், - 'கணினித் தமிழ்"
8. துரை மணிகண்டன், - 'இணையத்தில் தமிழ் வலைப்பூக்கள்"

COMMUNICATION SKILLS IN ENGLISH – II

SEMESTER: II   **COURSE CODE: U21EGI02**
CREDITS: 2   **HOURS/WEEK: 2**

Objectives:
- *To acquire knowledge on English usage and discourse styles for use in day-to-day contexts.*
- *To develop the skills of thinking, evaluating and writing.*

UNIT I   **(6 Hours)**
Soft Skills
Vocabulary Development
Written Communication

UNIT II   **(6 Hours)**
Spoken Communication
Speeches
Presentations

UNIT III   **(6 Hours)**
Meetings
Nonverbal Communication
Information Transfer

UNIT IV   **(6 Hours)**
Interview and Interviewing skills
Editing Skills
Reference Skills

UNIT V   **(6 Hours)**
Assertive Skills
Adaptability Skills
Problem-Solving Skills

TEXT BOOKS
1.   Board of Editors, **"Synergy-Communication in English and Study Skills"**, Orient Blackswan.
Pvt. Ltd., 2008.
2.   G. M. Sundaravalli, A.S. Kamalakar, P. Kusuma Harinath, **"Communication and Soft Skills"**,
Orient Blackswan Pvt. Ltd., 2015.
3.   Bikram K. Das, **"Functional Grammar and Spoken and Written Communication in
English"**, Orient Blackswan Pvt. Ltd., Kolkatta, 2006.

JAVA PROGRAMMING AND DATABASE MANAGEMENT SYSTEMS

SEMESTER: II   **COURSE CODE: U21IT203**
CREDITS: 2   **HOURS/WEEK: 2**

1.COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO. No.	1.COURSE OUTCOMES	Level	Unit
CO1	Recall the concepts of Object-Oriented Programming.	K1	I
CO2	Illustrate Classes, Objects and explain the Packages and Interfaces.	K2	II
CO3	Develop the methods for handling Events and Exceptions.	K3	III
CO4	Examine the Java Database connectivity.	K4	III
CO5	Explain the popular relational database system concepts and techniques	K5	IV
CO6	Construct different normal forms and practice with SQL packages.	K6	V

2.A. SYLLABUS

UNIT I: Overview of Java   **(9 Hours)**
Overview of Java - Single- and Two-dimensional Arrays, - Methods, General form, invoking, - method overloading, - Classes and objects General form, creation, - constructors - constructor overloading, copy constructor, - 'this' keyword, - Static members, - finalize method, - Inner class and anonymous classes, - Inheritance – inheriting, - abstract classes and final classes, - Interfaces – structure, implementation, - Interface inheritance.

UNIT II: Packages   **(9 Hours)**
Packages– Package Hierarchy, - Import Statement, - Hiding the Classes, - Access Control Modifiers, - Applets – Life Cycle, - Applet Class, - Syntax of Applet Tag, - Methods in Graphics Class, - Threading, Life Cycle, Creating and Running, - Methods in Thread Class, - Priority Thread, - Synchronization.

UNIT III: Events   **(9 Hours)**
Events, Listeners, - Event Handling Methods, - Inheritance of Control Classes, - Labels, - Button Control, - Check Box Control, - Radio Button, - Choice Control, - List Control, - Scroll Bars, - Layouts and Panel, - Windows and Frames, - Menus and Dialogs, - Mouse Events and Listeners, Adapter Class and Inner Class, - Exception Handling – Default Exception – User Defined Exception Handling, - Exception and Error Classes, - Catch Block - Throw and Throws- JDBC – Establishing Connection, - Creating Tables, - Enter Data, - Table Updating

UNIT IV: Introduction to Database System   **(9 Hours)**
Introduction to Database System- File Management Systems - Database Management Systems - File Management Systems Vs Database Management Systems - An Overview of Database Management Systems - Data Model -Relational Model: Relational Database Primer - Relational Database Characteristics - Database Integrity – Keys - Entity and Referential Integrity - Views.

UNIT V: Database Design   (9 Hours)

Database Design- Design Consideration - Functional Dependency - Normalization and Normal Forms (1NF, 2NF, 3NF, 4NF, 5NF) - E/R Modeling- Introduction to SQL-SQL Query language – SQL data definition – Basic, set and aggregate operation –Null values – Nested queries.

2.B. Topics of Self Study:

S.No.	Topics	Web Links
1	Basics of Swing	https://www.javatpoint.com/java-swing
2	Introduction to JSP	https://www.studytonight.com/jsp/introduction-to-jsp.php
3	Multimedia Databases	https://www.tutorialspoint.com/Multimedia-Databases
4	Distributed Databases	https://www.tutorialride.com/distributed-databases/distributed-databases-tutorial.htm
5	Embedded Databases	https://raima.com/embedded-database/

2.C. Text Book(s):

1.   Muthu C, **"Programming in Java"**, Thompson Learning, 2004.
2.   Atul Kahate, **"Introduction to Database Management Systems"**, 1st Indian Reprint, Pearson Education, Delhi, 2004.
3.   Abraham Silberchatz, Henry F. Korth and S. Sudharshan, **"Data Base System concepts"** Mc Graw Hill International – Fourth Edition.(Chapter-3)

2.D. Reference Book(s):

1.   Patrick Naughton& Hebert Schildt, **"The Complete Reference JAVA 2",** 3rd Edition, TMH, Delhi,
2.   E. Balagursamy, **"Programming with Java – A Primer"**, Third Edition, TataMcGraw-Hill Publishing Company Limited, 2007

2.E. Web Links:

1.   www.tutorialspoint.com/
2.   https://www.youtube.com/watch?v=grEKMHGYyns
3.   https://www.youtube.com/watch?v=3MZIkY55fS0
4.   https://www.w3schools.in/dbms
5.   https://www.tutorialspoint.com/dbms

3.SPECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Contents	Learning Outcomes	Highest Bloom's Taxonomic Level of

			Transaction
I	**Overview of Java**		
1.1	**Overview of Java**: Introduction of JAVA Language - Character set – Tokens – Constants, Variables – Operators and Expressions	Recall the principles of Java(K1)	K2
		List the features of Java(K1)	
		Explain various data types(K2)	
		Illustrate the basic structure of Java(K2)	
		List the basic operators and expression for computations(K4)	
1.2	**Arrays and Methods** Single- and Two-dimensional Arrays, - Methods – General form, invoking, - Method overloading – Recursion	Define array and its types(K1)	
		Explain how to invoke the method(K2)	
		Illustrate the general form of method(K2)	
		Demonstrate method overloading with example(K2)	
		Build programs using recursion(K3)	
1.3	**Classes, Objects and Constructors**: Introduction – General form of class creation – Constructors - Constructor overloading – Copy constructor – This' keyword – Static members – Finalize method - Inner class and anonymous classes	Define classes and objects(K1)	
		Outline the general form of class and methods(K2)	
		Define constructor(K1)	
		List the difference between constructor and classes(K1)	
		Show the usage of 'this' keyword(K1)	
		Explain how to execute finalize () method(K2)	
		Demonstrate inner class and anonymous class with programs(K1)	
1.4	**Inheritance and Interfaces**: Inheritance – inheriting abstract classes and final classes – Interfaces – structure – Implementation – Interface inheritance.	Recall classes and Objects(K1)	
		Define Inheritance(K1)	
		Explain how to operate abstract classes(K2)	
		Construct programs using final classes(K3)	
		Demonstrate the working methodology of interfaces(K2)	
		Recall inheritance(K1)	
		Apply the concept of inheritance to interfaces(K3)	
II	**Packages**		
2.1	**Packages**: Package Hierarchy – Import Statement – Hiding the Classes – Access Control Modifiers	Explain Package(K2)	K3
		Find the CLASSPATH(K1)	
		Illustrate how to place the classes in packages(K2)	
2.2	**Applets**: Applets – Life Cycle	Illustrate applet and applet tag(K2)	
		Explain life cycle of an apple tag(K2)	
		List the various attributes in applet	

	– Applet Class – Syntax of Applet Tag – Methods in Graphics Class	tag(K4)	
		Demonstrate applet programs and execute the simple applet programs(K2)	
		Make use of graphics class in applet programs(K3)	
2.3	**Threading**: Threading – Life Cycle – Creating and Running – Methods in Thread Class – Priority – Thread Synchronization – Inter Thread Communication – Applets Involving Threads	Explain life cycle of a thread(K2)	
		Develop and execute threads(K3)	
		Interpret methods in the thread class(K5)	
		Relate thread communication with synchronization(K2)	
		Illustrate the involvement of threads in applets(K2)	
III	**Abstract Window Toolkit I – Events, Listeners**		
3.1	**Abstract Window Toolkit I – Events, Listeners** : Event Handling Methods - Inheritance of Control Classes - Labels - Button Control - Check Box Control - Radio Button - Choice Control - List Control - Scroll Bars - Layouts and Panel	Define Events(K1)	K4
		Categorize the types of events(K4)	
		Explain event handling methods(K2)	
		Develop user interface(K3)	
		List various AWT controls(K4_	
		Construct programs using AWT controls(K3)	
		Elaborate various layouts and panels(K6)	
3.2	**Abstract Window Toolkit II I Windows and Frames**: Windows and Frames - Menus and Dialogs - Mouse Events and Listeners – Adapter Class and Inner Class	Define and Explain windows, frames(K2)	
		Develop menu programs using windows and frames(K3)	
		Experiment with mouse events and listeners(K3)	
		Demonstrate adapter class and inner class with programs(K2)	
3.3	**Exception Handling**: Exception Handling – Default Exception – User Defined Exception Handling, - Exception and Error Classes, - Catch Block - Throw and Throws	Define Exception(K1)	
		Classify the types of Exception(K4)	
		Compare exceptions and error classes(K2)	
		Distinguish between throw and throws statement(K4)	
		Construct programs using throw and throws statement(K6)	
3.4	**Java Database Connectivity**: JDBC – Establishing Connection, - Creating Tables,	List the functions of JDBC(K4)	
		Examine the connectivity(K4)	
		Develop program using JDBC(K3)	
		Test JDBC with data resources(K6)	
		Inspect the data manipulation in the	

	- Enter Data, - Table Updating	table using Queries(K4)	
IV	**Introduction to Database Systems**		
4.1	**Introduction to Database Systems**: File Management Systems - Database Management Systems - File Management Systems Vs Database Management Systems - An Overview of Database Management Systems - Data Model	Explain Database Management system(K5).	K5
		Elaborate File management system(K6)	
		Compare DBMS Vs FMS(K2)	
		List the importance of DBMS(K4)	
		Select the data model to interpret with DBMS(K5)	
		Discuss various data models(K6)	
4.2	**Relational Model**: Relational Database Primer - Relational Database Characteristics - Database Integrity – Keys - Entity and Referential Integrity - Views	Recall relational database(K1)	
		List the characteristics of Relational Database(K4)	
		Compare Entity and Referential Integrity(K4)	
		Explain various keys supports Database Integrity(K5)	
		Elaborate entity and referential Integrity(K6)	
		Discuss the concept of views(K6)	
V	**Database Design and Normalization**		
5.1	**Database Design and Normalization**: Design Consideration - Functional Dependency - Normalization and Normal Forms (1NF, 2NF, 3NF, 4NF, 5NF) - E/R Modeling	Define Functional Dependency(K1)	K6
		Explain the concept of functional dependency with an example(K2)	
		Define Normalization(K1)	
		Classify the types of Normal Forms(K4)	
		Design the database with normal forms(K6)	
		Develop E/R diagram using E/R modeling(K6)	
5.2	**Introduction to SQL**: SQL Query language – SQL data definition – Basic, set and aggregate operation –Null values – Nested queries.	Explain Structured Query Language(K5)	
		Illustrate SQL data definition(K2)	
		Elaborate basic, set and aggregate functions of SQL(K6)	
		Formulate nested queries(K6)	

4. MAPPING (CO, PO, PSO)

U21IT203	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	M	H	H	H	M	H	H	M	H	M	H	H
CO2	H	M	H	H	H	H	H	M	H	H	L	H	M
CO3	H	H	H	H	H	H	M	H	M	H	H	H	M
CO4	M	H	M	L	M	H	M	H	M	M	H	L	M
CO5	H	H	M	M	H	H	M	L	H	H	L	H	L
CO6	H	L	H	M	H	M	H	H	H	L	M	M	M

L – Low   **M** – Moderate   **H** – High

5. COURSE ASSESSMENT
METHODS DIRECT:
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. 2.Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, Project Report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

INDIRECT:

1.Course end survey (Feedback)

COMPUTER NETWORKS

SEMESTER: II   **COURSE CODE: U21IT204**
CREDITS: 2   **HOURS/WEEK: 2**

1.COURSE OUTCOMES:

After the successful completion of this course, the student will be able to

CO. No.	Course Outcome	Level	Unit
CO1	Explain Data Communications System and its components and explain the types of transmission media with real time applications.	K2	I
CO2	Examine ISDN mechanisms and the necessity of ATM	K2	II
CO3	Identify an error occurs in data link layer by error detection and correction mechanisms	K3	II
CO4	Explain the transmission equipment used in LAN and WAN networks.	K4	III
CO5	Describe transport layer protocols and routing mechanism to design wireless LAN to improve network performance.	K5	IV
CO6	Familiarity with the basic protocols of computer networks, and how they can be used to assist in network applications.	K6	V

2. A. SYLLABUS

UNIT – I: Introduction   **(9 Hours)**

Introduction: History - Applications – Computer Network Topologies – Categories of Networks – Networks – Network Architecture – OSI Model – TCP/IP Architecture - Communication Media and Data Transmission: Analog and Digital Data Transmission – Modulation and Demodulation – Transmission Media – Wireless Communications – Data Transmission Basics - Transmission Modes – Interfacing – Multiplexing.

UNIT – II: Error Detection and Correction , Data Link and Routing Protocol   **(9 Hours)**

Error Detection and Correction: Types of Errors – Error Detection – Error Correction. - Data Link Control and Protocol Concepts: Flow Control – Error Control – Asynchronous Protocols – Synchronous Protocols – HDLC - Integrated Services and Routing Protocols: Integrated Services – ISDN Services – ISDN Topology – ISDN Protocols – ATM – Characteristics – Frame Relay – Comparison of ISDN, ATM and Frame Relay.

UNIT – III: LAN and WAN   **(9 Hours)**

LAN: Types of Network and Topology – LAN Transmission Equipment – Ethernet – Token bus – Token ring – Fibre Distributed Data Interface – Distributed Queue Dual Bus – LAN Operating Systems and Protocols – Ethernet Technologies. WAN: Transmission Methods – Carrier Types – Transmission Equipment – Design and Multicast Considerations –Protocols.

UNIT – IV: Wireless LAN   and TCP Reliable Transport Services (9 Hours)

Wireless LAN: Applications – Requirements – Planning – Architecture – IEEE 802.12 – Protocol Layer – Physical Layer – Designing the Wireless LAN Layout – WAP Services - Internetworking: Principles – Routing – Internetwork Protocols – Shortcomings of IPv4 – IP Next Generation - TCP Reliable Transport Services: Transport Protocols – The Service TCP Provides to Applications – End-to-End Service and Datagrams – Transmission Control Protocol – User Datagram Protocol.

UNIT – V: Network Applications   and Management (9 Hours)

Network Applications: Client-Server Model – DNS – Telnet – File Transfer and Remote File Access – Electronic Mail – World Wide Web - Network Management: Goal of Network Management – Standards – Network Management Model – Infrastructure for Network Management – Simple Network Management Protocol.

2.B. Topics for Self Study:

S. No	Topics	Web Links
1	Common Network Application Software	https://www.omnisecu.com/basic-networking/common-network-application-software.php
2	Ad Hoc wireless Topology	https://www.omnisecu.com/basic-networking/ad-hoc-wireless-topology.php
3	Subnet Mask	https://www.omnisecu.com/tcpip/what-is-subnet-mask.php
4	Network Address	https://www.omnisecu.com/tcpip/what-is-network-address.php
5	CISCO Network Protection Framework	https://www.omnisecu.com/ccna-security/cisco-network-foundation-protection-nfp-framework.php

2.C. Text Book(s):

1. Brijendra Singh, **"Data Communications and Computer Networks"**, 2nd Edition, PHI, 2006.

2.D. Reference Books:

1. William Stallings, **"Data and Computer Communications"**, 8th Edition, Pearson Education, 2007.
2. Behrouz A. Forouzan, **"Data Communications and Networking"**, 4th Edition, Tata McGraw Hill Publishing Company, 2006.

2.E. Web Links:
1. https://www.tutorialspoint.com/data_communication_computer_network/index.html
2. https://www.pinterest.com/mskuthar/data-communication-computer-network-tutorial/
3. https://www.youtube.com/watch?v=sG6WGvzmVaw
4. https://www.guru99.com/data-communication-computer-network-tutorial.html
5. https://www.youtube.com/watch?v=mYWsllbszYQ&list=PLtJDAcNXilyR78LDCbEUwwmMYTnuTeS5S&index=17

3. SPECIFIC LEARNING OUTCOME (SLO)

Unit/ Section	Course Content	Learning outcomes	Highest Bloom's Taxonomic Level of Transaction
1	**Introduction and Communication Media**		
1.1	**Introduction**: History – Applications – Computer Network Topologies – Categories of Networks – Networks – Network Architecture – OSI Model – TCP/IP Architecture.	Outline the purpose of communication. (K2)	K2
		Explain the components of communication model.C(K5)	
		Illustrate the types of networks. (K2)	
		Outline the features of the internet. (K2)	
		Compare various types of topologies. (K4)	
		Explain about OSI layers. (K5)	
		Discuss the functionality of each layer in OSI model (K6)	
		Interpret the standards to define protocol structure. (K2)	
1.2	**Communication Media and Data Transmission**: Analog and Digital Data Transmission – Modulation and Demodulation – Transmission Media – Wireless Communications – Data Transmission Basics - Transmission Modes – Interfacing – Multiplexing.	Classify the types of transmission medium. (K2)	
		Relate the transmission media used in real time. (K1)	
		Compare the types of signals in communication. (K5)	
		Outline the purpose of multiplexing. (K2)	
		Explain guided media with real time example. (K5)	
		Outline the purpose of wireless transmission. (K2)	
		List the difficulties in wireless data transmission. (K4)	
		Discuss multiplexing mechanisms used in communication. (K6)	
		Identify the drawback of multiplexing techniques. (K3)	
II	**Error Detection and Correction, Data Link and Routing Protocols**		
2.1	**Error Detection and Correction**: Types of Errors – Error Detection – Error Correction.	List the types of error occurred in transmission. (K1)	K3
		Categorize various error detection methods used in the data link layer. (K4)	
		Discuss how to detect errors in transmission by Hamming code method. (K5)	
		Elaborate error detection methods. (K6)	

		Distinguish errors in transmission. (K4)	
		Predict the position of error data using error correction methods. (K6)	
2.2	**Data Link Control and Protocol Concepts**: Flow Control – Error Control – Asynchronous Protocols – Synchronous Protocols – HDLC	Recall the purpose of protocol. (K1)	K2
		Identify data kink control protocols. (K3)	
		Compare flow control mechanisms used in digital data transmission. (K4)	
		Explain error control techniques used in the data link layer. (K5)	
		Define HDLC protocol. (K1)	
		Discuss the purpose of the HDLC protocol in the data link layer of OSI model. (K6)	
2.3	**Integrated Services and Routing Protocols**: Integrated Services – ISDN Services – ISDN Topology – ISDN Protocols – ATM – Characteristics – Frame Relay – Comparison of ISDN, ATM and Frame Relay.	Define digital communication techniques.(K1)	
		List techniques to transmit digital data. (K4)	
		Recall topology used in networks. (K1)	
		Recall protocol architecture. (K1)	
		Examine the purpose of ATM(K4)	
		Explain layers in ATM(K6)	
		Discuss the functionalities of ATM layers.(K6)	
		Outline the services provide by ATM layers.(K2)	
III	**LAN and WAN**		
3.1	**LAN**: Types of Networks and Topology – LAN Transmission Equipment – Ethernet – Token bus – Token ring – Fiber Distributed Data Interface – Distributed Queue Dual Bus – LAN Operating Systems and Protocols – Ethernet Technologies.	Recall types of networks(K1)	K4
		Define topologies used in LAN.(K1)	
		Recall transmission media.(K1)	
		Identify protocol architecture used in LAN. (K3)	
		Explain hardware used in OSI layers. (K5)	
		Distinguish switch and bridge in transmission of digital data.(K4)	
		Discuss various types of LAN protocols.(K6)	
3.2	**WAN**: Transmission Methods – Carrier Types – Transmission Equipment – Design and Multicast Considerations –Protocols.	Recall types of networks(K1)	
		Discuss topologies used in LAN.(K6)	
		Recall transmission media.(K1)	
		Explain protocol architecture used in LAN.(K5)	
IV	**Wireless LAN and TCP Reliable Transport Services**		

4.1	**Wireless LAN:** Applications – Requirements – Planning – Architecture – IEEE 802.12 – Protocol Layer – Physical Layer – Designing the Wireless LAN Layout – WAP Services -	Define architecture for wireless LAN (K1)	
		List the services provided by WAP (K4)	
		Explain guided media with real time example. (K2)	
		Identify the purpose of wireless transmission.(K3)	
		Discuss difficulties in wireless data transmission.(K6)	
4.2	**Internetworking:** Principles – Routing – Internetwork Protocols – Shortcomings of IPv4 – IP Next Generation	Recall the types of protocols and its features.(K1)	K5
		Discuss the purpose of routing algorithms.(K6)	
		Classify the routing algorithms used in networks.(K4)	
		Illustrate least cost routing algorithms. (K2)	
		Discuss the concepts used in internetworking.(K6)	
		Explain the layers in IP protocol.(K5)	
		Explain the various fields in IP protocol architecture.(K5)	
		Compare IPv4 and IPv6.(K5)	
		Explain the necessity of IPv6.(K2)	
		Inspect algorithm with example.(K4)	
4.3	**TCP Reliable Transport Services:** Transport Protocols – The Service TCP Provides to Applications – End-to-End Service and Datagrams – Transmission Control Protocol – User Datagram Protocol.	Recall connection oriented and connectionless protocol. (K1)	
		List the protocols used in transport layer.(K4)	
		Explain the architecture of TCP and UDP.(K5)	
		Compare the features of TCP and UDP.(K4)	
V	**Network Applications and Management**		
5.1	**Network Applications:** Client-Server Model – DNS – Telnet – File Transfer and Remote File Access – Electronic Mail – World Wide Web	Recall internet application.(K1)	
		Recall the components used in communication.(K1)	
		Explain how an email works.(K5)	
		Explain the component involved in email communication process.(K5)	

		Discuss the purpose of SMTP and MIME protocol in email process.(K6)	
		Explain how the web pages accessed through networking protocols.(K2)	
		Explain how the web documents are organized in internet directories.(K5)	
			K6
5.2	**Network Management**: Goal of Network Management – Standards – Network Management Model – Infrastructure for Network Management – Simple Network Management Protocol.	Define the purpose to standardize network.(K1)	
		Discuss the functionalities of network management model.(K6)	
		Explain the SNMP protocol to manage a network.(K5)	

4.MAPPING SCHEME FOR THE PO, PSOS AND COS

U21IT204	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	L	L	L	L	L	L	L	L	L	M	L	L
CO2	L	M	L	M	L	M	L	L	L	L	L	M	L
CO3	L	H	L	L	M	L	L	L	L	H	L	L	L
CO4	L	L	L	L	H	L	L	L	M	M	H	L	M
CO5	L	L	M	L	L	H	L	L	M	L	H	L	L
CO6	L	L	L	L	M	L	M	M	H	M	L	H	L

L-Low   **M-Moderate**   **H- High**

5. COURSE ASSESSMENT

METHODS DIRECT:

1.   Continuous Assessment Test: T1, T2 (Theory Components): Closed Book
2.   Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, Field Visit Report, Seminar, Quiz (written).
3.   Pre-Semester & End Semester Theory Examination

INDIRECT:
1.   Course end survey (Feedback)

ENVIRONMENTAL STUDIES

SEMESTER: II   **COURSE CODE: U16EST21**
CREDITS: 2   **HOURS/WEEK: 2**

Unit – I: The Multidisciplinary nature of Environmental Studies
Definition, Scope and Importance. Need for Public awareness

Unit – II : Nature Resources:
Renewable and Non-renewable resources
Forest resources : Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people. - **Water resources:** Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam benefits and problems.-**Mineral resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies. -**Food resources:** World food problems, change4s caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity case studies.-**Energy resources:** Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case Studies.- **Land resources:** Land as a resource, land degradation, man induced landslides, soil erosion and desertification. - Role of an individual I conservation of natural resources. - Equitable use of resources of sustainable lifestyles.

Unit – III : Ecosystems: Ecosystems
Concept of an ecosystem, Structure of an ecosystem, producers, consumers, decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids. - Introduction, types, characteristics features, structure and function of ecosystem: - Forest ecosystem, - Grassland ecosystem, - Desert ecosystem, - Aquatic ecosystems (Ponds, streams, lakes, rivers, oceans, estuaries).

Unit – IV : Biodiversity and its conservation:
Introduction-definition : Genetic, species and ecosystem diversity, Biogeographical classification of India, value of biodiversity: Consumptive use, productive use, social ethical, aesthetic and option values, Biodiversity at global, National and local level, India as a megadiversity nation, Hot-spots of biodiversity, Threats to biodiversity : habit los, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity In-situ conservation of biodiversity.

Unit – V : Environmental Pollution:
Definition, Causes, effects and control measures of
a. Air Pollution b. Water Pollution c. Soil Pollution d. Marine Pollution
e. Noise Pollution f. Thermal Pollution g. Nuclear Hazards
Solid Waste Management: Causes, effects and control measures of urban and industrial wastes, role of an individual in prevention of pollution, pollution case studies.

Unit – VI: Social Issues and the Environment:
From unsustainable to sustainable development, Urban problems related to energy, water conservation, rain water harvesting, watershed management, resettlement and rehabilitation of people; its problems and concerns. Case studies, Environmental ethics: Issues and possible solutions, climate change, global warning, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies, wasteland reclamation, consumerism and waste products Environment Protection Act, Air (Prevention and Control

of Pollution) Act, Forest (Conservation) Act, issues involved in enforcement of environmental legislation, public awareness.

Unit – VII: Human Population and the Environment:
Population growth, variation among nations, Population explosion-family welfare programme environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies.

Unit – VIII: Field Work: Environmental Service Learning (ESL)
1.   Integrated learning:
Survey   and   Planning: Visit   to   a   local   area   to   document   environmental assets-river/forest/grassland/hill/mountain,   visit   to   a   local   polluted   site -Urban/Rural/Industrial/Agricultural,   study   of   common   plants   insects,   birds, study of simple ecosystems-pond, river, hill slopes, etc.
2.   **Service to the Community:** Action plan
3.   **Student Voice:** Creating awareness and implementation of Action plan
4.   **Civic Responsibility:** ESL activity of students and its effect on chosen community – Voice of the community
5.   **Reflection:** Before, during and after the project – to draw links between social and personal aspects of the project and academic curriculum.

The five elements of "Environmental Service Learning" incorporates – exploring/mapping local environments; making community partners; participating in local environmental service; reflecting on the learning which results from the service; and celebrate/communicating about environmental stewardship.

ENGLISH LANGUAGE LAB – II
(Remedial Grammar and Writing Skills)

SEMESTER: II   **COURSE CODE: U21EGIP2**
CREDITS: 3   **HOURS/WEEK: 3**

Objectives:
- *To obtain practical training on English usage and discourse styles for use in day-to-day context and to initiate the skills of thinking, evaluating and writing.*

1.   Types of Sentences

2.   Tenses

3.   Articles and Prepositions

4.   Punctuations

5.   Brainstorming and Gathering Information

6.   Organizing Information and Writing the First Draft

7.   Proofreading

8.   Descriptions

9.   Narrations

10.   Expositions

11.   Persuasions

12.   Essays

13.   Paragraphs

14.   Précis

15.   Abstract

16.   Leaving a Note

17.   Preparing Agenda, Minutes etc.

JAVA AND DBMS LAB

SEMESTER: II   **COURSE CODE: U21IT2P3**
CREDITS: 5   **HOURS/WEEK: 4**

1.COURSE OUTCOMES

After the successful completion of this course, the student will be able to

CO. No.	1.COURSE OUTCOMES	Level	Exercise
CO1	Identify classes, objects with Inheritance	K3	1 – 2
CO2	Examine Packages and Interfaces	K4	3 – 4
CO3	Evaluate user defined exceptions, multithreading and applets	K5	5 – 7
CO4	Develop database applications with AWT controls	K6	8 – 9
CO5	Explain various SQL commands with nested queries	K3/K4	10 – 12
CO6	Construct form builders and create reports with database operations	K5/K6	13 – 14

2.A. SYLLABUS

Ex. No.	Exercise
JAVA PROGRAMMING	
1	Develop Java Programs using Classes and Objects
2	Implement Java Programs using different types Inheritance
3	Develop Java Programs using Interfaces
4	Design and develop Packages in Java
5	Write Java Programs to handle Exceptions
6	Develop a Java Program to implement Multithreading
7	Implement Applet Programming in Java
8	Develop Java programs applying the AWT concepts
9	Implement JDBC to handle databases in Java
RDBMS PROGRAMMING	
10	Creating updating and inserting into databases & simple queries.
11	Usage of select statement – for queries using AND, OR, NOT Operators, WHERE clause UNION, INTERESECTION, MINUS Aggregate operations
12	Form Nested queries using SQL Sub queries Join operations
13	Implementation of Built–in functions of SQL.
14	Case studies: - Use forms for database manipulations and generate appropriate reports for the following Student evaluation systems. Pay – roll system. Income tax calculations Seat reservation Problem

2.B. Topics for Self Study:

S.No.	Topics	Web Links
1	Write a program to implement grid layout and card layout	https://www.ctae.ac.in/images/editorFiles/file/Lab%20Solutions%20of%20CSE_IT/java.pdf
2	Write a Java program to get IP Address	https://beginnersbook.com/2014/07/java-program-to-get-ip-address/
3	Write a program in PL/SQL to show the uses of implicit cursor without using any attribute.	https://www.w3resource.com/plsql-exercises/cursor/plsql-cursor-exercise-4.php
4	Write a PL/SQL program to check whether a given number is positive, negative or zero.	https://www.w3resource.com/plsql-exercises/control-statement/plsql-control-statement-exercise-12.php

3. SPECIFIC LEARNING OUTCOMES (SLO)

Ex. No.	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
JAVA PROGRAMMING			
1	**Program to prepare student mark list using classes and objects** Create a class student having student details and mark details Calculate total and result Create a main method that includes objects of the class student and call the methods using objects.	● Organize the creation of classes and objects. ● Make use of objects and call the methods and variables. ● Experiment with a program involves classes and objects.	K3
2 (A)	**Program to prepare electricity bill using single inheritance** Create two classes for getting customer details and unit details respectively Inherit the properties of a class customer. Calculate the unit price according to the units. Create a main method and call the methods using objects.	● Identify the object access with access specifiers. ● Select the classes and methods. ● Experiment with access specifiers. ● Select element and method scope. ● Organize COURSE CODE reusability with inheritance.	K3
2 (B)	**Program to display the product details using multilevel inheritance** Create two classes for getting	● Identify the object access with access specifiers. ● Choose the classes and methods.	

	customer details and item details respectively Calculate the total price based on the item price and quantity in another class. Create a main method and call the methods using objects.	● Experiment with access specifiers. ● Select element and method scope. ● Organize COURSE CODE reusability with inheritance.	K3
2 (C)	**Program to prepare the Paybill using hierarchical inheritance** Create a class consists of employee's details and designation details Create class and calculate Paybill based on designation Create a main method and call the methods using objects.	● Identify the Object access with access specifiers. ● Choose the classes and methods. ● Experiment with access specifiers. ● Select element and method scope. ● Organize COURSE CODE reusability with inheritance.	K3
3	**Program to calculate the area of different shapes using interfaces** Create an interface which declares methods of calculating area of different shapes Create a class to implement the methods declared in the interface. Create a main method and call the methods using objects.	● Analyze and initialize variables. ● List the object access with interfaces. ● Examine with interfaces. ● Inspect the operation of methods. ● Take part in abstraction using interfaces. ● Examine the programs with total abstraction.	K4
4	**Program to perform arithmetic operations using packages** Create a directory and name the packages. Create packages and class for performing arithmetic operation Create a main method and call all the packages.	● List the use of methods. ● Classify the modules in a program. ● Relate the classes into packages. ● Inspect the class scope within package	K4
5	**Program to implement user defined exception** Create a class exception and declare variables and methods. Declare user defined exceptions. Write exception handling mechanisms using try and catch blocks. Create a main method and call the methods using objects.	● Explain the COURSE CODE with various try () blocks. ● Influence the types of exceptions. ● Evaluate with various catch blocks. ● Deduct new exceptions. ● Conclude on possible exceptions. ● Determine the COURSE CODE to handle user defined exceptions	K5
6	**Program to apply the concept of multithreading in Bank transactions** Creating a class bank includes bank transactions like deposit and withdrawal.	● Explain thread. ● Evaluate the operation of threads. ● Recommend with thread priority. ● Assess thread synchronization. ● Prioritize the threads.	

	Create and initiate the threads. Start and run the thread for deposit and withdraw options. Create a main method and call the methods using objects.	● Interpret their operations with thread synchronization	K5
7	**Program to move a ball using applet** Create a class which extends the applet architecture Create and draw the shape using paint. Repaint the shape and view it in the applet viewer.	● Determine an Applet. ● Explain the use of applets. ● Justify shapes, reposition and repaint them using applets.	K5
8	**Program to perform simple calculator using AWT controls.** Create a class which extends abstract window toolkit. Create a tool button which consists of arithmetic operations. Create event listener interface and write on click events. Create a main method and perform calculator operations.	● Elaborate the controls. ● Combine the various AWT controls. ● Develop an applet. ● Discuss the use of applets. ● Develop web forms using applets.	K6
9	**To establish database connection, create and manipulate employee records using JDBC.** Create a class employee having employee details. Create a database in ms access and connect the database using JDBC. Perform insert, delete and update operations. Create a main method and call methods using objects.	● Construct the database. ● Elaborate the database operations. ● Create the table ● Formulate queries to perform various database operations.	K6
RDBMS PROGRAMMING			
10 (A)	**Create DDL statements with simple queries.** Create a table with columns and data types Insert the values into the table. Alter the columns/table with add/modify and drop keywords. Truncate the table Drop the table	● Make use of all the DDL Statements. ● choose data with data type ● Apply constraints to the table. ● Identify DELETE and DROP query ● Build a simple table	K3
10 (B)	**Create DML statements with simple queries.** Create a table with columns and data types	● Experiment with all the DML Statements. ● Make use of insert query ● Apply DELETE statement with	K3

	Insert the values into the table. Update the table values using update query Delete the unwanted rows with the help of delete query. Select the desired rows with the help of select statement.	where condition. ● Build select statement. ● Choose the correct syntax of DELETE statement.	
11	**Queries using** **i)Logical Operators, Where clause** **ii)Set operators.** **iv)Aggregate Functions** Create a table with columns and data types Make use of set operators like union, intersections and minus in the table Sorting and grouping the columns in ascending and descending order.	● Make use of all the logical operators. ● Identify the symbol of union. ● Apply conditions to the table. ● Build aggregation queries involving GROUP BY and HAVING clauses.	K3
12	**Create Nested queries using the following** **i) Sub queries.** **ii) Join operators.** Create a table with columns and data types Insert the values into the table. Make use of left, right outer join and full join in table	● Discover complex queries ● Simplify the complex queries with nested queries ● Inspect the nested queries ● Categorize different join operations ● Examine inner and outer join operations	K4
13	**Built – in functions** Use character functions Use mathematical functions Use string functions Use date functions	● Determine various Built-in Functions ● Influence the functions with characters and strings. ● Interpret the mathematical and date functions ● Justify the functions with different set of values	K5
14 (A)	**Prepare Student mark list using form builder and generate appropriate reports** Design form with student details Perform insert, delete and update queries with the form builder	● Design the form with student name, roll number, department and marks ● Develop the communication between form builder and the database ● Formulate the COURSE CODE to perform manipulation into the table	K6
14 (B)	**Prepare Pay – roll System using form builder and generate appropriate reports** Design form with employee details	● Design the form with employee name, id, designation, department, and basic pay ● Develop the communication between form builder and the database	

	Perform insert, delete and update queries with the form builder	● Formulate the COURSE CODE to perform the calculation for DA, HRA, CA, PF and IT ● Construct the COURSE CODE to insert the calculated value into the table.	K6
14 (C)	**Prepare Income – tax calculations using form builder and generate appropriate reports** Design form with employee details Perform insert, delete and update queries with the form builder	● Design the form with employee name, id, designation, department, and basic pay ● Develop the communication between form builder and the database ● Formulate the COURSE CODE to perform the income tax calculation ● Construct the COURSE CODE to insert the calculated value and deduct the income tax amount with gross pay into the table.	K6
14 (D)	**Prepare seat reservation system in railways using form builder and generate appropriate reports** Design form with customer details Perform insert, delete and update queries with the form builder	● Design the form with customer details and travelling details ● Develop the communication between form builder and the database ● Formulate the COURSE CODE to perform the calculation to reserve a seat ● Construct the COURSE CODE to insert the seat reserved and amount into the table	K6

4. MAPPING (CO, PO, PSO)

U21IT2P3	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	M	H	H	M	M	H	M	H	L	H	M	M
CO2	H	H	H	H	M	L	H	H	M	M	M	M	H
CO3	H	H	M	M	H	H	H	M	H	M	H	H	H
CO4	H	M	H	H	H	L	H	M	H	H	H	H	H
CO5	M	M	M	M	H	H	M	M	M	H	H	H	H
CO6	H	H	M	H	H	H	H	H	H	H	H	H	H

L – Low   **M** – Moderate   **H** – High

5.COURSE ASSESSMENT

METHODS DIRECT:

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2. Cooperative Learning Report, Assignment, Group Discussion, Project Report, Seminar.
3. Lab Model Examination & End Semester Practical Examination

INDIRECT:
1. Course end survey (Feedback)

COMPUTER HARDWARE AND NETWORKING LAB

SEMESTER: 2   **COURSE CODE: U21IT2P4**
CREDITS: 4   **HOURS/WEEK: 5**

1.COURSE OUTCOMES

After the successful completion of this course the students will be able to

CO. No.	1.COURSE OUTCOMES	Level	Exercise
CO1	Identify the hardware components in a PC and organize it.	K3	1,2
CO2	Examine the size of a hard disk and divide the space required to install OS.	K4	3,4
CO3	Deduct failure in computer components through troubleshooting process.	K5	5
CO4	Construct a network through network cables, network devices and test the connections.	K6	6,7,8
CO5	Compare various routing algorithms to communicate with nodes in a network.	K5	9,10,11
CO6	Analyze performance of various communication protocols	K6	12,13

2.A. SYLLABUS

Ex. No.	Exercise
Computer Hardware	
1	**Introduction to Computers and Operating Systems:** Evolution of Personal Computers – Types of Computers – Operating Systems: DOS, Unix, Windows & Linux (Basics only).
2	**PC Accessories and Functions:** Monitors & Types (CRT, LCD, TFT & LED) – Peripherals (Keyboard, Mouse, Speaker, etc.) – CPU - Processor and Types - Motherboard and Types – BIOS – CMOS – I/O Ports: Serial – Parallel – USB – AGP – VGA – PCI/ISA Slots – Game Port – Sockets – Buses (IDE, SATA, SCSI) – FDD Connectors - Jumper Settings - DIMM Slots - Front Panel Connectors – Hard Disk and Types, SMPS – Optical Storage Devices - I/O Buses – Memory - RAM and ROM - Imaging and Printing Devices: Printer, Scanner and Plotter.
3	**Assembling:** Setting up the Processor, Cooler Fan & RAM – Fixing the Motherboard & SMPS - Mounting the Cabinet – Connecting the Cards & Devices: FDD – HDD – CD Drive – SMPS – CMOS & BIOS Setup.
4	**Installation:** Fdisk – Partitioning – Formatting – File Systems (FAT & NTFS) – Installation: Operating System – Drivers - Printers – Basic Software - Antivirus.
5	**Troubleshooting:** BIOS Problem- Identification of source for Beep Sound - Display Problem - Booting Problem - Operating System Problems – Hardware Issues – Printer Issues - Error Messages.
Networking	
6	**Components of the Computer Network: -** Familiarization with various Network devices, Connectors and Cables - Understanding the Layout of network - **Crimping & Punching -** Crimping practice with straight and cross CAT 5 cables - Punching practice in IO Box and patch panel - Crimping and making cables - **Cabling -** Create cabling in a lab with

	HUB/Switch and IO Boxes and patch panel. Fitting Switch Rack
7	**Installing & configure a Network -** Installing & Configuring a Peer-to-Peer - Network using Windows Software. - Connect computers using Bluetooth - **Configuration of Data Communication Equipment-** Connecting computers with Network with Drop cable and using Wi Fi configuration- Basic Programmable switch Configuration-Spanning Tree Protocol (STP) - Command Line Interface - IP Routing Process - Verifying Configuration.
8	**IP Addressing & TCP/IP -** IP Addressing technique(IP4/IP6) and Subnetting and Supernetting the network - Installation and Configuration of TCP/IP Protocol - Practice TCP/IP Utilities : PING, IPCONFIG, HOSTNAME, ROUTE, TRACERT etc. - **Other Network Protocols -** Working with SMTP, TELNET, FTP, HTTP, SNMP, LDAP etc. - Practice on configuring DHCP.
9	**Sharing Resource & Internet connection -** Sharing Resource and Advance Sharing Setting - Installing Proxy Server - Exposure and using Internet. Setting E-mail accounts. Conferencing - Installing and Configuring Internet - Connection on a PC using Broadband or Dongle - **Network Protection and troubleshooting -** Setting up basic protection using public keys and MAC address filters. Integrate wired with wireless network. Power over Ethernet (PoE). Troubleshooting wired and wireless network.
10	**Control & Monitoring of Network Devices -** Setting up of basic collaboration tool like NetMeeting for activities like chat, application sharing, remote desktop access and control, VoIP. Setup, IP camera for basic surveillance scenario, logging and monitoring of devices / locations - Use Linux Network Tools to check / maintain / Manage Network – **Installing and Configuring Windows Server -** Configure services like Active Directory, DNS and DHCP. Configuration of broadband modem and sharing internet connection.

2. B. Topics for Self Study

S. No	Topics	Web Links
1	Networking Commands	https://whirlpool.net.au/wiki/windows_nw_diag_cmds
2	DHCP	https://www.geeksforgeeks.org/dynamic-host-configuration-protocol-dhcp/
3	Assign IP address to PC	https://www.howtogeek.com/howto/19249/how-to-assign-a-static-ip-address-in-xp-vista-or-windows-7/
4	Subnetting, Masking Class address	https://www.softwaretestinghelp.com/subnet-mask-and-network-classes/

3.. SPECIFIC LEARNING OUTCOMES (SLO)

Ex.No.	Lab Exercises	Learning Outcomes	Hieghest Blooms Taxonomy Level of Transaction
1	Identifying computer components	● Categorize the types of computers. ● Distinguish types of operating system ● List computer hardware ● Examine components of computer like	

		peripheral devices, memory devices, cables etc. (K4)	K3
2	Assembling a PC	● Identify the components of CPU. ● Organize the components in appropriate position. ● Experiment with assembled devices. (K3)	
3	Partitioning hard disk and installing windows OS	● Decide the partition required. ● Select drive to install OS. ● Interpret installation steps. ● Evaluate the performance of installed OS. (K5)	K4
4	Installing Linux Operating System	● Identify the purpose of Linux OS. ● Apply partition of memory space in hard disk. ● Build required directories and follow the installation procedure. (K3)	
5	Troubleshooting	● Examine hardware issues like printer error, error message. ● Examine OS related problem like BIOS, booting, display problem. (K3)	K5
6	Identify network components	● Make use of internetworking devices. ● Experiment with network commands. ● Construct network through hardware devices. (K3)	
7	Preparation of straight connected network cable	● Make up straight cable to connect computers. ● Design the cable with specifications. ● Test the cable with connections. (K6)	K6
8	Preparation of cross connected network cable	● Make up cross cable to connect computers. ● Construct the cable with mnemonics. ● Test the cable with connections. (K6)	
9	Static Routing	● Create a topology with required hardware. ● Adapt IP address for devices. ● Construct static network with router. ● Test the routing through commands. (K5)	
10	Default Routing	● Create a topology with required hardware. ● Adapt IP address for devices. ● Construct a network with default IP address through routers. ● Test the routing through commands. (K5)	

11	Dynamic Routing	● Create a topology with required hardware. ● Adapt IP address for devices. ● Construct a network with DHCP. ● Test the routing through commands. (K5)	K5
12	Network address Translation	● Create a topology with required hardware. ● Adapt IP address for devices. ● Construct a network with subnet mask and default gateway. ● Test the IP address with ping command. (K6)	
13	Point to Point authentication protocol	● Create a topology with required hardware. ● Adapt IP address for devices. ● Construct a network with interface and PAP protocol. ● Test the connections using ping commands. (K6)	K6

MAPPING SCHEME FOR THE PO, PSOS AND COS

U21IT2P4	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	L	L	L	M	L	L	L	L	H	L	L	L
CO2	L	H	L	M	L	M	L	L	L	H	L	L	L
CO3	L	H	L	H	M	L	L	L	L	L	L	H	L
CO4	M	L	M	/L	H	L	M	L	L	L	L	H	L
CO5	L	M	L	H	L	L	L	L	M	L	H	L	L
CO6	L	H	L	M	M	L	L	L	L	L	L	L	M

L-Low   **M-Moderate**   **H- High**

COURSE ASSESSMENT

METHODS DIRECT:

1.   Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2.   Cooperative Learning Report, Group Presentation, Group Discussion, Project Report, Field Visit Report, Quiz (written).
3.   Pre-Semester & End Semester Theory Examination

INDIRECT:

      1. Course end survey (Feedback)

.NET PROGRAMMING

SEMESTER: III   **COURSE CODE: U21IT305**
CREDITS: 3   **HOURS/WEEK: 3**

1.COURSE OUTCOMES:
After the successful completion of this course, the student will be able to

CO. No.	1.COURSE OUTCOMES	Level	Unit
CO1	Define the concepts and features of HTML	K1	I
CO2	Demonstrate the .NET framework, C# language and Visual Studio	K2	II
CO3	Compare web application and windows application and their controls	K3	III
CO4	Categorize the deployment of ASP.NET Application	K4	IV
CO5	Determine the validation controls, Rich controls and Navigation	K5	IV
CO6	Develop an ADO.NET data application and web service	K6	V

2. A. SYLLABUS

UNIT I: History of HTML   **(9 Hours)**
History of HTML – Anchor Tag – Hyperlinks – Head and Body Sections –Designing the Body Section : Heading Printing – Aligning the Headings – Horizontal Rule – Paragraph – Tab Settings – Images and Pictures Ordered and Unordered Lists – Nested Lists – Table Handling : Tables– Cells Spanning Multiple Rows / Columns – Coloring Cells – DHTML and Style Sheets : - Defining Styles – Elements of Styles – Linking of Style Sheet to a HTML Document – Inline Styles – External Style Sheets – Internal Style Sheets – Multiple Styles – Frames : Frameset Definition – Nested Framesets – Web Page Design Project: Frameset Definition – Forms

UNIT II: The Evolution of Web Development   **(9 Hours)**
The Evolution of Web Development – The .NET Framework – The C# Language : The .NET Languages - C# Language Basics – Variables and Data Types – Variable Operations – Object-Based Manipulation – Conditional Logic – Loops – Methods – Types, Objects, and Namespaces : Building a Basic Class – Value Types and Reference Types – Understanding Namespaces and Assemblies – Advanced Class Programming – Visual Studio: Creating Websites – Designing a Web Page – The Anatomy of a Web Form – Writing COURSE CODE – Visual Studio Debugging.

UNIT III: The Anatomy of an ASP.NET Application   **(9 Hours)**
The Anatomy of an ASP.NET Application – Introducing Server Controls – Application Events –ASP.NET Configuration –Web Controls: Stepping Up to Web Controls – Web Control Classes – List Controls – Table Controls – Web Control Events and AutoPostBack – A Simple Web Page – State Management: View State – Cookies – Session State – Error Handling, Logging, and Tracing: Exception Handling – Throwing Your Own Exceptions – Error Pages – Page Tracing

UNIT IV: Internet Information Services (IIS)   **(9 Hours)**
Internet Information Services (IIS) – Managing Websites with IIS Manager – Deploying a Simple Site – Validation: – Understanding Validation – The Validation Controls – Rich Controls:- The Calendar – The AdRotator – Styles, Themes, and Master Pages – Website Navigation:– Site Maps – The TrueView Control – The Menu Control

UNIT V: Understanding Data Management   **(9 Hours)**

Understanding Data Management – Configuring Your Database – SQL Basics – ADO.NET Basics – Direct Data Access – Disconnected Data Access – Data Binding:– Single-Value Data Binding – Repeated-Value Data Binding – Data Source Controls – The Data Controls:– The GridView – The Details View and Form View – XML

2.B. Topics for Self Study:

S.No.	Topics	Web Links
1	HTML5	https://www.tutorialspoint.com/html5/index.htm
2	CSS 3	https://www.tutorialspoint.com/css/css3_tutorial.htm
3	ASP.NET Web Apps	https://dotnet.microsoft.com/apps/aspnet/web-apps
4	Learn ASP.NET	https://dotnet.microsoft.com/learn/aspnet

2.C. Text Book(s):

1.   Xavier C., **"World Wide Web Design with HTML"**, TMH Publishing Company, New Delhi, 2006.
2.   Matthew Mac Donald, **"Beginning ASP.NET 3.5 in C# 2008-From Novice to Professional"**, 2nd Edition, 2007.

2.D. Reference Books:

1.   Matt J. Crouch **"ASP.NET and VB.NET Web Programming"**, Pearson Education. 2010.
2.   Matthew Mac Donald, **"ASP.NET:-The Complete Reference"**, TMH, New Delhi, 2002

2.E. Web Links:

1.   https://www.tutorialspoint.com/asp.net/index.htm
2.   https://www.dotnetcurry.com/aspnet-core/1501/web-development-in-dotnet
3.   https://www.youtube.com/watch?v=3AYoipyqOkQ&list=PL6n9fhu94yhXQS_p1i-HLIftB9Y7Vnxlo

3.SPECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
1	**Introduction to HTML :**		
1.1	History of HTML – Anchor Tag – Hyperlinks	● Tell the introduction to HTML ● Recall the History of HTML ● Define Anchor Tags and create Hyperlinks	K1
Head and Body Sections, Designing the Body Section			
1.2	Heading Printing – Aligning the Headings – Horizontal Rule – Paragraph – Tab Settings – Images and Pictures	● Recall the basic tags for aligning using heading tags ● Tell how to create a paragraph in web page with settings	K1

		● How to insert images and pictures	
Ordered and Unordered Lists			
1.3	Ordered and Unordered Lists – Nested Lists	● How to create Ordered and Unordered lists ● Recall Nested Lists	K1
Table Handling			
1.4	Tables– Cells Spanning Multiple Rows / Columns – Coloring Cells	● Recall the concept of table handling ● Tell how to span rows and columns ● How to apply color in table	K1
DHTML and Style Sheets			
1.5	Defining Styles – Elements of Styles – Linking of Style Sheet to a HTML Document – Inline Styles – External Style Sheets – Internal Style Sheets – Multiple Styles	● Tell the new features in DHTML and style sheet ● Recall the concepts of Internal and External Style sheets ● How to create and link multiple styles	K1
Frames			
1.6	Frameset Definition – Nested Framesets	● How frames works in HTML to display multiple pages ● Recall the concept of Nested frames	K1
Web Page Design Project			
1.7	Frameset Definition – **Forms**	● Recall the form design and controls in HTML	K1
The .NET Framework			
2.1	The Evolution of Web Development – The .NET Framework	● Explain the .NET framework and how it is useful in the evolution of web development	K2
The C# Language			
2.2	The .NET Languages - C# Language Basics – Variables and Data Types – Variable Operations – Object-Based Manipulation – Conditional Logic – Loops – Methods	● Demonstrate C# language with OOPS ● Interpret the basics of C# ● Illustrate the conditional logic and Looping	K2
Types, Objects, and Namespaces			
2.3	Building a Basic Class – Value Types and Reference Types – Understanding Namespaces and Assemblies – Advanced Class	● Illustrate the concepts of Namespace and class ● Explain value and reference types in class	K2

	Programming	● Extend advance class programming using C#	
Visual Studio			
2.4	Creating Websites – Designing a Web Page – The Anatomy of a Web Form – Writing COURSE CODE – Visual Studio Debugging	● Demonstrate the IDE visual studio ● Construct a web page using visual studio ● Explain the anatomy of web form	K2
Web Form Fundamentals			
3.1	The Anatomy of an ASP.NET Application – Introducing Server Controls – Application Events – ASP.NET Configuration	● Identify the web form fundamentals ● Make use of Server controls ● Organize application events and configurations	K3
Web Controls			
3.2	Stepping Up to Web Controls – Web Control Classes – List Controls – Table Controls – Web Control Events and AutoPostBack – A Simple Web Page	● Identify the web controls available in ASP.NET ● Make use of Web control events and AutoPostBack ● Develop a simple web page	K3
State Management			
3.3	View State – Cookies – Session State	● Identify the state management concepts using Cookies and session state	K3
Error Handling, Logging, and Tracing			
3.4	Exception Handling – Throwing Your Own Exceptions – Error Pages – Page Tracing	● Identify how to handle exception ● Make use of your own exception ● Organize the error pages and Page tracing	K3
Deploying ASP.NET Applications			
4.1	Internet Information Services (IIS) – Managing Websites with IIS Manager – Deploying a Simple Site	● Discover Internet information Services ● Inspect websites with IIS ● Discover a simple site	K4
Validation			
4.2	Understanding Validation – The Validation Controls	● Explain validation controls ● Choose appropriate validation Controls	K5
Rich Controls			
4.3	The Calendar – The AdRotator – Styles, Themes, and Master Pages	● Determine Rich controls available in ASP.NET ● Explain styles themes and master pages	K5

Website Navigation			
4.4	Site Maps – The TreeView Control – The Menu Control	● Explain how navigation works in asp and discuss the menu control	K5
ADO.NET Fundamentals			
5.1	Understanding Data Management – Configuring Your Database – SQL Basics – ADO.NET Basics – Direct Data Access – Disconnected Data Access	● Construct data management using ADO.NET ● Create Database ● Elaborate how to access the data and how the Disconnected architecture works	K6
Data Binding			
5.2	Single-Value Data Binding – Repeated-Value Data Binding – Data Source Controls	● Elaborate how to Bind data with controls and application views ● Design a data source control to access data from database	K6
The Data Controls			
5.3	The GridView – The DetailsView and FormView – XML	● Discuss the Gridview control to project the data from table ● Elaborate the DetailsView to list the data from database ● Develop a XML based web service to pass data between applications	K6

4. MAPPING (CO, PO, PSO)

U21IT305	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	M	M	H	M	L	M	H	H	M	L
CO2	H	H	H	M	M	H	M	L	M	H	M	M	L
CO3	M	M	M	H	H	H	M	L	M	H	H	M	M
CO4	M	M	M	H	H	H	M	L	M	M	M	M	L
CO5	L	L	M	M	M	M	M	L	H	M	H	H	M
CO6	M	L	L	L	L	L	M	L	H	M	M	M	H

L – Low   **M** – Moderate   **H** – High

5. COURSE ASSESSMENT
METHODS DIRECT:
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Field Visit Report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

INDIRECT:
1. Course end survey (Feedback)

DATA STRUCTURES AND ALGORITHMS

SEMESTER: III   **COURSE CODE: U21IT306**
CREDITS: 3   **HOURS/WEEK: 3**

1.COURSE OUTCOMES:

After the successful completion of this course, the student will be able to

CO. No.	Course Outcomes	Level	Unit
CO1	Recall the linear representation of data structures.	K1	I
CO2	Illustrate Non-linear representation of organization of data.	K2	I
CO3	Identify the graph representation of data.	K3	II
CO4	Examine the best and worst cases of searching and sorting techniques.	K4	III
CO5	Determine the greedy method to find the optimal solution.	K5	IV
CO6	Adapt backtracking in a greedy method for finding a solution.	K6	V

2. A. SYLLABUS

UNIT I: Arrays and Sequential Representations   9 Hours

Arrays and Sequential Representations – Ordered Lists – Stacks and Queues – Evaluation of Expressions – Multiple stacks and queues – Singly Linked Lists – Linked Stacks and Queues – Polynomial Addition – Doubly Linked Lists.

UNIT II: Trees   9 Hours

Trees – Binary tree representations – Tree traversal – Threaded binary trees – Binary tree representation of trees – Set representations – decision trees – Game Trees and counting Binary Trees – Graphs and Representations – Traversals. – Activity Networks – Topological sort.

UNIT III: Algorithms   9 Hours

Algorithms – Conventions – Writing Structured programs – Analyzing algorithms – Sorting – Heap sort – Binary Search – Finding the maximum and minimum – Merge sort – Quick sort – Selection Problem.

UNIT IV: Greedy Method   9 Hours

Greedy Method: The general method – Optimal storage on tapes – Knapsack problem – Job sequencing with deadlines – Optimal merge patterns – Minimum spanning trees – Single source shortest paths.

UNIT V: Backtracking   9 Hours

Backtracking: The General method – 8-Queen's problem – Sum of subsets – Graph coloring – Hamiltonian cycles – Knapsack problem.

2.B. Topics for Self-Study:

S.No.	Topics	Web Links
1	Branch and bound algorithms	https://www.geeksforgeeks.org/branch-and-bound-algorithm/
2	Dynamic Programming	https://www.tutorialspoint.com/data_structures_algorithms/dynamic_programming.htm
3	Red-Black tree	https://www.cs.auckland.ac.nz/software/AlgAnim/red_black.html
4	B tree and B+ tree	https://www.youtube.com/watch?v=jDM6_TnYIqE
5	AVL tree	https://www.tutorialspoint.com/data_structures_algorithms/avl_tree_algorithm.htm

2.C. Text Book(s):

1.   Ellis Horowitz and Sartaj Sahni, **"Fundamentals of Data Structures"**, Galgotia Publications., Delhi, Reprint 2001.

2.   Ellis Horowitz and Sartaj Sahni, **"Fundamentals of Computer Algorithms"**, Galgotia Publications., Delhi, Reprint 2001.

2.D. Reference Books:

1.   Seymour Lipschutz, "Data Structure", Schaum's Outline, Tata McGrawHill Education Pvt. Ltd., 2005.
2.   Samanta D., "Fundamentals of Data Structures for Students", Shroff Publishers and Distributers. Pvt. Ltd., Mumbai, 2015.
3.   Alfred V. Aho, John E. Hopcroft, Jeffry D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 2002.

2.E. Web Links:

1.   https://www.coursera.org/specializations/data-structures-algorithms
2.   https://sites.google.com/site/cse220datastructurevit/home/books
3.   https://www.techiedelight.com/best-online-courses-data-structures-algorithms/
4.   https://dzone.com/articles/algorithms-amp-data-structures-for-web-developers

3.SPECIFIC LEARNING OUTCOMES(SLO)

Unit/ Section	Course Contents	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Arrays, Stack, Queues and Linked List**		

1.1	Arrays, Stack, Queues and Linked List: Arrays and Sequential Representations – Ordered Lists – Stacks and Queues – Evaluation of Expressions.	Recall the dimension of Arrays(K1)	
		What are the operations of an ordered list?(K1)	
		Demonstrate the push and pop operations of stack.(K2)	
		Utilize Queue for INSERT and DELETE element in data structure(K3)	
		Construct post fix expression from infix.(K3)	K1
1.2	Multiple stacks and queues: Multiple stacks and queues – Singly Linked Lists – Linked Stacks and Queues – Polynomial Addition – Doubly Linked Lists.	What are the advantages of multiple stacks and queues?(K1)	
		Illustrate the operations of the linked list.(K2)	
		Outline the benefits of linked stacks and queues.(K2)	
		Demonstrate the linked list for adding two polynomials(K2)	
		Distinguish between singly linked list and doubly linked list.(K3)	
II	**Tree Representations and Tree traversals**		
2.1	Tree Representations and Tree traversals: Trees – Binary tree representations – Tree traversal – Threaded binary trees – Binary tree representation of trees – Set representations – decision trees – Game Trees and counting Binary Trees.	Label the terms used in tree.(K1)	
		Show how items are represented in binary tree(K2)	
		Illustrate the tree traversals(K2)	
		Distinguish between binary and threaded binary tree.(K4)	
		Explain the working of the decision tree.(K5)	K2
		Demonstrate the game tree with example.(K2)	
2.1	Graph Representations: Graphs and Representations – Traversals. – Activity Networks – Topological sort	What are the various representations of graphs?(K1)	
		Demonstrate DFS and BFS(K2)	
		Recall the importance of Activity networks.(K1)	
		Identify the working of topological sort.(K3)	
III	**Algorithms**		
3.1	Algorithms: Algorithms – Conventions – Writing Structured programs – Analyzing algorithms	Define Algorithm.(K1)	
		Recall the algorithm conventions.(K1)	

			Outline how to write structured programming.(K2)	
			Analyze the performance of algorithms.(K4)	
3.2	Sorting and searching: Sorting – Heap sort – Binary Search – Finding the maximum and minimum – Merge sort – Quick sort – Selection Problem.		What are the advantages of sorting?(K1)	K3
			Explain the working of heap sort.(K2)	
			Outline the benefits of Binary search.(K2)	
			Identify the technique for finding maximum and minimum.(K3)	
			Apply merge sort for sorting list with more elements.(K3)	
			Organize the elements using Quick sort.(K3)	
			Examine selection problem.(K4)	
IV	**Greedy Method**			
4.1	Greedy Method: The general method – Optimal storage on tapes – Knapsack problem – Job sequencing with deadlines – Optimal merge patterns – Minimum spanning trees – Single source.		What is a greedy method?(K1)	K4
			Demonstrate Optimal storage on tapes using greedy method.(K2)	
			Apply a greedy approach in the Knapsack problem.(K3)	
			Build optimal solutions with Job sequencing with deadlines.(K3)	
			Examine optimal merge patterns.(K4)	
			Recommend technique for minimum cost spanning tree.(K5)	
			Explain single source shortest path.(K5)	
V	**Backtracking**			
5.1	Backtracking: The General method – 8-Queen's problem – Sum of subsets – Graph colouring – Hamiltonian cycles – Knapsack problem.		Recall general methods of backtracking.(K1)	K6
			Solve 8 queen's problems with backtracking.(K6)	
			Apply a backtracking method to find sum of subset.(K3)	
			Adapt backtracking to color the graph.(K6)	
			Explain the working of the Hamiltonian cycle.(K5)	

4.MAPPING (PO, PSOS AND COS)L-Low   M-Moderate   H- High

U21IT306	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	H	L	M	L	L	M	H	M	M	L
CO2	H	H	H	M	M	M	L	L	L	H	M	M	L
CO3	H	H	H	M	M	M	L	L	L	H	M	M	L
CO4	M	H	M	L	L	L	L	L	M	H	M	M	L
CO5	L	H	L	H	L	H	H	H	H	H	M	M	L
CO6	L	M	M	H	L	M	L	L	M	H	M	M	L

5. COURSE ASSESSMENT

METHODS DIRECT*:*

1.   Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2.   Open Book Test.
3.   Assignment,Seminar, Quiz (written).
4.   Pre-Semester & End Semester Theory Examination

INDIRECT:

1.   Course end survey (Feedback)

DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION

SEMESTER: III   **COURSE CODE: U21IT307**
CREDITS: 4   **HOURS/WEEK: 4**
Objectives:
- *To understand the building blocks of a Computer System and to become familiar with the concepts and techniques involved in Computer Organization*

UNIT I: Digital Principles   **(12 HOURS)**
Digital Principles: - Definition for Digital Signals – Digital Logic – **Number Systems and COURSE CODE s:** – Binary Number System – Binary-to-Decimal Conversion – Decimal-to-Binary Conversion – Octal Numbers – Hexadecimal Numbers – ASCII COURSE CODE – Excess-3 COURSE CODE – Gray COURSE CODE - **Digital Logic:** -Logic Gates – Universal Logic Gates – AND-OR-Invert Gates – Positive and Negative Logic. - **Combinational Logic Circuits:** - Boolean Laws and Theorems – SOP Method – Karnaugh Map – Pairs, Quads, Octets – Karnaugh Simplification – Don't Care Conditions – POS Method & Simplification – **Data Processing Circuits:** - Multiplexers – Demultiplexers – 1 of 16 DeCOURSE CODE r – BCD to Decimal DeCOURSE CODE r – EnCOURSE CODE r.

UNIT II: Arithmetic Circuits: **(12 HOURS)**
Arithmetic Circuits: - Binary Addition – Binary Subtraction – Unsigned Binary Numbers – Sign Magnitude Numbers – 2's Complement Representation – 2's Complement Arithmetic – Arithmetic Building Blocks – The Adder-Subtractor – **Flip Flops: -** RS Flip Flops – Edge Triggered RS Flip Flop – D Flip Flop – JK Flip Flop –Master Slave Flip Flop - **Registers:** - Types of Registers – Serial In Serial Out – Serial In Parallel Out – Parallel in Serial Out – Parallel In Parallel Out – Universal Shift Register – Applications of Shift Registers – **Counters:** Asynchronous Counter –Synchronous Counters – Changing the Counter Modulus – Decade Counters– Presettable Counters.

UNIT III: Basic Computer Organization and Design   **(12 HOURS)**
Basic Computer Organization and Design: - Instruction COURSE CODE s – Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle – Memory Reference Instructions – Input, Output and Interrupts – Complete Computer Description – Design of Accumulator Logic. - **Central Processing Unit:** - General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulations – Program Control – RISC.

UNIT IV: Input – Output Organization   **(12 HOURS)**
Input – Output Organization: - Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer – Modes of Transfer – Priority Interrupts –Direct Memory Access – I/O Processor – Serial Communication.

UNIT V: Memory Organization   **(12 HOURS)**
Memory Organization: – Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory – Memory Management Hardware.

TEXT BOOKS
1.   Donald P Leach, Albert Paul Malvino, Goutam Saha, **"Digital Principles and Applications"**, 7th Edition, TMH Publications, Delhi, 2011.
2.   Morris Mano. M. **"Computer System Architecture"**, 3rd Edition, Pearsons Education, 2005.

PERSONAL EFFECTIVENESS

SEMESTER: III   **COURSE CODE: U21IT308**
CREDITS: 2   **HOURS/WEEK: 2**
1.COURSE OUTCOMES

After the successful completion of this course, the student will be able to

CO. No.	1.COURSE OUTCOMES	Level	Unit
CO1	Relate the role of Paradigms and Principles in personal effectiveness	K2	I
CO2	Make use of proactivity and planning to achieve Private Victory	K3	I
CO3	Utilize the habit of prioritizing to attain Private Victory	K3	II
CO4	Develop Win-Win and Empathetic attitudes to achieve Public Victory	K6	III
CO5	Improve the habit of Synergizing to realize Public Victory	K6	IV
CO6	Build effectiveness by Sharpening and Renewing all the seven habits	K6	V

2. A. SYLLABUS

UNIT I: Paradigms and Principles   **(6 HOURS)**
 Inside-out – The Seven Habits – An Overview.
Private Victory (Independence) :
1.   Being Proactive in roles and relationships in life.
2.   Beginning with the End in Mind

UNIT II: Private Victory (Independence)   **(6 HOURS)**
3.   Putting First Things First

UNIT III: Public Victory (Interdependence)   **(6 HOURS)**
4.   Think Win-Win: Genuine feelings for mutually beneficial solutions or agreements in relationships.
5.   Seek First to Understand, then to be understood - Use empathic listening to be genuinely influenced by a person, who compels them to reciprocate the listening and take an open mind to being influenced by you.

UNIT IV: Public Victory (Interdependence)   **(6 HOURS)**
6   Synergize - Combine the strengths of people through positive teamwork, so as to achieve goals that no one could have done alone.

UNIT V: Continuous Improvements   **(6 HOURS)**
7. Sharpen the Saw - Balance and renew your resources, energy, and health to create a sustainable, long-term, effective lifestyle. lt primarily emphasizes exercise for physical renewal, prayer(meditation, yoga, etc.) and good reading for mental renewal. It also mentions service to society for spiritual renewal.

2.B. Topics for Self Study:

S. No.	Topics	Web Links
1	Principle Centered Leadership	http://www.franklincoveysouthasia.com
2	First Things First	https://www.youtube.com/watch?v=5bg2pOMsQIk
3	Daily Reflections for Highly Effective	http://www.franklincoveysouthasia.com

	People		
4	The Power Principle	http://www.franklincoveysouthasia.com	
5	From Effectiveness to Greatness	http://www.franklincoveysouthasia.com	

2.C.TEXT BOOK
1. R. Stephen Covey, **"Seven Habits of Highly Effective People"**, Simon and Schuster Inc., 1989, reprint 2013.

2.D. REFERENCE BOOK:
1. Sean Covey, "Seven Habits of Highly Effective Teens",

2.E. Web Links:
1. http://www.franklincoveysouthasia.com
2. https://www.virtual-college.co.uk/resources/what-is-personal-effectiveness
3. https://cdlinsight.co.nz/blog/personal-effectiveness-10-traits/
4. http://www.leadersdirect.com/personal-effectiveness

3.SPECIFIC LEARNING OUTCOMES (SLO)

Unit / Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Paradigms and Principles**		
1.1	Paradigms and Principles: Inside Out	Illustrate the Paradigms and Principles essential for Personal Effectiveness(K2)	
1.2	Overview of the Seven Habits of effectiveness	Explain the aspects of the Seven Habits of Effectiveness(K2)	
1.4	**Private Victory (Independence):** Being Proactive: Principles of Personal Vision	Develop the habit of being Proactive to achieve Personal Goals and Visions(K3)	K3
1.5	Beginning with the End in Mind: Principles of Personal Leadership	Select course of actions that leads to the intended results by exhibiting Personal Leadership.(K3)	
II	**Private Victory (Independence)**		
2.1	**Private Victory (Independence):** Putting First Things First: Principles of Personal Management	Demonstrate the skill of prioritizing by adopting the skills of Personal Management(K3)	K3
III	**Public Victory (Inter-dependence)**		
3.1	**Public Victory (Inter-dependence):** Think Win-Win	Develop approaches and practices that directs toward the mutual benefits of everyone related in attaining the goals.(K6)	K6
3.2	Seek First to Understand, then	Formulate attitudes and methods to realize the	

	to be understood: Principle of Empathetic Communication	benefit of all through Empathetic Approach and Communication.(K6)	
IV	**Public Victory (Inter-dependence)**		
4.1	**Public Victory (Inter-dependence):** Synergize: Principle of Creative Cooperation	Combine the efforts of all who are related in achieving the goals through creative cooperation.(K6)	K6
V	**Continuous Improvements**		
5.1	**Continuous Improvements :** Sharpen the Saw : Principles of Balanced Self Renewal	Develop all the acquired skills and habits through balanced Self-Renewal(K6)	K6

4. MAPPING (CO, PO, PSO)

U19IT308	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	H	H	H	M	M	M	H	H	H	L	L	L	H
C02	M	M	M	H	H	H	H	H	H	L	L	L	H
C03	H	H	H	M	M	M	H	H	H	L	L	L	H
C04	H	H	H	H	H	H	H	H	H	L	L	L	H
C05	H	H	H	H	H	H	H	H	H	L	L	L	H
C06	M	M	M	M	M	M	H	H	H	L	L	L	H

L-Low   **M-Moderate**   **H- High**

5.COURSE ASSESMENT
METHODS DIRECT:

1.   Continuous Assessment Tests: T1, T2 (Theory & Practical Components) : Closed Book
2.   Open Book Test
3.   Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, Project Report, Field Visit Report, Poster Presentation, Seminar, Quiz (Written).
4.   Pre-Semester & End Semester Theory Examination.

INDIRECT:
1. Course End Survey (Feedback)

MATHEMATICS FOR COMPETITIVE EXAMINATIONS – I

SEMESTER: I   **COURSE CODE: U21IT309**
CREDITS: 2   **HOURS/WEEK: 2**

Objective:
- *To acquire arithmetic skills required to face competitive examinations.*

UNIT I
Numbers - HCF & LCM – Decimal Fractions – Simplification.

UNIT II
Square roots and Cube roots - Percentage – Average – Ratio and Proportion - Partnership.

UNIT III
Profit and Loss - Time and Work- Pipes and Cisterns - Time and Distance

UNIT IV
Problems on Trains – Problems on Boats and Streams - Problems on Numbers - Problems on ages.

UNIT V
Simple interest – Compound interest Area - Volume & Surface Areas.

TEXT BOOK
1.   R.S. Aggarwal, **"Objective Arithmetic"**, S. Chand & Company Ltd., New Delhi, 2003.

.NET PROGRAMMING LAB

1.COURSE OUTCOMES:

After the successful completion of this course, the students will be able to

CO. No.	1.COURSE OUTCOMES	Level	Exercise
CO1	Build web pages using basic HTML and tables	K3	1 – 3
CO2	Make use of hyperlinks, images and image maps	K3	4 – 6
CO3	Examine the concepts of Lists, frames, CSS and Forms	K4	7 – 10
CO4	Interpret the concepts to create shopping mall website, job seeker application and email registration forms with appropriate validations	K5	11 – 14
CO5	Build a database application in ASP.NET to manage and manipulate data	K5	15-19
CO6	Create web portal for college, application for Bharathidasan university and create first web service	K6	20-22

Ex. No.	Exercise
1.	Create a web page employing the Basic Tags and different Heading Styles
2.	Employ different types of Text Formatting
3.	Design a web page with Tables
4.	Create a web page with Hyperlinks
5.	Create a web page with Images
6.	Design a web page involving Image Maps
7.	Design a web page employing Lists
8.	Create a web page with Frames
9.	Design a web page employing Cascaded Style Sheets
10.	Create a Registration Form using HTML.
11.	Create a Website for Shopping Mall
12.	Design ASP.NET Web form using Web Server controls to enter job seeker's details.
13.	Create an ASP.NET Web form using web control to enter Email Registration form.
14.	Apply appropriate validation techniques in User registration form using validation controls.
15.	Write an ASP.NET application to retrieve form data and display it in table format.
16.	Create a Web application to read the data from XML format.
17.	Create a Web application using ADO.Net to (i) Insert (ii) Update (iii) Delete and (iv) Select
18.	Create an application using Data grid control to access information's form table in SQL Server.
19.	Create a login form using Mobile Control.
20.	Write an ASP.NET application to register in an on-line course of Bharathidasan University.
21.	Develop a Web Portal for our College.
22.	Display a "HELLO" message using Web Services.

Topics for Self Study

S.No.	Topics	Web Links
1	HTML5 Examples	https://www.tutorialrepublic.com/html-examples.php
2	CSS3 Examples	https://www.tutorialrepublic.com/css-examples.php
3	ASP.NET Web Pages	https://www.w3schools.com/ASp/webpages_examples.asp

SPECIFIC LEARNING OUTCOMES (SLO)

Ex. No.	Lab Exercises	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
1	**Create a web page employing the Basic Tags and different Heading Styles**	● Build a web page to structure the web using different heading style tags ● Identify the output in the browser	K3
2	**Employ different types of Text Formatting**	● Build a web page to format the text in a web page ● Identify the output in the browser	K3
3	**Design a web page with Tables**	● Build a web page with Table and span according to your requirement ● Identify the output in the browser	K3
4	**Create a web page with Hyperlinks**	● Build many web pages and use hyperlinks to navigate between them ● Identify the output in the browser	K3
5	**Create a web page with Images**	● Build a web page with images and align them in proper order ● Identify the output in the browser	K3
6	**Design a web page involving Image Maps**	● Build a web page with Images and map with the selected area to make it a clickable link to navigate ● Identify the output in the browser	K3
7	**Design a web page employing Lists**	● Examine the concept of ordered and unordered lists in HTML by creating a web page ● Inspect the output in the browser	K4
8	**Create a web page with Frames**	● Examine the concept of frames in HTML to view multiple pages by creating web pages ● Inspect the output in the browser	K4
9	**Design a web page employing Cascaded Style Sheets**	● Examine the concept of Style sheet using CSS and apply those in HTML web page ● Inspect the output in the browser	K4

10	Create a Registration Form using HTML.	● Examine the concepts of form controls in HTML by creating a registration form ● Inspect the output in the browser	K4
11	Create a Website for Shopping Mall	● Determine all the concepts of HTML and create a shopping mall website ● Interpret all the available tags ● Evaluate the output in the browser	K5
12	Design ASP.NET Web form using Web Server controls to enter job seeker's details.	● Explain the web server controls available in the ASP.NET Web form and create a job seeker's details website ● Evaluate the output in the browser	K5
13	Create an ASP.NET Web form using web control to enter Email Registration form.	● Determine the necessary web controls to create an email registration form using ASP.NET Web form ● Evaluate the output in the browser	K5
14	Apply appropriate validation techniques in User registration form using validation controls.	● Importance of validation is to get valid data input ● Explain the use of validation controls available in ASP.NET by applying it in a user registration form ● Evaluate the output in the browser	K5
15	Write an ASP.NET application to retrieve form data and display it in table format.	● Explain the concept of event handling in ASP.NET ● Importance of form data is explained by creating a web application ● Evaluate the output in the browser in a table format	K5
16	Create a Web application to read the data from XML format.	● Explain the use of XML and how data is formatted in XML ● Determine the connections and readers to access the data from XML ● Evaluate the output in the browser using controls	K5
17	Create a Web application using ADO.Net to (i) Insert (ii) Update (iii) Delete and (iv) Select	● Explain SQL Server database ● Determine the operations of ADO.NET to create connection to database securely ● Asses the data manipulation done from database ● Evaluate the output in the browser	K5
18	Create an application using Data grid control to access information's form table in SQL Server.	● Explain all the data controls available in ASP.NET ● Determine the GridView control to display the data from database ● Evaluate the output in the browser	K5

19	**Create a login form using Mobile Control.**	● Explain all the controls for mobile device available in ASP.NET ● Create a login form using Mobile control ● Evaluate the output in the emulated mobile from IDE	K5
20	**Write an ASP.NET application to register in an on-line course of Bharathidasan University.**	● Develop an application for registering online course at Bharathidasan University ● Plan the controls and validations to use ● Create the events based on the designed controls ● Test the working of application	K6
21	**Develop a Web Portal for our College.**	● Develop a portal for BHC with necessary web pages and navigate between them ● Test the application forms with proper validations and working of portal	K6
22	**Display a "HELLO" message using Web Services**	● Build a basic web service to be consumed by other languages ● Test the functions GET and POST ● Elaborate the basic web service that distribute the sample data	K6

MAPPING (CO, PO, PSO)

U21IT3P5	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	H	L	H	M	L	M	H	H	M	M
CO2	H	H	H	H	L	H	M	L	M	H	H	M	M
CO3	H	H	H	H	L	H	M	L	M	H	H	M	M
CO4	H	H	H	H	L	H	M	L	M	H	H	M	M
CO5	H	H	H	H	L	H	M	L	M	H	H	M	M
CO6	H	H	H	H	L	H	M	L	M	H	H	M	M

L – Low   **M** – Moderate   **H** – High

5. COURSE ASSESSMENT
METHODS DIRECT:

1.   Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2.   Cooperative Learning Report, Assignment, Group Discussion, project Report, Field Visit Report, Seminar.
3.   Pre/Post Test, Viva, Report for each Exercise.
4.   Lab Model Examination & End Semester Practical Examination

INDIRECT:
1.   Course end survey (Feedback)

DATA STRUCTURES AND ALGORITHMS LAB

SEMESTER: III   **COURSE CODE: U21IT3P6**
CREDITS: 4   **HOURS/WEEK: 4**

1.COURSE OUTCOMES:

After the successful completion of this course, the student will be able to

CO. No.	Course Outcomes	Level	Exercise
CO1	Identify the linear representation of data structures using arrays.	K3	1,2
CO2	Examine the various applications of stacks and queues.	K4	3,4
CO3	Apply the concepts of linked lists.	K3	5-8
CO4	Determine best and worst case of various sorting and searching algorithms.	K5	9-14
CO5	Recommend greedy methods to find optimal solutions.	K5	15
CO6	Adapt backtracking in a greedy method for finding a solution.	K6	16,17

2.Topics for Self-Study:

S.No.	Topics	Web Links
1	Create a program or dynamic implementation over static implementation of stack.	https://www.sanfoundry.com/c-program-implement-stack-operations/
2	Develop a program to implement circular queue.	https://www.edureka.co/blog/circular-queue-in-c/
3	Write a program to perform operations on BST.	https://www.sanfoundry.com/c-program-construct-binary-search-tree/
4	Solve applications using dynamic programming.	https://www.includehelp.com/algorithms/dynamic-programming-components-applications-and-elements.aspx

3.SPECIFIC LEARNING OUTCOMES (SLO):

Ex.No.	Lab Exercises	Learning Outcomes	Blooms Taxonomy Level of Transaction
1	Data representation using Single Dimension Array	Create an array and perform INSERT, DELETE, SEARCH, MERGE and DISPLAY operations.	K3
2	Organizing data items using a multidimensional array.	Create a multidimensional array and perform basic operations and oraganize elements.	K3
3	Perform INSERT and DELETE operations using Queues.	Create a program to INSERT and DELETE data element using First in First Out (FIFO)	K4
4	Perform PUSH and POP operation using Stack.	Develop a program to PUSH and POP data items using Last in First Out (LIFO)	K4
5	Implement Singly linked list	Create a node using a singly linked list and perform operations.	K3

6	Implement Doubly Linked Lists.	Create a node using a doubly linked list and perform various operations.	K3
7	Program to implement Tree Traversals.	Develop a program to implement Breadth first and Depth first search in tree.	K3
8	Perform Heap Sort	Create a program to sort the given data elements using heap sort.	K3
9	Perform Quick Sort.	Create a program to sort the given data elements using heap sort.	K5
10	Perform Merge Sort.	Perform Merge sort for the given list of data items.	K5
11	Perform Bubble Sort	Create a program to sort the given list using bubble sort.	K5
12	Perform Selection Sort	Perform Selection sort for the given list of data items.	K5
13	Perform Linear search.	Search the number in the given list using linear search.	K5
14	Perform Binary search.	Divide the list into two and search the given number using binary search.	K5
15	Implement Knapsack Algorithm	Implement Knapsack Algorithm using greedy methods.	K5
16	Implement the Spanning Tree Algorithm	Create a greedy method to find if the given tree is spanning tree or not.	K6
17	Implement the Single Source Shortest Path Algorithm	Develop a program to implement backtracking for finding single source shortest path.	K6

4. MAPPING (CO, PO, PSO)

U21IT3P6	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	H	L	M	L	L	M	H	M	M	L
CO2	H	H	H	M	M	M	L	L	L	H	M	M	L
CO3	H	H	H	M	M	M	L	L	L	H	M	M	L
CO4	M	H	M	H	L	L	L	L	M	H	M	M	L
CO5	L	H	L	H	L	H	H	H	H	H	M	M	L
CO6	L	M	H	H	L	M	L	L	M	H	M	M	L

L-Low   **M-Moderate**   **H- High**

5. COURSE ASSESSMENT METHODS

DIRECT:

1.   Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2.   Pre/Post Test, Viva, Report for each Exercise.
3.   Lab Model Examination & End Semester Practical Examination

INDIRECT: Course end survey (Feedback)

OPERATING SYSTEMS

SEMESTER-IV
CREDITS :3
1.COURSE OUTCOMES:

COURSE CODE: U21IT410
HOURS/WEEK: 3

After the successful completion of this course, the student will be able to

CO. No.	1.COURSE OUTCOMES	Level	Unit
CO1	Interpret basics of Operating system, characteristics and features of modern OS like UNIX, LINUX and WINDOWS etc.	K2	I
CO2	Experiment with the requirement for process synchronization and coordination handled by Operating System.	K3	II
CO3	Examine the various CPU scheduling algorithms and analyze the characteristics of deadlock and recovery of deadlock	K4	III
CO4	Determine memory management techniques and the necessity of virtual memory.	K5	IV
CO5	Evaluate the storage management policies with respect to different storage management technologies	K5	V
CO6	Discuss file system interface, protection and security mechanisms.	K6	V

2.A. SYLLABUS

Unit I: Introduction to Operating System   (9 Hours)

Introduction to Operating System: **-** Overview of Operating System-The Evolution of Operating System-Types of Operating Systems-Functions of Operating System-Characteristics of Modern Operating System-Operating System Structure.

Unit II: Processes   (9 Hours)

Processes: Process Concept-Comparison of Process and Programs - Process States-Process Scheduling-Ready Queue vs. Device Queue-Operations on a Process-Cooperating Processes- Threads - Interprocess Communication. Process Synchronization: Racing Problem-Avoiding Racing Problem-Requirement for Critical Problem-Critical Section algorithms-OS tools for Process Synchronization-Classical Synchronization Problems-Monitors-Inter Process Communication for Message Communication.

Unit III: Deadlocks   (9 Hours)

Deadlocks: Introduction-System Model-Deadlock Characteristics-Deadlock Detection-Deadlock Prevention-Deadlock Avoidance-Deadlock Recovery-Other methods of Deadlock Recovery. - CPU Scheduling: Schedulers-Scheduling Criteria-CPU Scheduling Algorithms-Multiple Processor Scheduling-Real time Scheduling-Performance Comparison.

Unit IV: Memory Management   (9 Hours)

Memory Management: Introduction-Logical versus Physical address space-Program Relocation- Logical Organization-Physical Organization-Dynamic Loading and Dynamic Linking-Memory Allocation Techniques. - Virtual Memory: Swapping-Demand Paging-Page Fault-Page Replacement Algorithms-Thrashing-Page replacement policies-Local and Global-Demand Segmentation-OS Software factors.

Unit V : Information Management   **(9 Hours)**

Information Management: Introduction-A Simple File System-File Access Methods-Directory Structure-File Protection-I-nodes-Free Space Management Techniques-Record Blocking. - Secondary Storage Structure: Introduction-Hard Disk Structure-Hard Disk Performance Parameter-Hard Disk Scheduling Algorithms-Swap Space Management-RAID and its level-Disk Space Allocation Methods-Stable Storage Implementation.

2.B. Topics for Self Study:

S.No.	Topics	Web Links
1	Multiple-processor System	https://www.youtube.com/watch?v=3RvkfuXUv1c
2	Singularity Architecture	https://singularity.lbl.gov/about
3	Security	https://www.youtube.com/watch?v=3yLf2dNqDzw
4	System Configuration	https://www.youtube.com/watch?v=YjF-K5H8Bnc

2.C. Text Book(s):

1.   S. Rajiv Chopra, **"Operating Systems – A Practical Approach"**, 2nd Edition, S. Chand & Company Pvt. Ltd., New Delhi, 2013.

2.D. Reference Books:

1.   Abraham Silberschatz, Peter B. Galvin, Greg Gange, "Operating System Concept", 9th Edition, Wiley India Pvt. Ltd., 2015.
2.   Andrew S. Tanenbaum, Herbert Bos, "Modern Operating Systems", 4th Edition, Pearson Education, 2014.
3.   William Stallings, "Operating Systems Internal and Design Principles", Sixth Edition, Pearson's Education, 2009.

2.E. Web Links:

1.   www.tutorialspoint.com
2.   www.geeksforgeeks.org
3.   https://www.youtube.com/watch?v=mXw9ruZaxzQ
4.   https://www.youtube.com/watch?v=2i2N_Qo_FyM

3.SPECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction

I	Introduction to Operating System		
1.1	Introduction to Operating System: - Overview of Operating System-The Evolution of Operating System-Types of Operating Systems	Explain the overview of the operating system.(K2)	K2
		Interpret the evolution of the operating system.(K2)	
		Classify the types of operating system.(K2)	
1.2	Functions of Operating System-Characteristics of Modern Operating System-Operating System Structure.	Explain the functions of the Operating system.(K2)	
		Discuss the characteristics of modern operating.(K6)	
		Show the operating system structure.(K2)	
II	Processes		
2.1	Process Concept-Comparison of Process and Programs - Process States-Process Scheduling.	Construct a state transition diagram for the process.(K3)	K3
		Compare process and program.(K2)	
		Explain state transition with a neat diagram.(K5)	
2.2	Ready Queue vs. Device Queue-Operations on a Process-Cooperating Processes-Threads - Interprocess Communication.	Develop the steps of inter process communication for threads.(K3)	
		Compare user level threads and kernel level threads.(K5)	
		Utilize cooperation among processes in threads.(K3)	
2.3	Racing Problem-Avoiding Racing Problem-Requirement for Critical Problem-Critical Section algorithms-OS tools for Process Synchronization-Classical Synchronization Problems-Monitors-Inter Process Communication for Message Communication.	Apply critical section algorithms for process synchronization.(K3)	
		Define process synchronization.(K1)	
		Explain inter process communication for message communication.(K5)	
III	Deadlocks		
3.1	Introduction-System Model-Deadlock Characteristics-	Discuss the deadlock detection algorithms.(K4)	K4
		Explain the steps of deadlock recovery.(K5)	

		Deadlock Detection-Deadlock Prevention-Deadlock Avoidance-Deadlock Recovery-Other methods of Deadlock Recovery	List the conditions for deadlock.(K4)	
3.2		Schedulers-Scheduling Criteria-CPU Scheduling Algorithms-Multiple Processor Scheduling -Realtime Scheduling- Performance Comparison.	Examine the scheduling criteria for CPU.(K4)	
			Categorize CPU scheduling algorithms. (K4)	
			Compare LOOK and CLOOK scheduling algorithms.(K5)	
			Explain First Come First Served scheduling algorithms with Gannt chart. (K5)	
IV		**Memory Management**		
4.1		Introduction-Logical versus Physical address space-Program Relocation- Logical Organization-Physical Organization	Explain the requirements of memory management techniques.(K5)	K5
			Compare physical and logical address space.(K4)	
			Discuss the physical organization of memory management techniques.(K6)	
4.2		Dynamic Loading and Dynamic Linking-Memory Allocation Techniques	Explain memory allocation techniques.(K5)	
			Define Dynamic Linking.(K1)	
4.3		Swapping-Demand Paging-Page Fault-Page Replacement Algorithms-Thrashing-Page replacement policies-Local and Global-Demand Segmentation-OS Software factors.	Explain page replacement algorithms with examples.(K5)	
			Discuss demand paging with samples.(K6)	
			Compare demand segmentation and demand paging.(K4)	
V		**Information Management**		
5.1		Introduction-A Simple File System-File Access Methods-Directory Structure-File Protection-I-nodes-Free Space Management Techniques-Record Blocking	Explain file system structure with a neat diagram.(K5)	K5
			Discuss file access methods in file management systems.(K6)	
			Define record blocking.(K1)	
5.2		Introduction-Hard Disk Structure-Hard Disk Performance Parameter-Hard Disk Scheduling	Discuss swap space management.(K6)	
			Interpret rotational latency.(K2)	

		Algorithms-Swap Space Management	Explain Shortest seek time first disk scheduling algorithms.(K5)	
5.3	RAID and its level-Disk Space Allocation Methods-Stable Storage Implementation.	Elaborate disk space allocation methods.(K6)	
		Discuss RAID levels with a neat diagram.(K6)	

4. MAPPING (CO, PO, PSO)

U21IT410	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	M	M	M	L	L	L	H	M	M	L
CO2	M	M	M	H	H	H	H	L	L	M	H	H	L
CO3	M	M	M	H	H	H	H	L	L	M	H	H	L
CO4	M	M	M	H	H	H	H	L	L	M	H	H	L
CO5	M	M	M	H	H	H	H	L	L	M	H	H	L
CO6	L	L	L	L	L	L	H	H	H	L	L	L	K

L-Low   **M-Moderate**   **H- High**

5. COURSE ASSESSMENT

METHODS DIRECT:

1. Continuous Internal Assessment Test: 1, 2(Theory & Practical Components): Closed Book.

2. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, Project Report, Field Visit Report, Poster Presentation, Seminar, Quiz(written).
3. Pre-Semester & End Semester Theory Examination.
INDIRECT:

1. Course-end survey.

MOBILE COMPUTING TECHNOLOGIES

SEMESTER: IV   **COURSE CODE: U21IT411**
CREDITS: 3   **HOURS/WEEK: 3**

1. COURSE OUTCOMES:
After the successful completion of this course, the student will be able to

CO. No.	CO Statement	Level	Unit
1	Define Mobile Telecommunication networks and wireless communication system.	K1	I
2	Demonstrate the understanding of mobile computing and wireless networking.	K2	II
3	Compare mobile databases for the best fit transaction process in mobile environment.	K3	III
4	Categorize various Mobile Operating Systems.	K4	IV
5	Determine the android application with suitable User Interface and data manipulation.	K5	IV
6	Develop Applications for Android Devices includes content providers and networking.	K6	V

2. A. SYLLABUS

UNIT I: Basics of Communication Technologies   **(9 Hours)**
Basics of Communication Technologies: Types of Telecommunication Networks – Components of a
Wireless Communication System – Architecture of Mobile Telecommunication Systems – Wireless
Networking Standards – WLAN – Bluetooth Technology – **Introduction to Mobile Computing and
Wireless Networking:** Mobile Computing – Mobile Computing Vs. Wireless Networking –
Characteristics of Mobile Computing - Structure of Mobile Computing Applications – Cellular Mobile
Communication – GSM – GPRS – UMTS.

UNIT II: MAC Protocols   **(9 Hours)**
MAC Protocols: Properties – Issues – Taxonomy –Assignment Schemes – MAC Protocols for Ad Hoc
Networks. - **Mobile Internet Protocol:** – Mobile IP – Packet Delivery – Overview – Desirable Features
– Key Mechanism – Route Optimization – DHCP - **Mobile Transport Layer:** Overview of TCP/IP
–Terminologies – Architecture – Operations – Application Layer Protocols of TCP – Adaptation of TCP
Window – Improvement in TCP Performance.

UNIT III: Operating Systems for Mobile Computing   **(9 Hours)**
Operating Systems for Mobile Computing : Mobile OS Responsibilities – Basic Concepts – Special
Constraints and Requirements – Commercial Mobile OSs – Comparative Study of Mobile OSs – OS for
Sensor Networks – **Mobile Application Development Protocols :** - Mobile Devices as Web Clients –
WAP – J2ME – Android SDK.

UNIT IV: Getting Started with Android   **(9 Hours)**
Getting Started with Android –- Activities, Fragments and Intents – Android User Interface – Designing
User Interface with views – Displaying Pictures and Menus with Views – Data Persistence.

UNIT V: Content Providers   **(9 Hours)**
Content Providers – Messaging – Location Based Services – Networking – Developing Android Services
– Publishing Android Applications.

2B. Topics for Self Study:

S.No.	Topics	Web Links
1	Android - Animations	https://www.tutorialspoint.com/android/android_animations.htm
2	Android - Auto Complete	https://www.tutorialspoint.com/android/android_auto_complete.htm
3	Android App Development Specialization	https://www.coursera.org/specializations/android-app-development
4	Android Development	https://developer.android.com/

2C. Text Book(s):
1. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning
2. Wei Meng Lee, "Beginning Android 4 Application Development", Wiley India Pvt. Ltd.., 2012.

2D. Reference Books:
1. Ashok K Talukder, Hasan Ahmed, Roopa R Yavagal, "Mobile Computing", 2nd Edition, Tata McGraw Hill Publishing Company Limited, 2010.
2. Jochen Schiller, "Mobile Comunications", Pearsons Education, 2008.
3. Reto Meir, "Professional Android 4 Application Development", Wiley India Pvt. Ltd., 2012
4. Pradeep Kotari, "Android Application Development Black Book", Dreamtech Press, 2014.

2E. Web Links:

1. www.tutorialspoint.com
2. https://www.studytonight.com/java/
3. https://developer.android.com/

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
Unit – 1 Basics of Communication Technologies			
1.1	Types of Telecommunication Networks – Components of a Wireless Communication System – Architecture of Mobile Telecommunication Systems – Wireless Networking Standards– WLAN– Bluetooth Technology	● Recall the concepts of Wireless Communications and Server applications ● Recall the concepts and explain the features of CAN, LAN and Internetworks and make use of it ● Name the Components of a wireless communication system ● List of wireless network standards ● Define the Architecture of wireless LAN ● Label the Applications of WLANs ● Show the Protocol stack of	K1

		Bluetooth	
Introduction to Mobile Computing and Wireless Networking			
1.2	Mobile Computing – Mobile Computing Vs. Wireless Networking – Characteristics of Mobile Computing – Structure of Mobile Computing Applications – Cellular Mobile Communication – GSM – GPRS – UMTS	● Define Mobile Computing ● Relate the Mobile computing and wireless networking ● List the Characteristics of mobile computing ● Label the Generations of cellular communications ● Define location based Services and their Architecture	K1
Unit – 2 MAC Protocols			
2.1	Properties – Issues – Taxonomy –Assignment Schemes – MAC Protocols for Ad Hoc Networks	● Name the protocols with their properties ● List the issues in MAC protocols ● Relate different schemes like FDMA, TDMA, CDMA, ALOHA and CSMA Schemes	K1
Mobile Internet Protocol			
2.2	Mobile IP –Packet Delivery – Overview – Desirable Features – Key Mechanism – Route Optimization – DHCP	● Explain Mobile IP ● Interpret the Features of Mobile IP ● Demonstrate the Key Mechanism used in Mobile IP ● Demonstrate the Route Optimization works ● Summarize the job of Dynamic Host Configuration Protocol	K2
Mobile Transport Layer			
2.3	Overview of TCP/IP –Terminologies – Architecture – Operations – Application Layer Protocols of TCP – Adaptation of TCP Window – Improvement in TCP Performance	● Explain the working of Protocols in mobile transport layer including TCP/IP ● Demonstrate the working of Application Layer Protocols of TCP ● Interpret the Adaptation of TCP Window ● Illustrate the Popular TCP Congestion Control and TCP in mobile networks	K2
Unit – 3 Operating Systems for Mobile Computing			
3.1	Basic Concepts – Special Constraints and Requirements – Commercial Mobile OSs – Comparative Study of Mobile OSs – OS for Sensor Networks	● Utilize the Basic Concepts of Mobile operating systems ● Examine the Special Constraints and Requirements for mobile computing ● List of commercial mobile operating systems	K3

		● Compare Mobile Oss ● Experiment with the Sensor Networks.	
Mobile Application Development Protocols			
3.2	Mobile Devices as Web Clients – WAP – J2ME – Android SDK	● Utilize the mobile device as web clients ● Examine WAP, J2ME and Android SDK	K3
Unit – 4 Getting Started with Android			
4.1	Getting Started with Android –- Activities, Fragments and Intents – Android User Interface – Designing User Interface with views – Displaying Pictures and Menus with Views – Data Persistence.	● Perceive the Android versions and its feature set ● Evaluate the Android architecture ● Explain how to develop your first Android application ● Interpret the life cycles of an activity ● Explain how to adapt and manage changes in screen orientation ● Evaluate how to make use of the basic views in Android to design your user interface ● Interpret options menus and context menus ● Explain how to Store simple data using the SharedPreferences object ● Assess and organize a SQLite database	K5
Unit – 5 Android Application Development			
5.1	Content Providers – Messaging – Location Based Services – Networking – Developing Android Services – Publishing Android Applications.	● Discuss how to make use of a content provider in Android ● Create and use your own content provider ● Elaborate how to receive incoming SMS messages ● Formulate how to send e-mail messages from your application ● Construct how to consume JSON web services ● Elaborate how to create a service that runs in the background ● Formulate, how to perform repeated tasks in a service ● Discuss how an activity and a service communicate	K6

4. MAPPING (CO, PO, PSO)

U21IT411	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	M	M	H	M	L	M	H	H	M	L
CO2	H	H	H	M	M	H	M	L	M	H	H	M	M
CO3	M	M	M	H	H	H	M	L	M	H	H	H	M
CO4	M	M	M	H	H	H	M	L	M	H	H	H	M
CO5	L	L	M	M	M	M	M	L	H	M	H	H	M
CO6	H	L	M	M	M	M	M	L	H	M	H	H	H

L – Low   **M** – Moderate   **H** – High

4. COURSE ASSESSMENT
METHODS DIRECT:

1.   Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2.   Open Book Test.
3.   Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Field Visit Report, Poster Presentation, Seminar, Quiz (written).
4.   Pre-Semester & End Semester Theory Examination
INDIRECT:
        Course end survey (Feedback)

SEMESTER-IV	COURSE CODE: U21IT412
CREDITS :2	HOURS/WEEK:2

1.COURSE OUTCOMES

After the successful completion of this course, the student will be able to

S.No.	1.COURSE OUTCOMES	Level	Unit
1	Recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system	K2	I
2	Make use of Assembly Language Program in Microprocessor.	K3	II
3	Illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor.	K2	III
4	Distinguish and analyze the properties of Microprocessors & Microcontrollers.	K4	III
5	Evaluate application on assembly language program download the machine COURSE CODE to provide solutions to real world control problems.	K5	IV
6	Discuss the architectures of other popular Microprocessors and its Addressing Modes.	K6	V

2.A. SYLLABUS

Unit I: Introduction   (12 Hours)

Introduction: - Word Length – Evolution of Microprocessors and Digital Computers –CPU – Memory – Busses – Processing Speed – Microprocessor Architecture: - Introduction–Intel 8085– Instruction Cycle– Timing Diagram- Instruction Set of Intel 8085: - Introduction– Instruction and Data Formats–Addressing Modes–Status Flags–Symbols & Abbreviations–Intel 8085 Instructions.

Unit II: Assembly Language Programs   (12 Hours)

Assembly Language Programs: - Introduction – Addition and Subtraction (8 and 16-bits) – Decimal Addition and Subtraction – One's and Two's Complements (8 and 16) – Shifting and Masking – Largest and Smallest Numbers – Ascending and Descending Order – Sum of a Series – Multiplication and Division – Multi-byte Addition and Subtraction – Square-Root of a number – Block Transfer

Unit III: Peripheral Devices and their Interfacing   (12 Hours)

Peripheral Devices and their Interfacing: - Introduction – Address Space Partitioning – Memory and I/O Interfacing – Data Transfer Schemes – Interrupts of Intel 8085 – Interfacing Devices and I/O Devices – I/O Ports – Programmable DMA Controller – Programmable Interrupt Controller – Programmable Communication Interface – Programmable Counter/Interval Timer.

Unit IV: Microprocessor Applications   (12 Hours)

Microprocessor Applications: - Introduction – Delay subroutines – 7 Segment LED Display – Frequency Measurement – Measurement of Voltage and Current – Resistance Measurement – Water Level Indicator – Traffic Control.

Unit V (12 Hours)

Other Microprocessors: - Introduction – Intel 8086 – Classification of Intel 8086 Instructions – Binary - Addresses of Intel 8086 Registers – Description of Intel 8086 Instructions - Intel 8088 – Intel 80186 - Intel 80286 – Intel 80386 – Intel 80486 – Intel Pentium I, II, III and IV Processors.

2.B. Topics for Self Study:

S.No.	Topics	Web Links
1	Intel Processor 11	https://newsroom.intel.com/news-releases/11th-gen-tiger-lake-evo/
2	Apple bionic Processor	https://www.imore.com/apple-a14-bionic-explained-ipad-air-iphone-12
3	Snapdragon processor	https://www.qualcomm.com/snapdragon/processors/comparison
4	AMD processor	https://www.youtube.com/watch?v=oHpgu-cTjyM

2.C. Text Book(s):

1. Alexis Leon, Mathews Leon, "**Fundamentals of Information Technology**", Second Edition, Vikas Publishing House Pvt. Ltd., Chennai, 2009.

2.D. Reference Books:

1.Pradeep K Sinha, Priti Sinha," Information Technology: Theory and Practice", Kindle Edition, PHI Learning, 2016.

2.E. Web Links:

1. https://www.youtube.com/watch?v=t0Z8P_hpbFk
2. https://www.youtube.com/watch?v=NEQASUsZ0g4
3. https://www.youtube.com/watch?v=_qtCAuLIaew&vl=en
4. https://www.youtube.com/watch?v=nxryfWg5Hm4

3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Content	Learning Outcomes	Blooms Taxonomic Levels of Transaction
1	**Introduction, Microprocessor Architecture, Instruction Set of Intel 8085**		
1.1	Introduction: - Word Length – Evolution of Microprocessors and Digital Computers –CPU – Memory – Busses – Processing Speed.	Define Word Length.(K1)	K2
		Recall bus.(K2)	
		Explain the evolution of microprocessors.(K5)	
1.2	Microprocessor Architecture: - Introduction–Intel 8085– Instruction	Which Stack is used in 8085? (K2)	

	Cycle– Timing Diagram-Instruction Set of Intel 8085: -Introduction– Instruction and Data Formats–Addressing Modes–Status Flags–Symbols & Abbreviations–Intel 8085 Instructions.	Illustrate the flags of 80 85.(K3)	
		Explain the various addressing modes of Intel 8085.(K5)	
		Discuss the instructions set of Intel 8085.(K6)	
II	**Assembly Language Programs**		
2.1	Assembly Language Programs: -Introduction – Addition and Subtraction (8 and 16-bits) –Decimal Addition and Subtraction – One's and Two's Complements (8 and 16) – Shifting and Masking.	Explain an Intermediate language?(K2)	K3
		What are the Types of Assemblies?(K1)	
		Construct an assembly language program for multiplication product being up 16 bits(K3)	
		Demonstrate an assembly language program add two 8-bit numbers the sum may of 16 bits(K3)	
2.2	Largest and Smallest Numbers – Ascending and Descending Order – Sum of a Series – Multiplication and Division – Multi-byte Addition and Subtraction – Square-Root of a number – Block Transfer	What is assembly condition COURSE CODE s?(K1)	
		Demonstrate an assembly language program add two 8-bit numbers the sum may of 16 bits(K2)	
		Construct an assembly language program for multiplication product being up 16 bits(K2)	
III	**Peripheral Devices and their Interfacing**		
3.1	Peripheral Devices and their Interfacing: - Introduction – Address Space Partitioning – Memory and I/O Interfacing – Data Transfer Schemes – Interrupts of Intel 8085 –	Build an architecture of Intel 8255A with neat diagram(K3)	K2
		List the pins of the programmable Interrupt controller of Intel 8259 with neat diagram.(K4)	
		Explain the interrupts of Intel 8085.(K5)	
3.2	Interfacing Devices and I/O Devices – I/O Ports – Programmable DMA Controller – Programmable Interrupt Controller – Programmable Communication Interface – Programmable	Discuss the pins, modes and operations of Programmable counter/interval timer of Intel 8253.(K6)	
		Explain the pins and registers of Programmable DMA controller of Intel 8257.(K5)	
		Explain the various data transfer schemes used in microprocessors with suitable diagram.(K2)	

	Counter/Interval Timer.		
IV	**Microprocessor Applications**		
4.1	Microprocessor Applications: - Introduction – Delay subroutines – 7 Segment LED Display –Frequency Measurement – Measurement of Voltage and Current – Resistance Measurement – Water Level Indicator – Traffic Control.	Explain the interface connections to measure and display current and voltage at several points of a circuit employing a microprocessor-based scheme.(K5)	K5
		Elaborate the interface connections of 7 segment display and also explain the display of digits.(K6)	
		Explain the applications of working of water level indicator with a neat diagram(K5)	
V	**Other Microprocessors**		
5.1	Other Microprocessors: - Introduction – Intel 8086 – Classification of Intel 8086 Instructions –	Recall other microprocessors.(K1)	K6
		Explain the functional units of the Intel 8086 with a neat block diagram(K5)	
		Categorize the addressing modes of Intel 8086.(K4)	
5.2	Binary - Addresses of Intel 8086 Registers – Description of Intel 8086 Instructions - Intel 8088 – Intel 80186 - Intel 80286 – Intel 80386 – Intel 80486 – Intel Pentium I, II, III and IV Processors.	Discuss the operating modes of Intel 8086.(K6)	
		Explain the main features of Intel 80486 Processor.(K5)	
		Identify the features of Intel Pentium 3 Processors.(K3)	

4. MAPPING (CO, PO, PSO)

U21IT412	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	M	M	M	L	L	L	H	M	M	L
CO2	M	M	M	H	H	H	H	L	L	M	H	H	L
CO3	M	M	M	H	H	H	H	L	L	M	H	H	L
CO4	L	L	L	L	L	L	H	H	H	L	L	L	H
CO5	L	L	L	L	L	L	H	H	H	L	L	L	M
CO6	L	L	L	L	L	L	H	H	H	L	L	L	H

L-Low　　　　　　　　**M-Moderate**　　　　　　　　**H- High**

5. COURSE ASSESSMENT METHODS
DIRECT:

Continuous Internal Assessment Test: 1, 2(Theory & Practical Components): Closed Book.
Open book test.
Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, Project Report, Field Visit Report, Poster Presentation, Seminar, Quiz(written).
Pre-Semester & End Semester Theory Examination.
INDIRECT:
1. Course-end survey.

PROFESSIONAL ETHICS AND CYBER LAWS

SEMESTER-IV   **COURSE CODE : U21IT413**
CREDITS :2   **HOURS/WEEK:2**

1.COURSE OUTCOMES

After the successful completion of this course, the students will be able to

S. No.	1.COURSE OUTCOMES	Level	Unit
1.	Apply values and ethics in profession	K3	I
2.	Explain the principles and concepts associated with Cyber Security	K2	II
3.	Classify and explain the aspects of Cyber Attacks	K2	III
4.	Analyse the nature and consequences of Cyber Crimes	K4	IV
5.	Determine the nature of Cyber Laws and their legal implications	K5	V
6.	Evaluate the nature and consequences of Cyber Crimes	K5	V

2.A. SYLLABUS

UNIT I: Professional Ethics

Values – Morals - Ethics – Habits – Character - Integrity – Honesty – Empathy – Respect for Others – Courage – Confidence – Work Ethics - Social Responsibility - Time Consciousness – Team Building – Moral leadership – Commitment – Spirituality.

UNIT II: Cyber Security Principles

Overview of Cyber Security - Cryptography – Digital and Electronic Signatures – Digital Certificates – Domain Naming System – Firewalls - Electronic Data Interchange (EDI) – Electronic Records and Authentication – E-Transactions - E-Commerce – E-Governance – Online Banking- Computer Forensics.

UNIT III: Cyber Attacks and Crime

Overview – Role of Computers – Perpetrators – Identity Thefts – SMS and E-Mail Spoofing – Hacking – Stalking – Carding – Infringement of Privacy – Cyber Bullying – Phishing – Cracking – Phreaking – Malicious Programs – Computer Fraud – Forgery and Counterfeiting – Theft of Telecommunication Services – IPR Infringements – Cyber Squatting - Economic Espionage – Tax Evasions – Computer Sabotage – Operating System Attacks –Application Attacks - Salami Attacks – Web Jacking – Money Laundering – Data Diddling – Pornography – Hate Propaganda – Cyber Warfare – Cyber Terrorism.

UNIT IV: Cyber Laws – I

Laws of Intellectual Property Rights – Copyright Act – Trademark and Merchandise Act – Patent Act – Domain Name Laws – Cyber Squatting Laws – Information Technology Act 2000.

UNIT V: Cyber Laws – II

International Perspectives – United Nations (UN) & International Telecommunication Union (ITU) Initiatives - Council of Europe - Budapest Convention on Cybercrime - Asia-Pacific Economic Cooperation (APEC) - Organization for Economic Co-operation and Development (OECD) - World Bank Commonwealth of Nations – **Cyber Crime Laws :** - Classification of Offences – Investigations - Forming an Incident Response Team – Reporting Cyber Crime – Power of Arrests – Remedial Measures
– Legislations – Preventive Measure – Power of Confiscation – Jurisdictional Problems.

2.B. Topics for Self Study:

S. No.	Topics	Web Links
1	Applied Ethics	https://en.wikipedia.org/wiki/Applied_ethics
2	Ethics of Technology	https://en.wikipedia.org/wiki/Ethics_of_technology
3	Internet Laws	https://www.upcounsel.com/internet-law
4	Computer Fraud and Abuse Act	https://en.wikipedia.org/wiki/Computer_Fraud_and_Abuse_Act
5	Website Defacement Attack	https://www.imperva.com/learn/application-security/website-defacement-attack/

2.C. TEXT BOOKS

1. Edmund G Seebauer and Robert L Barry, **"Fundamentals of Ethics for Scientists and Engineers"**, Oxford University Press, Oxford, 2000.
2. Shilpa Suryabhan Donre, **"Cyber Laws and its Applications"**, 2nd Edition, Current Publications, Mumbai, 2015.

2.D. REFERENCE BOOKS

1. John R Boatright, Jeffry D. Smith, Bibhu Prasan Patra, **"Ethics and the Conduct of Business"**, 8th Edition, Pearson Education, New Delhi, 2017.
2. James K. L., **"The Internet: A User's Guide"** 2nd Edition, Prentice Hall of India, New Delhi, 2010.
3. Ramappa T., **"Legal Issues in Electronic Commerce"**, Macmillan India Ltd, New Delhi, 2003.
4. Krishna Kumar, **"Cyber Laws – Intellectual Property and E-Commerce Security"**, Dominant Publishers and Distributers Pvt. Ltd., New Delhi, 2018.

2.E. Web Links:

1. https://www.iaa.govt.nz/for-advisers/adviser-tools/ethics-toolkit/professional-ethics-and-COURSE CODE s-of-conduct/
2. http://www.smitorissa.org/Documents/professional%20etics%20module%20-%201.NEW.pdf
3. https://www.infosecawareness.in/cyber-laws-of-india
4. https://www.meity.gov.in/content/cyber-laws

3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit / Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Professional Ethics :**		
1.1	Values, Morals & Ethics	Illustrate the significance of Values, Morals & Ethics (K2)	
1.2	Habits, Character	Relate the role of Habits and Character in Self-Development(K2)	K3
1.3	Integrity, Honesty	Explain the importance of Integrity	

		and Honesty(K2)	
1.4	Empathy, Respect for Others	Develop the qualities of empathy and Respect for others.(K3)	
1.5	Courage, Confidence	Choose the course of action based on courage and confidence(K3)	
1.6	Work Ethics, Social Responsibility, Time Consciousness	Demonstrate the need for Work Ethics, Social Responsibility and Time Consciousness in Profession(K2)	
1.7	Team Building, Moral leadership	Recall the aspects of Team Building and Moral Leadership(K2)	
1.8	Commitment, Spirituality	Choose the paths of Commitment and Spirituality(K2)	
II	**Cyber Security Principles :**		
2.1	Overview of Cyber Security	Relate the Overview of Cyber Security(K1)	
2.2	Cryptography	Explain the features of Cryptography(K2)	
2.3	Digital and Electronic Signatures	Illustrate the working of the Digital and Electronic(K2)	
2.4	Digital Certificates	Outline the features and uses of Digital Certificates(K2)	
2.5	Domain Naming System	Recall the use of Domain Naming System.(K2)	
2.6	Firewalls	Explain the features and working of Firewalls(K2)	K2
2.7	Electronic Data Interchange (EDI)	Choose the Electronic Data Interchange services(K1)	
2.8	Electronic Records and Authentication	Explain the features of Electronic Records and Authentication(K2)	
2.9	E-Transactions - E-Commerce – E-Governance	Illustrate the use of E-Transactions, E-Commerce and E-Governance(K2)	
2.10	Online Banking	Outline the features and uses of Online Banking(K2)	
2.11	Computer Forensics	Define Computer Forensics and explain its uses.(K2)	
III	**Cyber Attacks and Crimes:**		
3.1	Overview of Cyber Attacks and Crimes	Outline the aspects of Cyber Attacks and Crimes(K2)	
3.2	Role of Computers and Perpetrators	Explain the role of Computers and Perpetrators(K2)	K3
3.3	Identity Thefts, SMS and EMail Spoofing	Explain the concepts behind Identity Thefts, SMS and EMail Spoofing(K2)	
3.4	Hacking, Stalking, Carding	Interpret Hacking, Stalking and	

		Carding(K2)	
3.5	Infringement of Privacy, Cyber Bullying	Explain Infringement of Privacy and Cyber Bullying(K2)	
3.6	Phishing, Cracking, Phreaking	Classify Phishing, Cracking and Phreaking(K2)	
3.7	Malicious Programs, Computer Fraud, Forgery & Counterfeiting	Infer Malicious Programs, Computer Fraud, Forgery and Counterfeiting(K2)	
3.8	Theft of Telecommunication Services, IPR Infringements	Interpret and Classify Theft of Telecommunication Services and IPR Infringements(K2)	
3.9	Cyber Squatting, Economic Espionage, Tax Evasions, Computer Sabotage	Infer the nature of activities such as Cyber Squatting, Economic Espionage, Tax Evasions and Computer Sabotage(K2)	
3.10	Operating System Attacks, Application Attacks, Salami Attacks	Interpret Operating System Attacks, Application Attacks and Salami Attacks(K2)	
3.11	Web Jacking, Money Laundering, Data Diddling	Explain Web Jacking, Money Laundering, Data Diddling(K2)	
3.12	Pornography, Hate Propaganda	Classify the aspects of Pornography and Hate Propaganda(K2)	
3.13	Cyber Warfare and Cyber Terrorism.	Explain the aspects of Cyber Warfare and Cyber Terrorism.(K2)	
IV	**Cyber Laws – I**		
4..1	Laws of Intellectual Property Rights	Analyze Laws of Intellectual Property Rights(K4)	
4.2	Copyright Act, Trademark, Merchandise Act & and Patent Act	Classify the implications of Copyright Act, Trademark, Merchandise Act & and Patent Act(K4)	K4
4.3	Domain Name Laws	Examine the Domain Name Laws.(K4)	
4.4	Information Technology Act 2000.	Survey the Information Technology Act 2000(K4)	
V	**Cyber Laws – II**		
5.1	International Perspectives on Cyber Laws	Explain the features of International Perspectives on Cyber Laws(K5)	
5.2	United Nations (UN) & International Telecommunication Union (ITU) Initiatives	Explain the features of United Nations (UN) & International Telecommunication Union (ITU) Initiatives(K5)	K5
5.3	Council of Europe, Budapest Convention on Cybercrime	Discuss the role of Council of Europe, Budapest Convention on Cybercrime(K5)	

5.4	Asia-Pacific Economic Cooperation (APEC), Organization for Economic Co-operation and Development (OECD)	Explain the details on Asia-Pacific Economic Cooperation (APEC), Organization for Economic Co-operation and Development (OECD)(K5)	
5.5	World Bank, Commonwealth of Nations	Explain the role of World Bank and Commonwealth of Nations in imposing Cyber Laws(K5)	
	Cyber Crime Laws :		
5.8	Classification of Offences	Asses the Classification of Offences(K5)	
5.9	Investigations, Forming an Incident Response Team	Explain on the aspects of Investigations, Forming an Incident Response Team(K5)	
5.10	Reporting Cyber Crime, Power of Arrests	Explain the procedures in Reporting Cyber Crime and Power of Arrests(K5)	K5
5.11	Remedial Measures, Legislations and Preventive Measure	Determine the Remedial Measures, Legislations and Preventive Measure(K5)	
5.12	Power of Confiscation and Jurisdictional Problems	Explain the aspects of Power of Confiscation and Jurisdictional Problems(K5)	

4. MAPPING (CO, PO, PSO)

U19IT413	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	L	L	L	M	M	M	H	H	H	L	L	L	H
C02	H	H	H	M	M	M	L	L	H	M	M	H	L
C03	H	H	H	M	M	M	L	L	H	M	M	H	L
C04	H	M	M	M	M	H	M	M	H	L	L	H	L
C05	H	M	M	M	M	M	M	M	H	L	L	H	L
C06	H	M	M	M	M	M	M	M	H	L	L	H	L

L-Low   **M-Moderate**   **H- High**

COURSE ASSESMENT METHODS
DIRECT:
6.   Continuous Assessment Tests : T1, T2 (Theory & Practical Components) : Closed Book
7.   Open Book Test
8.   Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, Project Report, Field Visit Report, Poster Presentation, Seminar, Quiz (Written).
9.   Pre-Semester & End Semester Theory Examination.

INDIRECT:
1. Course End Survey (Feedback)

MATHEMATICS FOR COMPETITIVE EXAMINATIONS - II

SEMESTER: IV   **COURSE CODE: U21IT414**
CREDITS: 4   **HOURS/WEEK: 4**

Objective :

- *To acquire arithmetic skills required to face competitive examinations.*

UNIT I
Surds & Indices - Allegation or Mixture – True discount – Banker's discount

UNIT II
Stocks & Shares - Calendar - Clocks - Races & Games of Skill

UNIT III
Linear Equation in Two Variables - Quadratic Equations

UNIT IV
Arithmetic and Geometric Progressions (A.P. & G.P.) - Geometry - Polygons

UNIT V
Number Series - Tabulation - Pie-Chart - Bar-Graphs - Line Graphs

TEXT BOOK
1.   R.S. Aggarwal, **"Objective Arithmetic"** S. Chand & Company Ltd., New Delhi, 2003

OPERATING SYSTEMS LAB

SEMESTER: IV   **COURSE CODE : U21IT4P7**
CREDITS :4   **HOURS/WEEK:4**

1.COURSE OUTCOMES

After the successful completion of this course, the students will be able to

S.No.	1.COURSE OUTCOMES	Level	Exercise
1	Extend basic, directory and VI editor commands of Linux	K2	1-3
2	Make use of Linux commands for file handling	K3	5-7
3	Experiment with Linux commands with shell programming	K3	8-12
4	Examine the use of various grep commands	K4	4
5	Determine various shell scripts for simple applications	K5	16-19
6	Create a User and Group Login permission	K6	14,15

2.A. SYLLABUS

Ex.No.	Exercise
1	Execution of Simple Shell Commands
2	Usage of Directory Commands
3	Employing Vi Editor Commands
4	Searching a word in a file
5	Displaying the content of a file.
6	Displaying Login Greeting Script
7	Displaying the current date, time, username and current directory.
8	Shell Program to print the given number in reverse order.
9	Preparation of Mark list using shell programming
10	Menu driven shell program to create, sort and display a file.
11	Menu driven shell program to copy, edit, rename and delete a file.
12	Shell Program to Sort numbers in ascending and descending order.
13	Shell Program to Sort names in ascending and descending order.
14	User Creation in Linux
15	Group Creation in Linux
16	Menu driven shell program for the following – Passwd, pconfig, ping
17	Shell program to find the number of ordinary files and directory files in the current directory.
18	Shell program to accept the name of the directory as command line argument and display the listing in that directory. By default, the "Home" directory's contents should be displayed.
19	Finding the list of all running processes and redirect the output in file. Monitoring and managing system log information.

2.B. Topics for Self Study:

S.No.	Topics	Web Links
1	write a program to implement banker' algorithm for deadlock avoidance	https://www.geeksforgeeks.org/bankers-algorithm-in-operating-system-2/
2	write a script to calculate the factorial	https://www.log2base2.com/shell-script-examples/lo

	of a given number	op/shell-script-to-find-factorial-of-a-number.html
3	write a shell script to find Fibonacci series	http://www.anonhack.in/2018/05/program-to-find-fibonacci-series-using-shell-script/
4	write the Linux program script to check if the number is a palindrome.	http://gtuos.blogspot.com/2012/11/write-script-to-check-whether-given.html

3. SPECIFIC LEARNING OUTCOMES (SLO)

Ex. No.	Lab Exercise	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
1.	**Execution of Simple Shell Commands** ● Choose the Fedora Linux os. ● Click Activities Terminal to open the shell (i.e kernel mode) ● Create and change a directory and create a new file using vi filename command ● Save the file & run the program use esc: wq	● Relate shell commands of UNIX and Linux ● Show directory command ● Demonstrate create directory command	K2
2.	**Make use of Directory Commands** ● Make a directory ● Change a directory ● Open vi editor ● Make use of directory commands like rmdir, mkdir, etc.	● Illustrate directory commands. ● Compare cp and mv command ● Classify directory commands	K2
3.	**Employing Vi Editor Commands** ● Make a directory ● Change a directory ● Open vi editor ● Make use of vi editor commands ● i - Insert at cursor (goes into insert mode)	● Explain vi editor commands. ● Demonstrate various vi modes ● Interpret I mode	K2
4.	**Searching a word in a file** ● Make a directory, Change a directory ● Open vi editor, use grep command to search a word ● Save the file and run the program use esc: wq	● compare grep and grep -I command ● examine the purpose of grep command.	K4

5.	**Displaying the content of a file.** ● Make a directory, Change a directory ● Open vi editor ● Use cat and sh command	● Make use of cat command. ● Select sh command	K3
6.	**Displaying Login Greeting Script** ● Create a directory and change a directory and create a new file using vi filename command. ● Use echo command to display welcome message	● Construct a directory. ● Build a sub directory ● Apply echo command	K3
7.	**Displaying the current date, time, username and current directory.** ● Create a directory and change a directory ● Make use of the following commands date, pwd and user.	● Make use of pwd. ● Identify the syntax of date, time & user name.	K3
8.	**Shell Program to print the given number in reverse order.** ● Read the number n, initialize the sum value '0' and check the number greater ● then zero and calculate the summation process.	● Develop a program for reverse number. ● Choose the correct syntax	K3
9.	**Preparation of Mark list using shell programming** ● Read the name, rollno, marks and find total and average. ● Save the program using esc :wq command.	● Experiment with the number, find total. ● Choose the correct data. ● Select a value for input	K3
10.	**Menu driven shell program to create, sort and display a file.** ● Use the vi, sort and cat commands to create, sort and display a file ● save the program using esc: wq command.	● Identify the menu items ● Choose the input values ● Select the menu options (create, sort, display) ● Organize the output	K3
11.	**Menu driven shell program to copy, edit, rename and delete a file.** ● Create and change a directory and create a new file using vi filename command.	● Identify the menu items ● Choose the input values ● Select the menu options (copy, edit, rename) ● Organize the output	K3

	● Use the cp, vi, mv and rm commands to copy, edit, rename and delete a file		
12.	**Shell Program to Sort numbers in ascending and descending order.** ● Read the numbers and specify the number of elements and compare the number ● And arrange the number in ascending order and descending order	● Identify the sorting method. ● Choose the number of elements ● Select the elements and compare the number	K3
13.	**Shell Program to Sort names in ascending and descending order.** ● Create and change a directory and create a new file using vi filename command. ● Read the filename which containing name list.	● identify the sorting method. ● Choose the filename ● Select the elements and compare the number. ● Apply the file stream method.	K3
14.	**User Creation in Linux** ● Choose the Fedora Linux os. ● Create and change a directory and create a new file using vi filename command. ● use su command(sudo user), enter the root password: root123 or bhc@lab ● Use Useradd username command. ● Use passwd username command. ● Set the new password , Finally successfully user login is created.	● Build a sudo user. ● Create user name and password. ● modify a new password	K6
15.	**Group Creation in Linux** ● use su command(sudo user), enter the root password: root123 or bhc@lab ● Use Groupadd username command. ● Use gpasswd username command. ● Set the new password , Finally successfully your Grouplogin is created.	● Build a groupname. ● Create groupname and gpassword. ● modify a new password	K6
16.	Menu driven shell program for the following – Passwd, pconfig, ping ● Create and change a directory and create a new file using vi filename command. ● Enter the username to find out when	● Identify the menu items ● Choose the input values ● Select the menu options (passwd,pconfig,ping) ● Organize the output	K5

	a particular user last logged in to the Linux		
17	**Shell program to find the number of ordinary files and directory files in the current directory.** ● To count files in a directory on Linux is to use the "ls" command and pipe it with the "wc -l" command. ● To find" command and pipe it with the "wc" command in order to count the number of files.	● Importance of directory. ● Interpret ls command ● Explain wc- l command	K5
18.	**Shell program to accept the name of the directory as command line argument and display the listing in that directory. By default, the "Home" directory's contents should be displayed.**	● Importance directory ● Explain command line arguments ● Determine home/ directory	K5
19.	**Finding the list of all running processes and redirect the output in file. Monitoring and managing system log information.**	● Importance of Linux logging basics ● Determine Log file entries ● Compare rsyslog and syslog	K5

4. MAPPING (CO, PO, PSO)

U19ITP10	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	M	M	M	L	L	L	H	M	M	L
CO2	M	M	M	H	H	H	L	L	L	M	H	H	L
CO3	M	M	M	H	H	H	L	L	L	M	H	H	L
CO4	M	M	M	H	H	H	L	L	L	M	H	H	L
CO5	L	L	L	L	L	L	H	H	H	L	L	L	H
CO6	M	M	M	H	H	H	L	L	L	M	H	H	L

L-Low   **M-Moderate**   **H- High**

5. COURSE ASSESSMENT METHODS
DIRECT:

1. Continuous Internal Assessment Test: 1, 2(Practical Components): Closed Book.
2. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, Project Report.
3. Pre/Post Test, Viva, Report for each exercise.
4. Lab Model Examination & End Semester Practical Examination.

INDIRECT: 1. Course-end survey.

MOBILE APPLICATIONS DEVELOPMENT LAB

SEMESTER: IV   **COURSE CODE : U21IT4P8**
CREDITS: 4   **HOURS/WEEK: 4**
1.COURSE OUTCOMES:

After the successful completion of this course, the students will be able to

CO. No.	CO Statement	Level	Exercise
1	Build Android application with suitable user interface and android controls	K3	1 – 3
2	Make use of image controls, perform coloring screen and animate bitmap images.	K3	4 – 6
3	Examine the user interface with a dialog box and countdown timer.	K4	7 – 8
4	Interpret the android controls to store contact details and make phone call.	K5	9 – 10
5	Build Android Application to access media file from memory and store images from native applications	K5	11-12
6	Create Android Application to perform data manipulation such as Insert, update, delete and retrieve from SQLite database	K6	13

2.A. SYLLABUS

Ex. No.	Exercise
1.	Create a simple application that displays a text "Hello World" with text and background color.
2.	Create sample application for login module.
3.	Create an application that will change the color of the screen based on selected options from the menu.
4.	Create an application that will display toast (Message).
5.	Create an application to change the image displayed on the screen using radio button.
6.	Create an application to demonstrate alert dialog box.
7.	Create an application to demonstrate countdown timer.
8.	Create an application to animate a bitmap.
9.	Create an application to demonstrate a simple video view.
10.	Create an application to pick contacts using Intent.
11.	Create an application to play a media file from the menu card.
12.	Create an application to generate a new contact using Intent.
13.	Create an application to make database operations

2.B. Topics for Self Study:

S.No.	Topics	Web Links
1	Android - Animations	https://www.tutorialspoint.com/android/android_animations.htm
2	Android - Auto Complete	https://www.tutorialspoint.com/android/android_auto_complete.htm
3	Android App Development Specialization	https://www.coursera.org/specializations/android-app-development
4	Android Development	https://developer.android.com/

3. SPECIFIC LEARNING OUTCOMES (SLO)

Ex. No.	Lab Exercises	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
1	**Create simple application to display "Hello World" with text and background colors**	● Model the creation of android application project. ● Select the element to display the text. ● Choose the property to design the text. ● Solve with android virtual device (AVD) to run the application.	K3
2	**Create an application login module.**	● Select text view, text field and button to validate a login module. ● Apply the component using views. ● Construct android activity and use intent to pass the data to the next activity. ● Develop event handling mechanism for clicking the button. ● Solve AVD to run the application	K3
3	**Create an application to change the color of the screen using menu options.**	● Select the text view to change the color. ● Choose menu to display various colors. ● Develop event handling mechanism to display different colors. ● Solve with AVD to run the application.	K3
4	**Create an application to display toast(message)**	● Identify the components to be used to display the toast. ● Apply the component using views. ● Construct the method to handle the events. ● Solve with AVD to run the application.	K3
5	**Create an application to change the image displayed on the screen using radio button**.	● Identify the components of forms. ● Select the images and add it to the gallery.	K3

		● Develop the mechanism to change the images using radio button option. ● Experiment with AVD to run the application.	
6	**Create an application to demonstrate alert dialog box**	● Classify the components of forms. ● Analyze the builder objects. ● Inspect an alert dialog box using builder message. ● Discover the mechanism to handle the events. ● Examine with AVD to run the application.	K4
7	**Create an application to demonstrate countdown timer.**	● Classify the components of forms. ● Analyze the timer objects. ● Discover the mechanism to perform countdown activities. ● Examine with AVD to run the application.	K4
8	**Create an application to animate a bitmap.**	● Identify the components of media gallery. ● Select the images to the drawable component. ● Develop the mechanism to handle the events. ● Experiment with AVD to run the application.	K3
9	**Create an application to demonstrate a simple video view.**	● Identify the components of multimedia. ● Select the video to the playable component. ● Develop the mechanism to handle the events. ● Experiment with AVD to run the application.	K3
10	**Create an application to pick a contact using Intent.**	● Choose the components of forms. ● Determine the android manifest xml file and get the permission to pick a contact. ● Formulate the mechanism to pick a contact. ● Justify with AVD to run the application.	K5

11	**Create an application to play a media file from the memory card.**	● Choose the components of forms. ● Determine the media file to the drawable component ● Assess the components using views ● Formulate the mechanism to handle the events ● Justify with AVD to run the application	K5
12	**Create an application to create a new contact using Intent.**	● Choose the components of forms. ● Determine the android manifest xml file and get the permission to add new contact. ● Formulate the mechanism to add the new contact. ● Justify with AVD to run the application.	K5
13	**Create an application to make database operations.**	● Choose the components of forms. ● Build the mechanism to handle the events ● Solve with AVD to run the application	K6

4. MAPPING (CO, PO, PSO)

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	H	L	H	M	L	M	H	H	M	M
CO2	H	H	H	H	L	H	M	L	M	H	H	M	M
CO3	H	H	H	H	L	H	M	L	M	H	H	M	M
CO4	H	H	H	H	L	H	M	L	M	H	H	M	M
CO5	H	H	H	H	L	H	M	L	M	H	H	M	M
CO6	H	H	H	H	L	H	M	L	M	H	H	M	M

L – Low   **M** – Moderate   **H** – High

5. COURSE ASSESSMENT METHODS

DIRECT:
1.   Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2.   Cooperative Learning Report, Assignment, Group Discussion, project Report, Field Visit Report, Seminar.
3.   Pre/Post Test, Viva, Report for each Exercise.
4.   Lab Model Examination & End Semester Practical Examination

INDIRECT:
1.   Course end survey (Feedback)

PROGRAMMING WITH PHP AND MYSQL

SEMESTER V   **COURSE CODE: U21IT515**
CREDITS: 4   **HOURS/WEEK: 4**

1.COURSE OUTCOMES:

After the Successful completion of this course, the student will be able to

CO.No	COURSE OUTCOMES	Level	Unit
CO1	Define Expressions, Operators, Conditionals, Looping, Implicit and Explicit Casting	K1	I
CO2	Explain the Functions and Objects	K2	I
CO3	Apply the Arrays and File Handling	K3	II
CO4	Classify Indexes, MySQL Functions, Accessing MySQL via phpMyAdmin	K4	III
CO5	Explain Accessing MySQL Using PHP	K5	IV
CO6	Discuss the Functions, Objects, and Arrays using with JavaScript	K6	V

2.A.SYLLABUS

UNIT I :Introduction to PHP   (12 Hours)

Incorporating PHP Within HTML - Examples -The Structure of PHP.Expressions and Control Flow in PHP: Expressions - Operators - Conditionals – Looping -Implicit and Explicit Casting - PHP Dynamic Linking.

UNIT II :PHP Functions and Objects   (12 Hours)

PHP Functions - Including and Requiring Files - PHP Version Compatibility - PHP Objects. PHP Arrays: Basic Access -The foreach...as LoopMultidimensional Arrays -Using Array Functions. Practical PHP:Using printf - Date and Time Functions - File Handling

UNIT III :Introduction to MySQL   (12 Hours)

MySQL Basics - Summary of Database Terms Accessing MySQL via the Command Line – Indexes - MySQL Functions - Accessing MySQL via phpMyAdmin. Accessing MySQL Using PHP: Querying a MySQL Database with PHP - A Practical Example -Practical MySQL - Creating a Table - Preventing Hacking Attempts - Using mysql Procedurally.Form Handling: Building Forms - Retrieving Submitted Data - An Example Program - What's New in HTML5? - Features Awaiting Full Implementation.

UNIT IV :Cookies, Sessions, and Authentication   (12 Hours)

Using Cookies in PHP - HTTP Authentication – Using Sessions. Exploring JavaScript :Using Comments - Semicolons - Variables - Operators – Variable Typing -Functions - Global Variables - Local Variables-The Document Object Model -About document. write. Expressions and Control Flow in JavaScript:

Expressions - Literals and Variables - Operators - The with Statement - Using onerror -Using try...catch –Conditionals - Looping -Explicit Casting

UNIT V :JavaScript Functions, Objects, and Arrays   **(12 Hours)**

 JavaScript Functions - JavaScript Objects -Java Script Arrays. JavaScript and PHP Validation and Error Handling: Validating User Inputwith JavaScript - Regular Expressions - Redisplaying a Form After PHP Validation. Using Ajax: What Is Ajax? - Using XMLHttpRequest

2.B. Topics for Self Study:

S. No	Topics	Web Links
1.	Quality of Service	https://www.youtube.com/watch?v=bnB6LGyqYNk&pbjreload=101/
2.	Mobile and Wireless	https://www.youtube.com/watch?v=GwjKSWJCcxg/
3.	Security	https://www.youtube.com/watch?v=inWWhr5tnEA/
4.	Real World Web Service Application Development—Advanced Technologies	https://www.youtube.com/watch?v=IE1VtwhBtR8/

2. C Text Book(s):

1.   Robin Nixon., "Learning PHP, MySQL and JavaScript ", O'reilly Publishers , 2009.
2.D. Reference Books:

1.   Huge E Williams and David Lane, "Web Database Applications with PHP and MySQL",O'reilly Publishers, 2007.

2.E. Web Links:

1.   https://www.w3schools.com/php/php_mysql_intro.asp/
2.   https://www.siteground.com/tutorials/php-mysql/
3.   https://www.tutorialspoint.com/php/index.htm/
4.   https://www.php.net/manual/en/function.mysql-query.php/

3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Introduction to PHP**		

1.1	Incorporating PHP Within HTML - Examples -The Structure of PHP.	Tell the basics of PHP(K1)	K2
		List the Expressions, Operators, Conditional and looping of PHP(K1)	
		Demonstrate the Dynamic Linking of PHP(K2)	
1.2	**Expressions** - Operators - Conditionals – Looping - Implicit and Explicit Casting - PHP Dynamic Linking.	Demonstrate Expressions, Operators, Conditionals, Looping(K2)	
		Classify Implicit and Explicit Casting(K2)	
		Interpret with the PHP Dynamic Linking(K2)	
II	**PHP Functions and Objects**		
2.1	PHP Functions - Including and Requiring Files - PHP Version Compatibility- PHP Objects	Experiment with functions and objects(K3)	K3
		Demonstrate the structure of function and objects (K2)	
		Construct PHP Version Compatibility (K3)	
2.2	**PHP Arrays:** Basic Access -The foreach...as Loop Multidimensional Arrays -Using Array Functions. Practical PHP: Using printf - Date and Time Functions - File Handling	Classify the Arrays and functions(K2)	
		Explain the Array functions(K3)	
		Solve the Practical PHP program using with PHP Arrays(K3).	
III	**Introduction to MySQL**		
3.1	MySQL Basics - Summary of Database Terms Accessing MySQL via the Command Line -Indexes -MSQL Functions-Accessing MySQL Via phpMyAdmin.	Label the MySQL Basics(K5)	K4
		Illustrate the functions Using MySQL Command line(K2)	
		Examine the functions using MySQL program(K4)	
3.2	**Accessing MySQL Using PHP:** Querying a MySQL Database with PHP -A Practical Example -Practical MySQL - Creating a Table - Preventing Hacking Attempts - Using mysql Procedurally.	Test the Accessing MySQL table Using PHP(K3)	
		Apply the Preventing Hacking Attempt(K4)	
3.3	**Form Handling:** Building Forms - Retrieving Submitted Data - An	Experiment with form handling(K3)	

	Example Program - What's New in HTML5? - Features Awaiting Full Implementation.	Test for simple programs using Form Handling with HTML(K4)	
IV	**Cookies, Sessions, and Authentication**		
4.1	Using Cookies in PHP - HTTP Authentication - Using Sessions	Explain cookies ,session and Authentication(K4)	K5
		Distinguish Cookies, Authentication and sessions(K4)	
		Interpret programs using Cookies and session(K4)	
4.2	**Exploring JavaScript:**Using Comments - Semicolons - Variables - Operators – Variable Typing -Functions - Global Variables - Local Variables- The Document Object Model -About document.write.	List the Comments, Semicolons , Variables, Operators, Variable Typing, Functions, Global Variables, Local Variables.(K4)	
		Estimate the Control flow in JavaScript(K5)	
4.3	**Expressions and Control Flow in JAvaScript:**Expressions - Literals and Variables - Operators - The with Statement - Using onerror -Usingtry...catch –Conditionals - Looping -Explicit Casting	Importance of expression and its control flow in JavaScript(K2)	
		Interpret OnError and try..catch conditionals using javascript(K5)	
		Evaluate JavaScript programs Using looping and explicit Casting(K5)	
V	**JavaScript Functions, Objects, and Arrays**		
5.1	JavaScript Functions - JavaScript Objects - JavaScript Arrays.	Experiment with JavaScript Functions, objects and Arrays(K6).	K6
		Develop program using objects and Arrays(K6)	
5.2	**JavaScript and PHP Validation and Error Handling:**Validating User Input with JavaScript - Regular Expressions - Redisplaying a Form AGer PHP Validation.	Discuss the PHP Validation and Error handling using JavaScript(K6)	
		Build Validation program using JavaScript(K3)	
5.3	**Using Ajax:**What Is Ajax? - Using XMLHttpRequest	Define Ajax(K6).	
		Evaluate the XMLHttpRequest(K6)	

4. MAPPING SCHEME FOR THE PO, PSOS AND COS

U21IT515	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO 3	PSO4
CO1	H	H	H	M	M	M	L	L	L	H	L	L	L
CO2	H	H	H	L	L	M	L	L	L	H	M	M	L
CO3	H	H	H	M	M	M	L	L	L	H	M	M	L
CO4	M	M	M	H	H	H	L	L	L	M	H	H	L
CO5	M	M	M	H	H	H	L	L	L	M	H	H	L
CO6	M	M	M	H	H	H	L	L	L	M	H	H	L

L-Low   **M-Moderate**   **H- High**

5. COURSE ASSESSMENT METHODS

METHODS DIRECT:

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

INDIRECT:

1. Course end survey (Feedback)

INFORMATION SECURITY

SEMESTER: V   **COURSE CODE: U21IT516**

CREDITS: 3   **HOURS/WEEK: 3**

1. COURSE OUTCOMES

After the successful completion of this course, the student will be able to

CO.No	COURSE OUTCOMES	Level	Unit
CO1	Define the basics of Cryptography	K1	I
CO2	Compare the working principle of the Symmetric and Asymmetric Cryptographic Algorithms	K2	II
CO3	Make use of the digital certificates in message communication	K3	III
CO4	Examine the security concepts through secure socket layer	K4	IV
CO5	Evaluate security mechanism through Java and .Net	K5	V
CO6	Discuss the functions of Firewalls, IPSecurity and Virtual Private Networks.	K6	V

2. A. SYLLABUS

Unit – I: Introduction to Information Security and Cryptography   **9 Hours**
Need for Security – Security Approaches – Principles of Security – Types of Attacks –Cryptography:-Introduction–Plain Text & Cipher Text–Substitution Techniques–Transposition Techniques–Encryption & Decryption–Symmetric & Asymmetric Cryptography–Steganography.

Unit – II: Symmetric and Asymmetric Key Algorithms   **9 Hours**
Symmetric Key Algorithms: -Algorithm Types and Modes– Overview–DES–IDEA–RC4–RC5–AES–Asymmetric Key Algorithms: -Overview–RSA Algorithm–Symmetric and Asymmetric Key Cryptography.

Unit – III: Digital Signatures, Digital Certificates and Public Key Infrastructure   **9 Hours**
Digital Signatures: - Introduction – Message Digests – MD5 – SHA – SHA-512 – Message Authentication COURSE CODE – HMAC - Digital Signature Techniques – Digital Certificates and Public Key Infra Structure: - Digital Certificates – Private Key Management – The PKIX model – Public Key Cryptography Standards

Unit – IV : Internet Security Protocols and User Authentication and Kerberos   **9 Hours**
Internet Security Protocols: - Basic Concepts – SSL - TLS – SHTTP – TSP – Secure Electronic Transactions (SET)– Electronic Money – Email Security – WAP Security – GSM Security – User Authentication and Kerberos: - Authentication Basics – Passwords – Authentication Tokens – Certificate Based Authentication – Biometric Authentication – Kerberos – Key Distribution Centre – Security Handshake Pitfalls – Single Sign On Approaches.

Unit – V: Cryptography in JAVA.   **9 Hours**

Cryptography in JAVA, .NET and OS:- Cryptographic Solution in Java – Microsoft .NET Framework – Cryptographic Toolkits – Security and OS – Database Security – Network Security, Firewalls and VPN: - Firewalls – IP Security – Virtual Private Networks – Intrusion.

2.B Topics for Self Study

S. No	Topics	Web Links
1	Cyber Security	http://uou.ac.in/foundation-course/
2	Cyber Law	**https://www.tutorialspoint.com/information_security_cyber_law/quick_guide.htm/**
3	Block chain technology	**https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cs26/**
4	Steganography and Biometrics	**https://www.igi-global.com/chapter/steganography-using-biometrics/184201/**

2. C. Text Book(s)

1.   Atul Kahate, "Cryptography and Network Security", 2nd Edition, 6th Reprint, TMH Publications, New Delhi, 2009.

2. D. Reference Books

1.   William Stallings, "Cryptography and Network Security: Principles and Practices", Fourth Edition, Pearson Education, 2005.

2.   Charlie kaufman, Radia Perlman, Mike Speciner, "Network Security – Private Communication in a Public World", 2nd Edition, PHI Publications, 2002.

2. E. Web Links

1.   http://https//nptel.ac.in/courses/106/106/106106129/
2.   https://lecturenotes.in/project-report/17568-cyber-crime-and-its-prevention
3.   www.javatpoint.com › computer-network-security.
4.   https://www.tutorialspoint.com/network_security/index.htm/

3. PECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Contents	Learning Outcomes	Highest Bloom's Taxonomic Levels of Transaction
I	**Introduction to Cryptography**		
1.1	Need for Security – Security Approaches – Principles of Security – Types of Attacks	Recall the importance of security(K1) List the various types of attack(K1) Analyze the approaches of	K2

		security(K4)	
		Identify the principles of security(K3)	
1.2	**Cryptography:** -Introduction– Plain Text & Cipher Text–Substitution Techniques–Transposition Techniques – Encryption & Decryption–Symmetric & Asymmetric Cryptography– Steganography.	Define the basics of cryptography(K1)	
		Interpret encryption and decryption(K5)	
		Apply substitution and transposition techniques(K3)	
		Distinguish Symmetric and asymmetric cryptosystem(K4)	
		Plan to improve the secrecy using stegnography(K3)	
II	**Symmetric and Asymmetric Key Algorithms**		
2.1	**Symmetric Key Algorithms:-**Algorithm Types and Modes– Overview–DES–IDEA– RC4–RC5 – AES	Classify the types and modes of cryptographic algorithms(K2)	K2
		Illustrate the steps of DES,AES and IDEA algorithm with examples(K2)	
		Compare the steps of RC4 and RC5(K6)	
2.2	**Asymmetric Key Algorithms:** Overview–RSA Algorithm– Symmetric and Asymmetric Key Cryptography.	List the steps of RSA algorithm(K4)	
		Identify the attacks of RSA algorithm(K3)	
		Compare the symmetric and asymmetric algorithms(K4)	
III	**Digital Signatures, Digital Certificates and Public key Infrastructure**		
3.1	**Digital Signatures:** - Introduction – Message Digests – MD5 – SHA – SHA-512 – Message Authentication COURSE CODE – HMAC - Digital Signature Techniques	Explain the concept of message digest(K2)	K3
		Define the function of message authentication COURSE CODE (K1)	
		Illustrate the steps of MD5, SHA, SHA-1 algorithm(K2)	
		Compare the steps of MAC and HMAC algorithms(K5)	
		Build the digital signature and apply into message communication(K3)	
		Improve both MAC and Digital signature(K6)	
3.2	**Digital Certificates and Public Key Infra Structure:** - Digital Certificates – Private Key Management – The PKIX model – Public Key Cryptography Standards	Create Digital certificates by certification authority(K6)	
		Design PKIX model for digital Certificate creation(K6)	
		Plan the model and define the features of PKIX standards(K3)	
IV	**Internet Security Protocols, User authentication and Kerberos**		

4.1	**Internet Security Protocols: -** Basic Concepts – SSL - TLS – SHTTP – TSP – Secure Electronic Transactions (SET)– Electronic Money – Email Security – WAP Security – GSM Security –	Recall the ISO/OSI and TCP/IP model(K1)	K4
		Explain the concept of SET(K5)	
		Propose SSL in communication security(K6)	
		Compare the functionality of SSL and TLS(k4)	
		Asses the security level of Email(k5)	
		Inspect the security of money transfer(K4)	
		Apply the security in wireless network environment(K3)	
4.2	**User Authentication and Kerberos:** - Authentication Basics – Passwords – Authentication Tokens – Certificate Based Authentication – Biometric Authentication – Kerberos – Key Distribution Centre – Security Handshake Pitfalls – Single Sign On Approaches.	Recall the basics of authentication(K1)	
		Asses the authentication based on passwords and tokens(K5)	
		Compare Authentication based techniques(K5)	
		Build Kerberos Authentication mechanism(K3)	
		Identify the issues of key distribution centre(K3)	
V	**Cryptography in JAVA, .NET and OS, Network Security, Firewalls and VPN**		
5.1	**Cryptography in JAVA, .NET and OS:-** Cryptographic Solution in Java – Microsoft .NET Framework – Cryptographic Toolkits – Security and OS – Database Security	Construct cryptographic solution through Java(K3)	K6
		Inspect the security system using Microsoft .Net framework(K4)	
		Identify the cryptographic toolkits(K3)	
		Plan to improve the security of OS and database(K6)	
5.2	**Network Security, Firewalls and VPN:** - Firewalls – IP Security – Virtual Private Networks – Intrusion.	Plan to protect the unwanted data by using firewall(K6)	
		Design the protocols to provide the security for internet(K6)	
		Define the VPN (K1)	
		Experiment with the security concepts in VPN.(K3)	
		Measures the security level(K5)	

4. MAPPING SCHEME FOR THE POS,PSOS AND COS

U21IT516	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	M	L	L	L	M	L	L	L	M	H	L	L	M
CO2	L	H	H	H	M	M	M	L	H	H	L	M	H
CO3	H	M	M	H	H	H	H	H	H	M	M	M	H
CO4	H	H	H	M	H	H	H	H	M	H	M	H	M
CO5	M	H	H	H	H	H	H	M	H	M	H	H	H
CO6	H	M	M	M	M	H	M	M	H	H	H	H	H

L-Low   **M-Moderate**   **H- High**

5. COURSE ASSESSMENT
 METHODS DIRECT:
1.   Continuous Assessment Test T1,T2 (Theory & Practical Components): Closed Book
2.   Open Book Test.
3.   Cooperative learning report, Assignment, Group Presentation, Group Discussion, Project Report, Field Visit Report, Poster Presentation, Seminar, Quiz (written).
4.   Pre-Semester & End Semester Theory Examination.
INDIRECT
1.   Course end survey (Feedback)

PRINCIPLES OF MARKETING

SEMESTER – V   **COURSE CODE : U21IT517**
Credits: 2   **HOURS/WEEK : 2**

Objectives:
- *To understand the basic principles of Marketing*
- *To acquire skills for effective promotion of concepts, commodities and services.*

UNIT-1   **6 HOURS**
Marketing function - Marketing concept - Marketing Management System Objectives and its interfaces with other functions in the organization.

UNIT II   **6 HOURS**
Marketing Environment – Demographic, Economic, Physical, Technological, Political- Marketing segmentation, targeting and positioning.

UNIT III   **6 HOURS**
Consumer markets and buying behaviour- (terms).

UNIT IV   **6 HOURS**
Concept of Marketing Mix. - Four P's of Marketing, -Marketing Strategies – Concept of Product Life Cycle- New Product Development Process – Pricing Decisions.

UNIT V   **6 HOURS**
Introduction to service marketing: Types of service – Difference between goods & service – problems in service, Bank, Insurance, BPO – Handling complaints – Quality of service..

TEXT BOOKS
1. Philip Kotler, Kevin Lane Keller, **"Marketing Management"** 15th Edn. Pearson Education. 2015.
2. Rajan Saxena, **"Marketing Management"**, Tata McGraw Hill Education Pvt. Ltd., 2009

REFERENCE BOOKS
1. V.S. Ramasamy, S. Namakumari, **"Marketing management"**, 4th Edition, OM Books, 2010.
2. William J Stanton, Michael J Etzel, Bruce J Walker, **"Fundamentals of Marketing"** McGraw Hill, International Edition, 1994.

SOFTWARE ENGINEERING

SEMESTER: V   **COURSE CODE : U21IT5:1**
CREDITS: 3   **HOURS/WEEK : 3**

1.COURSE OUTCOMES:

After the successful completion of this course the students will be able to

CO No	Course Outcomes	Level	Unit
CO1	Define size, quality factors and plan organization structure.	K1	I
CO2	Outline the cost estimation of Software.	K2	II
CO3	Identify the requirement specification notations.	K3	II
CO4	Examine the design notations, techniques and considerations.	K4	III
CO5	Determine programming standards and procedures.	K5	IV
CO6	Adapt different testing strategies and quality factors of process models.	K6	V

2.A.SYLLABUS

UNIT I:Planning a Software Project   9 Hours
Introduction: Definitions – Size factors – Quality and Productivity Factors – Managerial Issues –Planning a Software Project: Introduction – Defining the Problem – Developing a Solution Strategy – Planning and Development Process – Planning an Organizational Structure.

UNIT II:Software Cost Estimation, Software Requirement Definition   9 Hours
Software Cost Estimation: Software Cost Factors – software Cost Estimation Techniques – Staffing Level Estimation – Estimating Software Maintenance Costs – Software Requirement Definition: Software Requirement Specification – Formal Specification Techniques – Languages and Processors for Requirements.

UNIT III:Software Design   9 Hours
Software Design: Fundamental Design Concepts – Modules and Modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations – Real Time and Distributed Systems – Test Plans – Milestones, Walkthroughs and Inspections – Design Guidelines.

UNIT IV :Implementation Issues, Modern Programming Language Features   9 Hours
Implementation Issues: Structured Coding Techniques – Coding Style – Standards and Guidelines Documentation Guidelines. Modern Programming Language Features: User-Defined Data Types - Data Abstraction – Exception Handling – Concurrency Mechanisms.

UNIT V:Verification and Validation Techniques, Software Maintenance   9 Hours
Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – Static Analysis – Symbolic Execution – Unit Testing and Debugging – System Testing – Formal Verification – Software Maintenance: Enhancing Maintainability During Development – Managerial Aspects – Configuration Management – Source COURSE CODE Metrics.

2.B. Topics for Self-Study:

S.No.	Topics	Web Links
1	Advancements in Software Engineering	https://www.ecpi.edu/blog/most-important-technological-advances-software-developers
2	Cleanroom software development	https://www.youtube.com/watch?v=XNENtRpYy2o
3	Apply Software engineering concepts in Web application	https://www.youtube.com/watch?v=rwGTkaUuzXQ
4	Agile software development life cycle	https://relevant.software/blog/agile-software-development-life-cycle-phases-explained

2.C. Text Book(s):

1. Richard Fairley, **"Software Engineering Concepts"**, Tata McGraw-Hill Education, 2008.

2.D. Reference Books:

1. Ian Sommerville, **"Software Engineering"**, 6th Edition, Pearson Education, Delhi, 2005.

2. Douglas Bell, **"Software Engineering for Students-A Programming Approach"**, 4th Edition, Pearson Education, Delhi

2.E. Web links:

1.   http://www.qucis.queensu.ca/Software-Engineering/reading.html
2.   http://infolab.stanford.edu/~burback/watersluice/watersluice.html
3.   https://www.youtube.com/watch?v=sB2iQSvrcG0
4.   https://www.youtube.com/watch?v=4b1D1QFEel0

3.SPECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Planning a Software Project**		
1.1	Introduction: Definitions – Size factors – Quality and Productivity Factors – Managerial Issues	Define the Size of the project .(K1)	
		Illustrate the quality and productivity factors for project development.(K2)	
		Identify the managerial issues of the project.(K3)	
1.2	Planning a Software Project: Introduction – Defining the Problem – Developing a Solution Strategy – Planning	Recall how to define a problem.(K1)	K1
		Define the strategy for finding a solution.(K1)	

		and Development Process – Planning an Organizational Structure.	Outline the standards and techniques of process model.(K2)	
			Organize the structure of software.(K3)	
II		**Software Cost Estimation, Software Requirement Definition**		
2.1		Software Cost Estimation: Software Cost Factors – software Cost Estimation Techniques – Staffing Level Estimation – Estimating Software Maintenance Costs.	Illustrate the cost factors of software.(K2)	K2
			Identify the techniques used for estimating cost.(K3)	
			Estimate number of staff involved in project.(K5)	
			Inspect the maintenance cost of software. (K3)	
2.2		Software Requirement Definition: Software Requirement Specification – Formal Specification Techniques – Languages and Processors for Requirements.	Identify the people who participate in the requirement.(K2)	
			Interpret the requirement in the form of documentation.(K3)	
			Examine the requirement specification technique for designing.(K3)	
			Utilize the languages for requirements specification.(K3)	
III		**Software Design**		
3.1		Software Design: Fundamental Design Concepts – Modules and Modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations – Real Time and Distributed Systems – Test Plans – Milestones, Walkthroughs and Inspections – Design Guidelines.	Analyze the design concepts.(K4)	K3
			Identify the criteria of modularization.(K3)	
			Examine the techniques and consideration of high-level design.(K4)	
			Create the test plan for validation.(K6)	
			Inspect the milestones using design guidelines.(K4)	
IV		**Implementation Issues, Modern Programming Language Features**		
4.1		Implementation Issues: Structured Coding Techniques – Coding Style – Standards and Guidelines Documentation Guidelines.	Asses the coding techniques for structured programming.(K5)	K5
			Examine the various coding styles for implementation.(K4)	
			Choose the guidelines for documentation.(K6)	
4.2		Modern Programming Language Features: User-Defined Data Types - Data Abstraction – Exception Handling – Concurrency Mechanisms	Illustrate the various types of user defined data type.(K2)	
			Make use of data abstraction for programming.(K3)	
			Explain exception handling with their types.(K2)	

		Prioritize the processes in concurrency mechanism.(K5)	
V	**Verification and Validation Techniques, Software Maintenance**		
5.1	Verification and Validation Techniques**:** Quality Assurance – Walkthroughs and Inspections – Static Analysis – Symbolic Execution – Unit Testing and Debugging – System Testing – Formal Verification.	Identify the quality factors and standards of software engineering.(K3)	K6
		Plan the formal walkthroughs and inspections.(K6)	
		Recommend appropriate testing for developed software.(K5	
		Create the formal verification.(K6)	
5.2	Software Maintenance: Enhancing Maintainability During Development – Managerial Aspects – Configuration Management – Source COURSE CODE Metrics.	Outline the technique used for enhancing the maintainability of software.(K2)	
		Explain the configuration management of software.(K5)	
		Predict the metrics of Lines of COURSE CODE of software.(K6)	

4.MAPPING (PO, PSOS AND COS)

U21IT5:1	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO 3	PSO 4
CO1	H	M	H	M	M	L	H	L	L	M	H	L	M
CO2	L	H	M	M	M	M	H	M	M	M	H	L	M
CO3	L	M	H	M	H	L	H	L	L	M	H	L	M
CO4	L	L	M	H	M	L	M	M	L	M	H	L	M
CO5	M	L	H	H	M	L	H	L	M	M	H	L	M
CO6	L	H	M	H	H	M	M	L	L	M	H	L	M

L-Low   **M-**Moderate   **H-** High

5. COURSE ASSESSMENT METHODS
DIRECT:

1.   Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2.   Open Book Test.
3.   Assignment ,Project Report, Field Visit Report, Seminar, Quiz (written).
4.   Pre-Semester & End Semester Theory Examination
INDIRECT:

1. Course end survey (Feedback)

SOFTWARE PROJECT MANAGEMENT

SEMESTER: V   **COURSE CODE : U21IT5:A**
CREDITS: 3   **HOURS/WEEK: 3**

1.COURSE OUTCOMES:
After the successful completion of this course the students will be able to

CO No.	Course Outcomes	Level	Unit
CO1	Recall steps involved in project planning.	K1	I
CO2	Outline the cost and risk in project.	K2	II
CO3	Plan the project schedule, manage risk and identify hazards in the project.	K3	III
CO4	Analyze how to prioritize and manage and control the contract.	K4	IV
CO5	Determine the team involved in the project.	K5	V
CO6	Build the safety and health of the people involved in project.	K6	V

UNIT I:Introduction to Software Project Management Project   **9 Hours**
Introduction to Software Project Management Project Definition – Contract Management – Activities
Covered by Software Project Management – Overview of Project Planning – Stepwise Project Planning.

UNIT II:Project Evaluation   **9 Hours**
Project Evaluation**:** Strategic Assessment – Technical Assessment – Cost Benefit Analysis–Cash Flow
Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

UNIT III:Activity Planning   **9 Hours**
Activity Planning Objectives – Project Schedule – Sequencing and Scheduling Activities –Network
Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration –
Activity on Arrow Networks – Risk Management – Nature of Risk – Types of Risk – Managing Risk –
Hazard Identification – Hazard Analysis – Risk Planning and Control.

UNIT IV:Monitoring and Control   **9 Hours**
Monitoring and Control: Creating Framework – Collecting the Data – Visualizing Progress – Cost
Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back to Target – Change Control
– Managing Contracts – Introduction – Types of Contract – Stages in Contract Placement – Typical
Terms of a Contract – Contract Management – Acceptance.

UNIT V:Managing People and Organizing Teams   **9 Hours**
Managing People and Organizing Teams: Introduction – Understanding Behavior – Organizational
Behavior: A Background – Selecting the Right Person for The Job – Instruction in The Best Methods –
Motivation – The Old man – Hackman Job Characteristics Model – Working in Groups – Becoming A

Team –Decision Making – Leadership – Organizational Structures – Stress –Health and Safety – Case Studies.

2.B. Topics for Self-Study:

S.No.	Topics	Web Links
1	Defining Software Quality	https://xbosoft.com/definition-software-quality/
2	Software Measures	https://www.tutorialspoint.com/software_quality_management /software_quality_measurement_metrics.htm
3	Product Vs. Process Quality Management.	https://www.ease.io/manufacturing-quality-control -the-difference-between-product-and-process-audits/
4	External Standards.	https://www.gristprojectmanagement.us/software-2 /external-standards.html

2.C. Text Book(s):

1. Bob Hughes, Mike Cotterell, **"Software Project Management"**, 4th edition. TMH, 2009

2.D. Reference Books:

1. Walker Royce, **"Software Project Management"**, Pearson Education, 1998.

2. Pankaj Jalote, **"Software Project Management in Practice"**, Pearson Education, 2002.

2.E. Web Links:

1. http://www.processimpact.com/articles/telepathy.html
2. http://www.agile-software-development.com/
3. https://www.youtube.com/watch?v=eOTcPOvT-H4
4. https://www.youtube.com/watch?v=fbwmAzPY8tE

3.SPECIFIC LEARNING OUTCOMES (SLO):

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Introduction to Software Project Management Project**		
1.1	Definition – Contract Management – Activities Covered by Software Project Management – Overview of Project Planning – Stepwise Project Planning.	Define, what is a software project?(K1)	K1
		Illustrate the activities covered in project.(K2)	
		Identify what should be included in project.(K3)	
		Organize the activities of project plan.(K3)	
II	**Project Evaluation**		

2.1	Strategic Assessment – Technical Assessment – Cost Benefit Analysis–Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.	Tells how to assess the strategic and technical activities of project evaluation.(K1)	K2
		Analyze the benefits of project.(K4)	
		Inspect the risk involved in project.(K4)	
		Build the techniques for cost evaluation and cash flow.(K6)	
III	**Activity Planning**		
3.1	Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.	What are the objectives of the project proposed?(K1)	K3
		Illustrate the activities of the project with a plan.(K1)	
		Organize the activities and schedule appropriately.(K3)	
		Propose an activity on the network which comes first and next.(K6)	
		Analyze the types of risk that occur.(K4)	
		Identify the risk and control the risk with tolerance.(K3)	
IV	**Monitoring and Control**		
4.1	Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.	Explain the structure of system.(K2)	K5
		Identify the data required for development.(K3)	
		Classify the priority according to importance.(K4)	
		Construct the contracts for developing subsystems.(K6)	
		Demonstrate the stages in contract.(K2)	
V	**Managing People and Organizing Teams**		
5.1	Introduction – Understanding Behavior – Organizational Behavior: A Background – Selecting the Right Person for The Job – Instruction In The Best Methods – Motivation – The Old man – Hackman Job Characteristics Model – Working In Groups –	Recall the behavior of the people in development.(K1)	K6
		Select the correct person with the experience.(K1)	
		Appraise the person for his work involvement.(K5)	
		Propose right decision-making work in group.(K6)	

Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.	Create organizational hierarchy.(K6)												
	Build health and safety measures of team members.(K3)												

4.MAPPING (PO, PSOS AND COS)

U21IT5:A	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO 3	PSO 4
CO1	H	M	M	M	L	L	L	L	L	H	M	L	L
CO2	M	M	H	H	L	L	M	L	L	H	M	L	L
CO3	M	M	H	H	M	L	M	L	L	H	M	L	L
CO4	L	H	H	H	M	L	M	L	L	H	M	L	L
CO5	L	M	M	M	H	M	H	M	M	H	M	L	M
CO6	L	L	L	M	M	H	H	H	M	H	M	L	M

L-Low   **M-Moderate**   **H- High**

5. COURSE ASSESSMENT METHODS
DIRECT:

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Assignment, Group Discussion, Field Visit Report,Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

INDIRECT:

2. Course end survey (Feedback)

SOFTWARE TESTING

SEMESTER: V   **COURSE CODE: U21IT5:B**
CREDITS: 3   **HOURS/WEEK: 3**

1.COURSE OUTCOMES:

After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Unit
CO1	Recall the Software Development Life cycle.	K1	I
CO2	Illustrate the need for testing in software development process.	K2	II
CO3	Identify the needs of system testing.	K3	III
CO4	Analyse test phases and formulate tools for testing.	K4	IV
CO5	Build test plan, manage and report the software developed.	K6	V
CO6	Create test automation tools for programming model.	K6	V

2.A. SYLLABUS
UNIT I: Software Development Life Cycle Models, White Box, Black Box Testing   9 Hours
Software Development Life Cycle Models: – Phases of Software Project – Quality, Quality Assurance and Quality control – Testing, Verification & Validation – Process Model – Life Cycle Models - White Box Testing: Overview of White Box Testing – Static Testing – Structural Testing – Challenges - Black Box Testing: Overview of Black Box Testing – Need for Black Box Testing – When to do Black Box Testing? – How to do Black Box Testing?

UNIT II:Integration, System and Acceptance Testing   9 Hours
Integration Testing: Overview of Integration Testing – Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario testing – Defect Bash - System and Acceptance Testing: Overview – Need for System Testing – Functional Vs Non-Functional Testing – Functional System Testing – Non-Functional Testing – Acceptance Testing – Summary of Testing Phases.

UNIT III:Performance and Regression Testing   9 Hours
Performance Testing: Factors governing Performance Testing – Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing - Regression Testing: – What is Regression Testing – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

UNIT IV:Internationalization   9 Hours
Internationalization (I18n) Testing: - Primer – Test Phases – Enabling Testing – Locale Testing – Validation – Language Testing – Localization Testing – Tools – Challenges and Issues – Ad hoc Testing:
- Overview – Buddy Testing – Pair Testing – Exploratory Testing – Iterative Testing – Agile and Extreme Testing – Defect Seeding – Usability and Accessibility Testing: - Overview of Usability Testing – Approach – When to do Usability Testing? – How to Achieve Usability? – Quality Factors – Aesthetics Testing – Accessibility Testing – Tools – Lab Setup – Test Roles

UNIT V:Test Planning   9 Hours

Test Planning, Management, Execution and Reporting: - Test Planning -Test Management – Test Process – Test Reporting – Best Practices - Software Test Automation: What is Test Automation – Terms used in Automation – Skills Needed for Automation – What to Automate, Scope of Automation – Design & Architecture for Automation – Generic Requirement for Test Tool Framework – Process model for Automation – Selecting a Test tool – Automation for Extreme Programming Model – Challenges in Automation.

2.B. Topics for Self-Study:

S.No.	Topics	Web Links
1	Develop a strategy for testing software that uses a sequence of testing steps	https://www.edureka.co/blog/software-testing-strategies/
2	Strategy along with test case design	https://reqtest.com/testing-blog/test-case-design-techniques/
3	Testing Principles	https://www.guru99.com/software-testing-seven-principles.html
4	Concepts of testing	https://techazzist.wordpress.com/2012/05/04/basic-concepts-of-software-testing/
5	Strategies and tactics for Extreme programming.	http://agilemodeling.com/essays/agileModeling XP.htm

2.C. Text Book(s):

1. Srinivasan Desikan, Gopalaswamy Ramesh, "**Software Testing–Principle & Practices"**, Pearson Education, New Delhi, 2006. .

2.D. Reference Books :

1. Ron Patton, "Software Testing", 2nd Edition, Pearson Education, New Delhi, 2006.
2. William E. Perry, "Effective Methods for Software Testing", 3rd Ed., Wiley India, 2006.
3. Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", TMH Publishing Company Limited, New Delhi, 2004.

2.E. Web Links:

1.   http://en.wikipedia.org/wiki/Software_testing#White-box_and_black-box_testing
2.   http://www.testingstuff.com/
3.   https://www.youtube.com/watch?v=goaZTAzsLMk
4.   https://www.youtube.com/watch?v=cv6GvRCIuTs

3.SPECIFIC LEARNING OUTCOMES (SLO):

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Software Development Life Cycle Models, White Box, Black Box Testing**		

1.1	Software Development Life Cycle Models: Phases of Software Project – Quality, Quality Assurance and Quality control – Testing, Verification & Validation – Process Model – Life Cycle Models	Recall the phases of the SDLC.(K1)	
		Outline the various process models for software development.(K2)	
		Identify the quality by following standards.(K3)	
		Examine the software by testing with requirement.(K4)	K1
1.2	White Box Testing Overview of White Box Testing – Static Testing – Structural Testing – Challenges -	Tells what white box is testing.(K1)	
		Recall why white box testing.(K1)	
		Apply the testing strategies for doing static testing.(K3)	
1.3	Black Box Testing**:** Overview of Black Box Testing – Need for Black Box Testing – When to do Black Box Testing? – How to do Black Box Testing?	Defines black box testing.(K1)	
		Identify why, when, where and how to do black box testing.(K3)	
II	**Integration, System and Acceptance Testing**		
2.1	Integration Testing**:** Overview of Integration Testing – Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario testing – Defect Bash	Label the use of integration testing.(K1)	
		Relate the testing with previous and next phase.(K1)	
		Identify the bugs and send them to development team.(K3)	
2.2	System and Acceptance Testing: Overview – Need for System Testing – Functional Vs Non-Functional Testing – Functional System Testing – Non-Functional Testing – Acceptance Testing – Summary of Testing Phases.	Defines the importance of system testing.(K1)	K2
		Explain the functional and non-functional testing.(K2)	
		Identify the satisfactory level of testing.(K3)	
		Tells the test plan in each phase. (K2)	
III	**Performance and Regression Testing**		
3.1	Performance Testing: Factors governing Performance Testing – Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing	Recall the factors used for testing the performance.(K1)	
		Outline the road map for testing.(K2)	
		Identify the manual or automation tools for testing the performance.(K3)	
		Illustrate the plan of process to test.(K2)	
3.2	Regression Testing: What is Regression Testing – Types of Regression Testing – When to do Regression Testing – How to do	Define the importance of regression testing.(K1)	K3
		Illustrate the various types of regression testing.(K2)	

	Regression Testing – Best Practices in Regression Testing.	Tells when and how to perform regression testing.(K1)	
		Determine the innovation of regression testing.(K5)	
IV	**Internationalization (I18n) Testing, Ad hoc Testing and Usability and Accessibility Testing**		
4.1	Internationalization (I18n) Testing**:** Primer – Test Phases – Enabling Testing – Locale Testing – Validation – Language Testing – Localization Testing – Tools – Challenges and Issues –	Define languages, character set and locale.(K1)	
		Recall validation and language testing.(K1)	
		Explain the localization of testing.(K2)	
		Identify the tools for testing.	
		Inspect the challenges and issues in testing.(K3)	
4.2	Ad hoc Testing: - Overview – Buddy Testing – Pair Testing – Exploratory Testing – Iterative Testing – Agile and Extreme Testing – Defect Seeding	Define different types of Ah hoc testing.(K4)	K4
		Tells techniques in exploratory testing.(K1)	
		Recall agile and extreme testing.(K1)	
4.3	Usability and Accessibility Testing: - Overview of Usability Testing – Approach – When to do Usability Testing? – How to Achieve Usability? – Quality Factors – Aesthetics Testing – Accessibility Testing – Tools – Lab Setup – Test Roles	Define the usability testing.(K1)	
		When, how to achieve usability.(K1)	
		Outline the quality factors.(K2)	
		Identify tools and lab setup of testing.(K3)	
		Apply aesthetic and accessibility testing.(K3)	
V	**Test Planning, Management, Execution and Reporting, Software Test Automation**		
5.1	Test Planning, Management, Execution and Reporting: Test Planning -Test Management – Test Process – Test Reporting – Best Practices	What is test planning and management?(K1)	
		Tells the activities involved i test process.(K1)	
		Explains the test reporting.(K2)	
		Tells the best practices of testing.(K1)	
5.2	Software Test Automation**:** What is Test Automation – Terms used in Automation – Skills Needed for Automation – What to Automate, Scope of Automation – Design & Architecture for Automation – Generic Requirement for Test Tool Framework – Process model for Automation – Selecting a Test tool – Automation for Extreme	Recall the test automation.(K1)	K6
		List the tools and techniques used for automation testing.(K1)	
		Select the scope of automation.(K1)	
		Identify the requirement test tool.(K3)	
		Analyze the challenges in automation.(K4)	
		Select a test tool of automation testing.(K1)	

		Programming Model – Challenges in Automation.		

4.MAPPING (PO, PSOS AND COS)

U21IT5:B	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO 3	PSO 4
CO1	H	M	L	L	L	L	M	L	L	H	L	L	L
CO2	M	H	L	L	L	L	L	L	L	H	L	L	L
CO3	L	H	M	M	L	L	M	L	L	H	L	L	L
CO4	L	M	H	H	M	L	M	L	L	H	L	M	L
CO5	L	L	M	H	M	L	M	L	L	M	M	H	L
CO6	L	M	M	H	M	M	M	L	L	M	M	H	L

L-Low   **M-Moderate**   **H- High**

5. COURSE ASSESSMENT

METHODS DIRECT:
1.   Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2.   Open Book Test.
3.   Assignment, Group Discussion, project Report, Field Visit Report, Seminar, Quiz (written).
4.   Pre-Semester & End Semester Theory Examination

INDIRECT:

1. Course end survey (Feedback)

WEB DEVELOPMENT LAB

SEMESTER: V   **COURSE CODE: U21ITP09**
CREDITS: 4   **HOURS/WEEK: 4**

1.COURSE OUTCOMES:

After the successful completion of this course, the students will be able to

CO. No.	Course Outcomes	Level	Exercise
CO1	Build web pages using basic HTML and tables	K3	1 – 4
CO2	Make use of hyperlinks, images and image maps	K3	5– 7
CO3	Examine the concepts of Lists, frames, CSS and Forms	K4	8– 10
CO4	Recommend various arithmetic operations to create simple calculator.	K5	11 – 15
CO5	Build an application using JavaScript string functions to manipulate the text.	K5	16-18
CO6	Create web application using JavaScript and perform form validation.	K6	19-20

2.A.SYLLABUS

Ex. No.	Exercise
1.	Create a web page employing the Basic Tags
2.	Design a web page using different Heading Styles.
3.	Employ different types of Text Formatting.
4.	Design a web page with Tables.
5.	Create a web page with Hyperlinks.
6.	Create a web page with Images.
7. PC	Design a web page involving Image Maps.
8.	Design a web page employing Lists.
9.	Create a web page with Frames.
10.	Design a web page employing Inline Cascaded Style Sheets.
11.	Create a web page using Internal CSS.
12.	Develop a web page by linking External CSS.
13.	Create a Registration Form using HTML tags.
14.	Create a website for shopping mall.
15.	Using Java Script perform Arithmetic Operations in a web page.
16.	Create a program using Java Script functions.
17.	Using Java Script strings perform sorting and text manipulation.
18.	Write Java Script code using string functions.
19.	Develop a Calculator Using Java Script.
20.	Perform Form Validations Using Java Script.

2.B.Topics for Self-Study

S.No.	Topics	Web Links
1	HTML5 Examples	https://www.tutorialrepublic.com/html-examples.php
2	CSS3 Examples	https://www.tutorialrepublic.com/css-examples.php
3	JavaScript	https://www.w3schools.com/js/js_intro.asp

3.SPECIFIC LEARNING OUTCOMES (SLO)

Ex. No.	Lab Exercises	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction

1	Create a web page employing the Basic Tags	• Build a web page using basic html tags and format the output. (K3) • Identify the output in the browser. (K3)	K3
2	Design a web page using different Heading Styles.	• Build a web page to structure the web using different heading style tags. (K3) • Identify the output in the browser. (K3)	K3
3	Employ different types of Text Formatting.	• Build a web page to format the text in a web page. (K3) • Identify the output in the browser. (K3)	K3
4	Design a web page with Tables.	• Build a web page with Table and span according to your requirement. (K3) • Identify the output in the browser. (K3)	K3
5	Create a web page with Hyperlinks.	• Build many web pages and use hyperlinks to navigate between them. (K3) • Identify the output in the browser. (K3)	K3
6	Create a web page with Images.	• Build a web page with images and align them in proper order. (K3) • Identify the output in the browser. (K3)	K3
7	Design a web page involving Image Maps.	• Build a web page with Images and map with the selected area to make it a clickable link to navigate. (K3) • Identify the output in the browser. (K3)	K3
8	Design a web page employing Lists.	• Examine the concept of ordered and unordered lists in HTML by creating a web page. (K4) • Inspect the output in the browser. (K4)	K4
9	Create a web page with Frames.	• Examine the concept of frames in HTML to view multiple pages by creating web pages. (K4) • Inspect the output in the browser. (K4)	K4
10	Design a web page employing Inline Cascaded Style Sheets.	• Examine the concept of Style sheet using Inline CSS and apply those in HTML web page. (K4) • Inspect the output in the browser. (K4)	K4
11	Create a web page using Internal CSS.	• Examine the concepts of Internal style sheet to format the document. (K4) • Inspect the output in the browser. (K4)	K4
12	Develop a web page by linking External CSS.	• Determine external CSS styles and create style sheet, link to the needed document. (K5) • Evaluate the output in the browser. (K5)	K5
13	Create a Registration Form using HTML tags.	• Examine the concepts of form controls in HTML by creating a registration form. (K5) • Inspect the output in the browser. (K5)	K5

14	Create a website for shopping mall.	• Determine all the concepts of HTML and create a shopping mall website. (K5) • Interpret all the available tags. (K5) • Evaluate the output in the browser. (K5)	K5
15	Using Java Script perform Arithmetic Operations in a web page.	• Recommend various arithmetic operations for creating simple calculator. (K5) • Evaluate the output in the browser. (K5)	K5
16	Create a program using Java Script functions.	• Determine the JavaScript functions to perform various task. (K5) • Evaluate the output in the browser. (K5)	K5
17	Using Java Script strings perform sorting and text manipulation.	• Build java script application to perform sorting of given numbers and names. (K5) • Evaluate the output in the browser. (K5)	K5
18	Write Java Script code using string functions.	• Employ various string manipulation functions for the given string. (K5) • Examine the output in the browser. (K5)	K5
19	Develop a Calculator Using Java Script.	• Develop a calculator using operators available in JavaScript. (K6) • Evaluate the output in the browser. (K6)	K6
20	Perform Form Validations Using Java Script.	• Create a script to validate the user input given in the form. (K6) • Perform various validations. (K6) • Evaluate the output in the client side. (K6)	K6

4.MAPPING (CO, PO, PSO)

U21ITP09	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	M	M	M	L	L	L	L	M	M	H	L	L
CO2	M	L	H	M	L	L	L	L	L	M	H	L	L
CO3	H	M	L	L	L	L	L	L	L	M	H	M	L
CO4	M	M	H	H	L	L	L	L	L	M	H	L	L
CO5	M	H	H	H	M	L	M	L	L	M	H	M	L
CO6	M	H	H	H	M	L	M	L	L	M	H	M	L

L – Low   **M** – Moderate   **H** – High

5.COURSE ASSESSMENT
METHODS DIRECT:

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2. Pre/Post Test, Viva, Report for each Exercise.
3. Lab Model Examination & End Semester Practical Examination

INDIRECT:
1. Course end survey (Feedback)

PHP AND MYSQL PROGRAMMING LAB

SEMESTER: V   **COURSE CODE: U21ITP10**
CREDITS: 4   **HOURS/WEEK: 4**

1.COURSE OUTCOMES
After the successful completion of this course, the students will be able to

CO. No.	COURSE OUTCOMES	Level	Exercise
CO1	Identify the concept to read, understand and the execution of PHP Programming	K3	1-2
CO2	Illustrate the use of operators and expressions to solve the problems	K3	3-4
CO3	Function to test given character is lower or upper case, search word and palindrome.	K4	5-7
CO4	Execute programs with appropriate function statements to solve the problems.	K5	8-13
CO5	Create validations,cookies, sessions and Authentication in PHP	K5	14-17
CO6	Develop HTML, hashing functions in programs to solve the problems. and Demonstrate accessing MySQL using PHP.	K6	18-20

2.A.SYLLABUS

Ex. No.	Exercise
1.	Number of days in a month
2.	Sorting Numbers.
3.	Sorting Names
4.	Function Using reverse an integer and a string.
5.	Function to test given character is lower or upper case
6.	Search a given word in a text.
7.	Check a given number is a palindrome.
8.	Test a 10 String functions.
9.	Develop home page for College.
10.	Develop a program and check file System functions, network functions, Date and time functions.
11.	Check message passing mechanism between pages.
12.	Check Regular Expression, HTML functions, Hashing Functions.
13.	Download a file from the server.
14.	Develop a web page for user registration with suitable validations.
15.	Store the current date and time in a COOKIE and display the 'Last Visited' date and time on the web page.
16.	Store page views count in SESSSION, to increment the count on each refresh and to show the count on web page.

17.	Maintain student records using files.
18.	An inventory program to demonstrate Insertion,Updation and deletion of rows in MYSQL tables.
19.	Forms to display Employee records stored in MYSQL.
20.	College application form using MYSQL table.

2.B. Topics for Self Study

S.No.	Topics	Web Links
1	Create Pongal Greeting card using Photoshop	https://www.javatpoint.com/programs-list#string
2	Create animated text using in Adobe Flash	https://www.javatpoint.com/programs-list#singly-linked-list
3	Create image ,video and audio using in Premier pro	https://beginnersbook.com/2014/07/java-program-to-get-ip-address/
4	Create Christmas audio song using in Adobe Audition	https://www.w3resource.com/java-exercises/sorting/index.php

3. SPECIFIC LEARNING OUTCOMES (SLO)

Ex.No	Lab Excerises	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
1.	Number of days in a month	● List the functions(K1) ● Explain the if function(K2) ● Plan the functions(K3) ● Utilize function(K4) ● Develop the days in a month(K3)	K3
2.	Sorting Numbers.	● Tell the sorting number(K1) ● Demonstrate the sorting function(K2) ● Make use of the sorting function(K3) ● Test the sorting function(K4) ● Organize sorting number(K3) ● Experiment with the sorting function(K3)	K3
3.	Sorting Names	● Define Sorting(K1) ● Demonstrate the sorting function (K2) ● Make use of the sorting function(K3) ● Test the sorting function(K4) ● Organize sorting number(K3) ● Experiment with the sorting function(K3)	K3
4.	Function Using reverse an integer and a string.	● Classify reverse an integer and string functions(K2) ● Demonstrate reverse function(K2) ● Organize the reverse function(K3)	K3

		• Test for the reverse function(K4) • Experiment with the reverse function(K3)	
5.	Function to test given character is lower or upper case	• Define lower- and upper-case function(K1) • Illustrate lower and upper function(K2) • Apply the lower and upper function(K3) • Test the lower and upper function(K4) • Analyze the lower and upper integer and string(K4) •	K4
6.	Search a given word in a text.	• Define search a given word function(K1) • Analyze the given word(K4) • Apply the search function(K3) • Test for the search function(K4)	K4
7.	Check a given number is a palindrome.	• Define palindrome(K1) • Analyze Palindrome(K2) • Apply Palindrome number(K3) • Test for the palindrome number(K4) • Demonstrate the Palindrome number(K2)	K4
8.	Test a 10 String functions.	• List String function(K1) • Classify the string function(K2) • Demonstrate the String function(K2) • Test for the string function(K4) • Assess the string function(K5) • Evaluate the string function(K5)	K5
9.	Develop home page for College.	• Define browsers do with it(K1) • Make use of text elements and image(K3) • Test for the home page(K4) • Evaluate the home page(K)	K5
10.	Develop a program and check file System functions, network functions, Date and time functions.	• Define file system, network, date and time function(K1) • Illustrate file, network, date and time function(K2) • Test for the file function(K4) • Assess the date function(K5)	K5
11.	Check message passing mechanism between pages.	• Define message passing mechanism(K1) • Demonstrate message passing between pages(K2) • Analyze the message passing.(K4) • Analyze the pages(K4) • Appraise the message passing pages(K5)	K5
12.	Check Regular Expression, HTML functions, Hashing Functions.	• Define Regular Expression(K1) • Classify Hashing functions(K2) • Make use of Regular Expression with function(K3) • Test for the Hashing function(K4) • Analyze the hashing (K5) • Appraise the regular expression(K5)	K5

13.	Download a file from the server.	● Define server and file(K1) ● Apply file from the server(K3) ● Analyze the file from the server(K4) ● Analyze a file from the server(K5) ● Appraise the file from the server(K5)	K5
14.	Develop a web page for user registration with suitable validations.	● Recall the web page(K1) ● Apply the validations(K3) ● Make use of the validations function(K3) ● Test for the registration form(K4) ● Analyze a web page for user registration(K4) ● Evaluate the web page(K5)	K5
15.	Store the current date and time in a COOKIE and display the 'Last Visited' date and time on the web page.	● Show cookie(K1) ● Explain COOKIE function(K2) ● Experiment with Web page (K3) ● Test for the current date and time(K4) ● Assess the last visited date and time(K5) ● Evaluate the web page using COOKIE(K5)	K5
16.	Store page views count in SESSSION, to increment the count on each refresh and to show the count on web page.	● Define SESSION(K1) ● Explain SESSION function(K2) ● Experiment with web page(K3) ● Test for increment the count on each refresh web page(K4) ● Assess the count on web page(K5) ● Evaluate the page views count in SESSION(K5)	K5
17.	Maintain student records using files.	● Recall file(K1) ● Explain student's data(K2) ● Apply read and write data in file(K3) ● Analyze the student records(K4) ● Evaluate the student records(K5)	K5
18.	An inventory program to demonstrate Insertion,Updation and deletion of rows in MYSQL tables.	● Define MYSQL tables(K1) ● Explain inventory(K2) ● Demonstrate Insert, Update and Delete the rows(K2) ● Design the inventory web page (K6) ● Test the inventory program(K6)	K6
19.	Forms to display Employee records stored in MYSQL.	● Recall MYSQL(K1) ● Explain records(K2) ● Demonstrate Employee records(K2) ● Test the Employee records(K6) ● Create the employee table in MYSQL(K6) ● Develop the employee records(K6)	K6

20.	College application form using MYSQL table.	- Label MySQL(K1) - Discuss College application with web page(K6) - Apply MYSQL table(K3) - Test the Application(K6) - Develop the college application form using MYSQL table (K)	K6

4. . MAPPING SCHEME FOR THE PO, PSOS AND COS

U21ITP10	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	M	M	M	L	L	L	H	M	M	L
CO2	H	H	H	M	M	M	L	L	L	H	M	M	L
CO3	H	H	H	M	M	M	L	L	L	H	M	M	L
CO4	M	M	M	H	H	H	L	L	L	M	H	H	L
CO5	M	M	M	H	H	H	L	L	L	M	H	H	L
CO6	M	M	M	H	H	H	L	L	L	M	H	H	L

  L-Low   **M-Moderate**   **H- High**

5. COURSE ASSESSMENT METHODS

METHODS DIRECT:

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2. Cooperative Learning Report, Assignment, Group Discussion, project Report, Report, Seminar.
3. Pre/Post Test, Viva, Report for each Exercise.

INDIRECT:

  1. Course end survey (Feedback)

INFORMATION SECURITY LAB

SEMESTER: V   **COURSE CODE: U21ITP11**
CREDITS: 4   **HOURS/WEEK: 4**

1.COURSE OUTCOMES

After the successful completion of this course, the student will be able to

CO.No.	1.COURSE OUTCOMES	Level	Exercise
CO1	Make use of network programming in Java	K3	1-3
CO2	Develop client server communication using TCP and UDP	K3	4-10
CO3	Examine the message passing using message window and group window	K4	11-12
CO4	Asses the security level for message passing using substitution techniques	K5	13-14
CO5	Choose the security mechanism using symmetric or asymmetric algorithms	K6	15-16
CO6	Design the security system using One Time Password	K6	17

2.A. SYLLABUS

Ex. No	Exercises
1	Capturing internet address of local host and remote host using Java Program
2	find network ports using port scanner
3	Implement ping programming using Java.
4	Implement peer to peer communication using UDP
5	Implement Client Server Communication Using TCP
6	Implement finger client
7	Implement socket program for UDP Echo Client and Echo Server
8	Implement Client Server Application for chat
9	Implement multicasting on a network
10	Implement Client Server Communication using object stream.
11	Perform Message passing using Message Window
12	Perform Message Passing using Group Window
13	Implement Caesar Cipher technique
14	Implement the Monoalphabetic Cipher
15	Implement Diffie Hellman Key Exchange Algorithm
16	Implement RSA Algorithm
17	Implement basic One Time Password

2.B Topics for Self-Study

S. No	Topics	Web Links
1	**Program to implement the online test for a single client**	https://www.javatpoint.com/online-exam-project-in-java-swing-without-database/
2	**Program to implement the product cipher**	**https://mahanama94.github.io/product-cipher/**

3	Program to implement the Cyclic Redundancy Check to detect errors	https://www.geeksforgeeks.org/error-detection-in-computer-networks/
4	Program to implement Transposition Cipher	https://www.sanfoundry.com/java-program-perform-cryptography-using-transposition-technique/

3. SPECIFIC LEARNING OUTCOMES (SLO)

Ex. No	Lab Exercises	Learning Outcomes	Highest Bloom's Taxonomic Levels of Transaction
1	Find the IP address of local host an remote host	● Choose the socket programming in Java ● Make use of network package ● Construct a Java program to find the IP address ● Build the program to find the host name ● Experiment with the results.	K3
2-3	Find network port using port scanner	● Choose the socket programming in Java ● Make use of network package ● Build a Java program to find the active port number ● Develop a program to implement the ping program ● Experiment with the results	K3
4-5	Peer to peer communication using UDP	● Choose the socket programming in Java ● Make use of network package ● Build a Java program for peer to peer communication using UDP ● Construct a program to implement the peer to peer communication using TCP ● Experiment with the results	K3
6-8	Socket program for Echo client and Echo server	● Choose the socket programming in Java ● Make use of network package ● Build a Java socket program for Echo server an Echo client ● Develop a socket program for client server chat and also implement the finger client ● Experiment with the results	K3
9-10	Implement client server communication using Object stream	● Choose the socket programming in Java ● Make use of network package ● Build a Java program to implement client server communication using object stream ● Construct a program to implement the multicast network ● Experiment with the results	K3

11-12	Message passing using message window	● Examine the socket programming in Java ● Analyze the use of network package ● Inspect a Java program to message passing using message window ● Compare a program to implement the message passing using group window with message window ● Test for the results.	K4
13-14	Caesar cipher technique	● Choose control statements and array concepts ● Interpret the use of encryption and decryption ● Asses a Java program to implement Caesar cipher technique ● Determine a program to implement Mono alphabetic technique ● Justify the results.	K5
15-16	RSA algorithm	● Choose control statements and array concepts ● Predict the use of encryption and decryption ● Build a Java program to implement RSA algorithm ● Create a program to implement Diffie Hellman key exchange ● Test the results.	K6
17	Basic One time password	● Adapt the Thread concepts in Java ● Discuss the use of authentication ● Build a Java program to implement thread program ● Create a program to implement basic OTP using thread ● Prove the results.	K6

4.MAPPING SCHEME FOR THE PO, PSOS AND COS

U19ITP14	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	L	M	M	H	H	H	H	L	M	H	M	H	H
CO2	L	M	H	H	H	H	H	L	H	H	M	H	H
CO3	L	H	H	H	H	H	L	M	H	M	H	H	M
CO4	M	H	H	H	M	H	L	M	H	M	H	H	M
CO5	M	H	H	H	M	H	M	M	H	M	H	M	M
CO6	L	M	M	H	L	H	M	H	M	L	H	M	H

L-Low   **M-Moderate**   **H- High**

COURSE ASSESSMENT METHODS
DIRECT:

1.   Continuous Assessment Test T1, T2 (Practical Components): Closed Book
2.   Cooperative learning report, Assignment, Group Discussion, Project Report, Field
Visit Report, Seminar.
3.   Pre/Post Test, Viva, Report for each Exercise.
4.   Lab Model Examination & End Semester Practical Examination.

INDIRECT
1. Course end survey (Feedback)

PROGRAMMING WITH PYTHON

SEMESTER: VI   **COURSE CODE: U21IT618**
CREDITS: 4   **HOURS/WEEK: 4**

1.COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO.No.	COURSE OUTCOMES	Level	Unit
CO1	Illustrate the basics of computer programming languages	K2	I
CO2	Apply the concepts of user defined functions	K3	II
CO3	Make use of the built in functions	K3	II
CO4	Classify the built in function of string, List, Tuple and Dictionary.	K4	III
CO5	Determine the Importance of file programs and Exceptions handling	K5	IV
CO6	Develop programs using classes and Objects	K6	V

2.A. SYLLABUS
UNIT – I: Introduction to Python: **(12 Hours)**
Introduction to Python: Introduction – Python Overview – Getting started with python – Comments – Python Identifiers – Reserved Keywords – Variables – Standard Data Types – Operators – Standard and Expressions – String Operations – Boolean Expressions – Control Statements – Iteration – Input from Keyboard.

UNIT – II: Functions   **(12 Hours)**
Functions: Introduction – Built-in Functions – Composition of Functions – User Defined Functions – Parameters and Arguments – Function Calls – The return statement – Python Recursive functions – The anonymous functions – Writing python scripts

UNIT – III: Strings, Lists, Tuples and Dictionaries   **(12 Hours)**
Strings and Lists: Strings – Compound Data type – len Function – String Slices – Strings are Immutable – String Traversal – Escape Characters – String Formatting Operator – String Formatting Functions - Lists – Values and accessing elements – Lists are Mutable – Traverse – Deleting elements from list – Built-in list operators – Built-in List methods - Tuples and Dictionaries: Tuples – Creating Tuples – Accessing values in Tuples – Basic Tuple Operations – Built-in Tuple Functions - Dictionaries.

UNIT – IV:Files and Exceptions   **(12 Hours)**
Files and Exceptions: Text Files – Opening a File – Closing a File – File Object Attributes – Reading from a file – Writing to a file – Renaming a file – Deleting a file – File related methods. - Directories – Exceptions – Built-in Exceptions – Handling Exceptions - Exception with arguments – User defined Exceptions

UNIT – V: Classes and Objects   **(12 Hours)**

Classes and Objects: Overview of OOP – Class Definition – Creating Objects – Objects as Arguments – Objects as Return values – Built-in class attributes – Inheritance – Method Overriding – Data Encapsulation – Data Hiding.

2.B.Topics for Self Study

S.No.	Topics	Web Links
1	Python with Database	https://www.tutorialspoint.com/python/pdf/python_database_access.pdf/
2	Scientific Python	https://raw.githubusercontent.com/jrjohansson/scientific-python-lectures/master/Scientific-Computing-with-Python.pdf
3	Client Server Programming	http://www.dabeaz.com/python/PythonNetBinder.pdf/
4	Game Development	https://inventwithpython.com/makinggames.pdf/

2.C. Text Book(s):
1.   Balagurusamy E, **"Introduction to Computing and Problem Solving Using Python"**, 1st Edition, McGraw Hill Education(India) Private Limited, 2017.

2.D. Reference Books:
1.   Reema Thareja, **"Python Programming using Problem Solving Approach"**, Oxford University Press, 2017.
2.   Ashok Namdev Kamthane and Amit Ashok Kamthane, **"Programming and Problem Solving with Python"**, McGrawHill Education, November 2017.
3.   Mark Lutz, **"Learning Python"**, O'Reilly, Shroff Publishers & Distributors Private Ltd.,June 2017.

2.E. Web Links:
1.   https://www.tutorialspoint.com/python3/python_tutorial.pdf/
2.   https://nptel.ac.in/courses/106/106/106106145/
3.   https://towardsdatascience.com/
4.   https://www.computer-pdf.com/programming/802-tutorial-python-tutorial.html/

3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Content	Learning Outcomes	Blooms Taxonomic Levels of Transaction
I	**Introduction to Python**		
1.1	Introduction to Python: Introduction - Python Overview- Getting started with python- Comments- Python Identifiers- Reserved Keywords-Variables- Standard Data Types-Operators- Standard and	Tell the basics of Python(K1)	K2
		List the Key Features of Python(K1)	
		Recall the fundamentals of Programming Language(K1)	

	Expressions- String Operations-Boolean Expressions	Demonstrate the installation of Python(K2)	
1.2	Control Statements - Iteration - Input from Keyboard.	Recall the selection and iteration statements(K1)	
		Identify programs using control statements(K3)	
		Classify input and output statements(K2)	
II	**Functions**		
2.1	Functions: Introduction – Built-in Functions – Composition of Functions – User Defined Functions – Parameters and Arguments – Function Calls – The return statement – Python Recursive functions – The anonymous functions – Writing python scripts	Experiment with built in function(K3)	K3
		Test the results of Built in Function(K4)	
		Build functions with parameters(K3)	
		Construct anonymous function(K3)	
		Develop programs using Python scripts(K6)	
		Create functions with call and return statements(K6)	
		Recall recursive function(K1)	
III	**Strings, Lists, Tuples and Dictionaries**		
3.1	Strings and Lists: String –Compound Data type – len Function – String Slices – Strings are Immutable – String Traversal – Escape Characters – String Formatting Operator – String Formatting Functions - Lists – Values and accessing elements – Lists are Mutable – Traverse – Deleting elements from list – Built-in list operators – Built-in List methods -	Categorize the string functions.(K4)	K4
		Interpret the results of string functions(K5)	
3.2	Tuples and Dictionaries**:** Tuples – Creating Tuples – Accessing values in Tuples – Basic Tuple Operations – Built-in Tuple Functions -	Classify the functions of tuples and dictionaries.(K2)	
		Compare the functionality of list tuples and dictionaries(K4)	
		Make use of list functions(K3)	

	Dictionaries.		
IV	**Files and Exceptions**		
4.1	Files: Text Files – Opening a File – Closing a File – File Object Attributes – Reading from a file – Writing to a file – Renaming a file – Deleting a file – File related methods. – Directories	Recall the file concepts(K1)	K5
		Create programs using file concepts(K6)	
4.2	Exceptions: Exceptions – Built-in Exceptions – Handling Exceptions – Exception with arguments – User defined Exceptions	Define the concepts of Exception handling(K1)	
		Develop program using exception handling(K3)	
		Build user defined exception(K3)	
V	**Classes and Objects**		
5.1	Classes and Objects: Overview of OOP – Class Definition – Creating Objects – Objects as Arguments – Objects as Return values – Built-in class attributes – Inheritance – Method Overriding – Data Encapsulation – Data Hiding.	Recall the oops concepts(K1)	K6
		Apply objects as arguments and return types(K3)	
		Classify the types of inheritance(K4)	
		Test the execution of methods in parent and child class(K6)	
		Evaluate both data and function using access specifier(K6)	

4. MAPPING SCHEME FOR THE PO, PSOS AND COS

U21IT618	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	M	M	M	H	M	L	L	M	H	H	M	L
CO2	H	M	H	H	M	H	M	L	L	H	H	M	M
CO3	M	H	M	H	H	H	M	L	M	H	H	M	M
CO4	M	H	H	H	M	H	H	M	H	M	H	H	H
CO5	L	H	H	H	H	H	H	M	H	M	H	H	H
CO6	L	H	H	H	L	H	H	M	H	M	H	H	H

L-Low   **M-Moderate**   **H- High**

5. COURSE ASSESSMENT
 METHODS DIRECT:

1.   Continuous Assessment Test T1,T2 (Theory & Practical Components): Closed Book
2.   Open Book Test.
3.   Cooperative learning report, Assignment, Group Presentation, Group Discussion, Project Report, Field Visit Report, Poster Presentation, Seminar, Quiz (written).
4.   Pre-Semester & End Semester Theory Examination.

INDIRECT
1. Course end survey (Feedback)

INTERNET OF THINGS

SEMESTER: VI   **COURSE CODE: U21IT619**
CREDITS: 3   **HOURS/WEEK: 3**

1.COURSE OUTCOMES

After the successful completion of this course, the student will be able to

S. No.	1.COURSE OUTCOMES	Level	Unit
1	Demonstrate the designs and levels of IoT	K2	I
2	Identify Domain Specific IoTs	K3	II
3	Utilize IoT and M2M	K3	II
4	Discover IoT design methodology, Devices and Endpoints	K4	III
5	Interpret IoT design using case studies	K5	IV
6	Elaborate Data analytics for IoT and Tools for IoT	K6	V

UNIT – 1: Introduction to Internet of Things   **(9 Hours)**
Introduction – Physical Design of IoT – Logical Design of IoT – IoT Enabling Technologies – IoT Levels & Deployment Templates.

UNIT - 2: Domain Specific IoTs   **(9 Hours)**
Introduction – Home automation – Cities – Environment – Energy – Retail – Logistics – Agriculture – Industry – Health & Lifestyle – IoT and M2M: Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Networking – Network Function Virtualization.
–
UNIT - 3: IoT Platforms Design Methodology   **(9 Hours)**
Introduction – IoT Design Methodology – IoT Physical Devices and Endpoints: – What is an IoT device – Exemplary Device: Raspberry Pi – About the Board – Linux on Raspberry Pi – Raspberry Pi Interfaces – Programming Raspberry Pi with Python – Other IoT devices.
–
UNIT - 4: Case Studies   **(9 Hours)**
Case Studies Illustrating IoT Design: Introduction – Home Automation – Smart Lighting – Home Intrusion Detection – Cities – Smart Parking – Environment –Weather Monitoring System – Weather Reporting Bot – Air Pollution Monitoring – Forest Fire Detection – Agriculture – Smart Irrigation – Productivity Applications.

UNIT - 5: Data Analytics for IoT   **(9 Hours)**
Introduction – Apache Hadoop – Using Hadoop MapReduce for Batch Data Analysis – Apache Oozie – Apache Spark – Apache Storm – Using Apache Storm for Real-time data analysis. Tools for IoT: Introduction – Chef – Chef case studies – Puppet – Puppet case study.

2B. Topics for Self Study:

S.No.	Topics	Web Links
1	NodeMcu	https://www.nodemcu.com/index_en.html
2	Arduino	https://www.arduino.cc/en/Guide
3	IOT Projects	https://nevonprojects.com/iot-projects/

2.C. Text Book(s):

1. Arshdeep Bahga, Vijay Madisetti, **"Internet of Things – A Hands-on Approach"**, Universities Press(India) Private Limited, 2016.

2.D. Reference Books:

1. Peter Waher**, "Learning Internet of Things"**, PACKT Publishing, 2015.
2. Cuno Pfister, **"Getting Started with the Internet of Things"**, O'Rielly Publication.
3. Francis DaCosta, **"Rethinking the Internet of Things-A Scalable Approach to Connecting Everything",** Apress open publication, 2013 Edition.

2.E. Web Links:

1. https://www.tutorialspoint.com/internet_of_things/index.htm
2. https://www.edureka.co/blog/iot-tutorial/
3. https://www.youtube.com/watch?v=LlhmzVL5bm8&list=PL9ooVrP1hQOGccfBbP5tJWZ1hv5sI UWJl

3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Introduction to Internet of Things**		
1.1	Introduction – Physical Design of IoT – Logical Design of IoT – IoT Enabling Technologies – IoT Levels & Deployment Templates.	● Tell Introduction of IoT ● Demonstrate the designs of IoT ● Explain IoT enabling technologies ● Compare different levels and Deployment Templates of IoT	K2
II	**Domain Specific IoTs**		
2.1	Introduction – Home automation – Cities – Environment – Energy – Retail – Logistics – Agriculture – Industry – Health & Lifestyle	● Applications of IoT ● Identify IoT in different domains ● Make use of IoT in all domains	K3
	IoT and M2M:		
2.2	Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Networking – Network Function Virtualization.	● Apply M2M in IoT ● Identify the difference between IoT and M2M ● Make use of SDN and NFV for IoT ● Organize SDN and NFV	K3
III	**IoT Platforms Design Methodology**		

3.1	Introduction – IoT Design Methodology	● Analyze design methodology of IoT ● Discover the steps involved in IoT Design Methodology	K4
	IoT Physical Devices and Endpoints		
3.2	What is an IoT device – Exemplary Device: Raspberry Pi – About the Board – Linux on Raspberry Pi – Raspberry Pi Interfaces – Programming Raspberry Pi with Python – Other IoT devices.	● Analyze the devices and endpoints of IoT ● List the other IoT Devices ● Distinguish different IoT devices ● Examine how to program Raspberry Pi with Python	K4
IV	**Case Studies Illustrating IoT Design**		
4.1	Introduction – Home Automation – Smart Lighting – Home Intrusion Detection – Cities – Smart Parking – Environment –Weather Monitoring System – Weather Reporting Bot – Air Pollution Monitoring – Forest Fire Detection – Agriculture – Smart Irrigation – Productivity Applications.	● Importance of IoT in Use cases ● Decide the framework for Home Automation ● Determine the weather using IoT ● Prioritize IoT Home Intrusion detection ● Select smart irrigation from IoT ● Support IoT Productivity applications	K5
V	**Data Analytics for IoT**		
5.1	Introduction – Apache Hadoop – Using Hadoop MapReduce for Batch Data Analysis – Apache Oozie – Apache Spark – Apache Storm – Using Apache Storm for Real-time data analysis.	● Build Data analytics application for IoT using Apache Hadoop ● Elaborate Apache Oozie, Spark and Storm ● Construct Real-time data analysis using Apache Storm	K6
	Tools for IoT		
5.2	Introduction – Chef – Chef case studies – Puppet – Puppet case study.	● Discuss Tools for IoT ● Formulate Chef case study ● Adapt puppet Case study	K6

4. MAPPING (CO, PO, PSO)

U21IT619	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	M	M	M	M	L	M	H	H	M	L
CO2	H	H	H	M	M	M	M	L	M	H	H	M	M
CO3	H	H	H	M	M	M	M	L	M	H	H	H	M
CO4	M	M	M	H	H	H	M	L	M	H	H	H	M
CO5	M	H	M	H	H	H	M	L	H	M	H	H	M
CO6	M	M	M	H	H	H	M	L	H	M	H	H	H

L – Low   **M** – Moderate   **H** – High

5. COURSE ASSESSMENT METHODS

DIRECT:

1.   Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2.   Open Book Test.
3.   Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project
Report, Field Visit Report, Poster Presentation, Seminar, Quiz (written).
4.   Pre-Semester & End Semester Theory Examination
INDIRECT:

1. Course end survey (Feedback)

ENTREPRENEURIAL DEVELOPMENT

SEMESTER – VI   **COURSE CODE: U21IT620**
Credits: 2   **HOURS/WEEK: 2**

Objectives:
- *To understand the principles for developing Entrepreneurial Skills*

UNIT I   **(6 HOURS)**
Definition of Entrepreneur – Importance of Entrepreneurship in underdeveloped Economics – Constraints in underdeveloped Countries to Entrepreneurship – Sociological and Psychological factors of Entrepreneurship Achievement - Motivation and Methods of improving a person.

UNIT II   **(6 HOURS)**
Why and How to be an Entrepreneur? - Factors to consider when selecting a project and its location – Technical Feasibility, Market Feasibility, Importance of market survey and how to do it.

UNIT III   **(6 HOURS)**
Economic Feasibility – Planning the project – Essentials of a project report of a business – Counseling facilities available for technical training and project formulation - Choosing the scale of business.

UNIT IV   **(6 HOURS)**
Managerial skills required by entrepreneurs and methods of acquiring them – Role of management consultant – Different types of credit required by a firm, seed capital, venture capital, fixed capital, working capital, packing and export credit, and sources of these. Benefits of leasing.

UNIT V   **(6 HOURS)**
Problems faced by rural Women Entrepreneurs – Emerging Trend – SHG's and KVIC's suitable for Handicapped Persons – Problems of Family Business – Prevention of Industrial Pollution of air and water around the business unit – causes and prevention of industrial sickness, Emerging trends in IT industry, BPOs / ITES/STPs.

TEXT BOOK
1.   P. Saravanavel, **"Entrepreneurship Development Principles, Policies and Programmes"**, Ess Pee Kay Publishing House, Chennai, 1997.

REFERENCE BOOKS
1.   Vasanth Desai, **"Dynamics of Entrepreneurial Development"**, Himalaya Publishing House, 2011.
2.   S B Srivastavan, **"A practical guide to Industrial Entrepreneur"**, Sultan Chand & Sons, 1981.
 Gupta, Srinivasan, **"Entrepreneur Development"**, Sultan Chand & Sons, 2014.

WEB SERVICE TECHNOLOGIES

SEMESTER:VI **COURSE CODE: U21IT6:2**

CREDITS: 3 **HOURS/WEEK: 4**

1.COURSE OUTCOMES

After the successful completion of this course, the student will be able to

CO.No	COURSE OUTCOMES	Level	Unit
CO1	Illustrate the importance of web service and fundamentals of XML	K2	I
CO2	Explain the Messages and encoding through Simple Object Access Protocol (SOAP) Web Services Description Language (WSDL) and Universal Description Discovery and Integration (UDDI)	K2	I
CO3	Develop SOAP and WSDL	K3	II
CO4	Examine the Web Services Conversation Language (WSCL) implement the business level conversations or public processes	K4	III
CO5	Evaluate workflow with Business Process Execution Language (BPEL)	K5	IV
CO6	Build the Organization for the Advancement of Structured Information Standard (OASIS) using Business Transaction Protocol	K6	V

2.A. SYLLABUS

UNIT I: Introduction   (9 Hours)
Introduction: Overview of web services – SOAP, WSDL, UDDI – Importance of Web Services – Web services and enterprises – XML Fundamentals: The Lingua Franca of Web Services – XML Documents - XML Namespaces - XML Schema - Processing XML.

UNIT II: SOAP and WSDL   (9 Hours)
 The SOAP Model – SOAP – SOAP Messages – SOAP Encoding – SPOAP RPC – Using Alternate SOAP Encodings – Document, RPC, Literal, EnCOURSE CODE d – SOAP Web Services and the REST Architecture – Looking Back to SOAP 1.1 - WSDL – Using SOAP and WSDL.

UNIT III: UDDI   (9 Hours)
UDDI at a glance – UDDI Business Registry – UDDI under the covers – Accessing UDDI – How UDDI is Playing Out. Conversations: -Overview–Web Services Conversation Language– WSCL Interface Components– Relationship Between WSCL and WSDL.

UNIT IV: Workflow   (9 Hours)
Business Process Management–Workflows and Workflow Management System – Business Processing Language for Web Services (BPEL) Transactions: - ACID Transactions –Distributed Transactions and Two-Phase Commit – Dealing with Heuristic Outcomes – Scaling Transactions to Web Services.

UNIT V: Transactions   (9 Hours)
OASIS Business Transaction Protocol - Other Web Service Transaction Protocols. Security: Everyday Security Basics - Security Is an End-to-End Process - Web Service Security Issues - Types of Security Attacks and Threats - Web Services Security Roadmap - WS-Security. Real World Web Service Application Development-Foundations: - Enterprise Procurement –System Functionality and Architecture – Running the EPS Application.

2.B. Topics for Self Study:

S.No.	Topics	Web Links
1	Mobile Web Services	https://www.vskills.in/certification/tutorial/mobile-web-services/
2	Proxy Based Mobile System	https://link.springer.com/chapter/10.1007/978-3-642-17758-3_5/
3	Direct Mobile Web Service Access	https://docs.servicenow.com/bundle/paris-application-development/page/integrate/inbound-soap/concept/c_DirectWebServices.html/
4	J2ME Web Services	https://www.infoworld.com/article/2074517/mobile-java-access-web-services-from-wireless-devices.html/

2. C. Text Book:

1. Sandeep Chatterjee, James Webber, **"Developing Enterprise Web Services – An Architect's Guide",** Pearson Education, 2004.

2.D. Reference Book:

1. Frank. P. Coyle, **"XML, Web Services and The Data Revolution"**, Pearson Education, 2002.

2.E. Web Links:

1. https://www.tutorialspoint.com/webservices/what_are_web_services.htm/
2. https://www.w3.org/DesignIssues/WebServices.html/
3. https://www.ibm.com/support/knowledgecenter/en/SSGMCP_5.1.0/com.ibm.cics.ts.webservices.doc/concepts/dfhws_definition.html/

3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Contents	Learning Outcomes	Highest Bloom's Taxonomic Levels of Transaction
I	**Introduction, XML Fundamentals**		
1.1	Overview of web services – SOAP, WSDL, UDDI – Importance of Web Services – Web services and enterprises.	Define the SOAP,WSDL and UDDI of Web Service(K1).	K2
		Interpret Web service and enterprises(K2)	

1.2	**XML Fundamentals:**The Lingua Franca of Web Services - XML	List the XML fundamentals of Web service(K1).	
	Documents - XML Namespaces - XML Schema - Processing XML	Explain the XML fundamental(K2).	
II	**SOAP and WSDL**		
2.1	RPC – Using Alternate SOAP Encodings – Document, RPC, Literal, EnCOURSE CODEd – SOAP Web Services and the REST Architecture – Looking Back to SOAP 1.1 - WSDL – Using SOAP and WSDL.	Recall functions of SOAP Encoding(K1)	K3
		Classify the REST Architecture(K2).	
		Apply the REST Architecture(K3).	
		Organize SOAP and WSDL (K3)	
III	**UDDI**		
3.1	UDDI:UDDI at a glance – UDDI Business Registry – UDDI under the covers – Accessing UDDI	Label UDDI Business Registry(K1)	
		Construct UDDI using with web service(K2).	K4
3.2	**How UDDI is Playing Out. Conversations:**Overview–Web Services Conversation Language–WSCL Interface Components– Relationship Between WSCL and WSDL.	Explain the UDDI Conversations(K4)	
		Apply the WSCL using with UDDI(K3)	
		Distinguish between WSCL and WSDL(K4)	
IV	**Workflow**		
4.1	Business Process Management–Workflows and Workflow Management System – Business Processing Language for Web Services (BPEL)	Analyze the Business Process Management using with web service(K4).	K5
		Explain the BPEL with workflow(K5).	
4.2	**Transactions:**ACID Transactions –Distributed Transactions and Two Phase	Interpret the web service BPEL Transaction(K5).	
		Demonstrate the ACID transactions using with BPEL(K2)	
		Classify Heuristic outcomes using with web services(K4)	

		Commit – Dealing with Heuristic Outcomes – Scaling Transactions to Web Services.		
V		**Transactions**		
	5.1	OASIS Business Transaction Protocol - Other Web Service Transaction Protocols.	Elaborate OASIS using with Business transactions(K6)	K6
			Test for the web service transaction protocols(K4).	
	5.2	**Security:** Everyday Security Basics - Security Is An End-to-End Process - Web Service Security Issues - Types of Security Attacks and Threats - Web Services Security Roadmap - WS-Security.	Build the web service security using end to end process(K6).	
			Distinguish the types of security attacks and Threats(K4).	
			Design the web services security roadmap(K6).	
	5.3	**Real World Web Service Application Development-Foundations:**Enterprise Procurement –System Functionality and Architecture – Running the EPS Application.	Develop the enterprise procurement.(K6)	
			Interpret the running EPS Applications in web services(K5)	

4. MAPPING SCHEME FOR THE PO, PSOS AND COS

U21IT6:2	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO 3	PSO4
CO1	H	H	H	M	M	M	L	L	L	H	M	M	L
CO2	H	H	H	M	M	M	L	L	L	H	M	M	L
CO3	M	M	M	H	H	H	L	L	L	M	H	H	L
CO4	M	M	M	H	H	H	L	L	L	M	H	H	L
CO5	L	L	L	L	L	L	H	H	H	L	L	L	H
CO6	L	L	L	L	L	L	H	H	H	L	L	L	H

L-Low   **M**-Moderate   **H**- High

5. COURSE ASSESSMENT METHODS
METHODS DIRECT:
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examinat
INDIRECT:
1. Course end survey (Feedback)

OPEN-SOURCE TECHNOLOGIES

SEMESTER:VI   **COURSE CODE: U21IT6: A**
CREDITS: 3   **HOURS/WEEK: 3**

1.COURSE OUTCOMES

After the successful completion of this course the students will be able to

CO. No.	COURSE OUTCOMES	Level	Unit
CO1	Explain the Overview of Linux and Unix	K2	I
CO2	Develop the Apache Web Server using with open source Software	K3	II
CO3	Distinguish between Perl and MySQL commands.	K3	III
CO4	Classify the Website META Language for project creations	K4	IV
CO5	Interpret the Common Gateway using with Apache Configuration and programming with perl	K5	IV
CO6	Build the Mason configuration with the Mason project	K6	V

2.A. SYLLABUS
UNIT I : Introduction   (9 Hours)
Open Source Software – Web Explained - Working – Security – Linux: -Overview –Basic UNIX

UNIT II :Apache Web Server   (9 Hours)
Introduction – Starting, Stopping and Restarting Apache – Configuration –Securing Apache – Web Site Creation – Apache Log Files.

UNIT III :Perl   (9 Hours)
Introduction – Perl Documentation – Perl Syntax Rules – Introduction to Object Oriented Programming – MySQL: - Introduction – Commands - SHOW DATABASES – CREATE DATABASES – USE –CREATE TABLE – SHOW TABLES – DESCRIBE – INSERT – SELECT – UPDATE – DELETE – Administrative Details – Database Independent Interface – Table Joins – Loading and Dumping Database.

UNIT IV : Website META Language   (9 Hours)
 Introduction – Installation – Basics – Creating a Template – Other Helpful Includes – Diversion – A Better Template – Configuring WML with .wmlrc – MACROSCreating Custom Tags – Programming COURSE CODE – eperl – Project Creation – Common Gateway Interface: - Introduction – Apache Configuration – First CGI Program – Introduction of CGI.pm – CGI.pm HTML Shortcuts – Information Received by the CGI Program - Form Widget Methods – CGI Security Considerations – die() function – mod-Perl: - Introduction – Configuration – Turning CGIs into mod-perl Programs – Pure mod-perl Programming.

UNIT V : Server Side Includes   (9 Hours)
 Introduction – Security Considerations – Embperl (HTML::Embperl): – Introduction – Installation – Apache Configuration – Example Program – Embperl Commands – Posted Data and %fdat – Other Embperl Variables - Embperl Project – Mason (HTML::Mason): – Introduction – Installation – Apache Configuration – Example Program – Inline Perl Sections – Handling Posted Data with % ARGS and <%args> - Mason Components – Mason Project

2.B. Topics for Self Study:

S.No.	Topics	Web Links
1	Internet of Things	https://www.youtube.com/watch?v=LlhmzVL5bm8/
2	Django framework	https://www.youtube.com/watch?v=OTmQOjsl0eg/
3	Python Programming	https://www.youtube.com/results?search_query=python+programming+for+beginners/
4	Hadoop Operation services	https://www.youtube.com/watch?v=n3qnsVFNEIU/

2. C. Text Book:

1. James Lee and Brent Ware,**"Open Source Web Development with LAMP using Linux,Apache, MySQL, Perl and PHP**", Dorling Kindersley(India) Pvt. Ltd, 2009.

2. D. Reference Book:

1. Eric Rosebrock, Eric Filson, **"Setting up LAMP: Getting Linux, Apache, MySQL, and PHP and working Together**", Published by John Wiley and Sons, 2004.

2.E. Web Links:

1. https://madhavuniversity.edu.in/open-source-technology.html/
2. https://hackernoon.com/10-open-source-tech-you-should-take-a-look-at-before-2020-ppho3s5o'/
3. https://en.wikipedia.org/wiki/Open-source_software/

3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Introduction**		
1.1	Open Source Software – Web Explained - Working – Security	List open source software(K1) .	K2
		Explain the security with open source software(K2) .	
1.2	**Linux:**Overview – Basic UNIX	List the basic UNIX commands(K1)	
		Apply the UNIX commands(K3) .	
		Demonstrate the UNIX commands(K2)	
II	**Apache Web Server**		
2.1	Introduction – Starting, Stopping and Restarting Apache – Configuration – Securing Apache – Web Site Creation – Apache Log Files.	Define the Apache web server(K1)	K3
		Classify to configure and secure the Apache	

		Apply the REST Architecture(K2) .	
		Construct web site with apache Log files(K3)	
III	**Perl**		
3.1	Introduction – Perl Documentation – Perl Syntax Rules – Introduction to Object Oriented Programming	Explain Perl(K2)	K3
		Define OOPS(K1)	
		Apply Perl Syntax Rules(K3)	
3.2	**MySQL:**Introduction – Commands - SHOW DATABASES - CREATE DATABASES – USE – CREATE TABLE – SHOW TABLES – DESCRIBE – INSERT – SELECT – UPDATE – DELETE – Administrative Details – Database Independent Interface – Table Joins – Loading and Dumping	Label MySQL Commandsv(K1) .	
		Recall the MySQL Command(K1) .	
		Apply and Execute the MySQL commands(K3)	
		Develop the MySQL commands(K3)	
		Classify the MySQL table with join Commands(K2) .	
		Build MySQL Loading and Dumping Database(K2) .	
IV	**Website META Language**		
4.1	Introduction – Installation – Basics – Creating a Template – Other Helpful Includes – Diversion – A Better Template – Configuring WML with .wmlrc – MACROSCreating Custom Tags – Programming COURSE CODE – eperl – Project Creation	Explain website META Language (K2)	K5
		Show META data template for website(K1)	
		Determine the Common gateway of Website(K5)	
		Evaluate the project creation with COURSE CODE (K5)	
4.2	**Common Gateway Interface :**Introduction – Apache Configuration – First CGI Program – Introduction of CGI.pm –CGI.pm HTML Shortcuts – Information Received by the CGI Program - Form Widget Methods –CGI Security Considerations – die() function	Define the Apache Configuration(K1)	
		Test for First CGI program(K4)	
		Demonstrate CGI program using with HTML function(K2)	
		Interpret program Form widgets function(K5)	
4.3	**mod-Perl:** - Introduction – Configuration – Turning CGIs into mod-perl Programs – Pure mod-perl Programming.	Define perl Configurations(K1)	
		Apply CGIs into perl programs(K3)	
V	**Server Side Includes**		

5.1	Introduction – Security Considerations – Embperl (HTML::Embperl): – Introduction – Installation – Apache Configuration – Example Program – Embperl Commands –Posted Data and %fdat – Other Embperl Variables - Embperl Project	Elaborate Apache configuration with serverside program(K6).	K6
		Develop program using with Embperl Commands(K6)	
5.2	**Mason (HTML::Mason):**Introduction – Installation – Apache Configuration – Example Program – Inline Perl Sections – Handling Posted Data with % ARGS and <%args> - Mason Components – Mason Project	Recall the Mason with Apache Configurations(K1)	
		Solve the Apache Configuration program(K3).	
		Develop the Inline perl sections(K6)	
		Evaluate the Masan Project(K5)	

4. MAPPING SCHEME FOR THE PO, PSOS AND COS

U21ITG:2	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	M	M	M	L	L	L	L	M	M	L
CO2	H	H	H	M	M	M	L	L	L	H	M	M	L
CO3	H	H	H	M	M	M	L	L	L	H	M	M	L
CO4	M	M	M	H	H	H	L	L	L	M	H	H	L
CO5	M	M	M	H	H	H	L	L	L	M	H	H	L
CO6	M	M	M	H	H	H	L	L	L	M	H	H	L

L-Low   **M**-Moderate   **H**- High

5. COURSE ASSESSMENT METHODS

METHODS DIRECT:

1.   Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2.   Open Book Test.
3.   Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Field Visit Report, Poster Presentation, Seminar, Quiz (written).
4.   Pre-Semester & End Semester Theory Examination
INDIRECT:

1. Course end survey (Feedback)

DISTRIBUTED COMPUTING TECHNOLOGIES

SEMESTER:VI   **COURSE CODE: U21IT6: B**

CREDITS: 3   **HOURS/WEEK: 3**

1.COURSE OUTCOMES

After the successful completion of this course, the student will be able to

CO. No	COURSE OUTCOMES	Level	Unit
CO1	Illustrate characterization of Distributed System	K2	I
CO2	Classify Networks and Apply Ethernet and WiFi Blutooth	K3	I
CO3	Develop Distributed objects and remote Invocation and Java RMI	K3	II
CO4	Test for Sun network File System	K4	III
CO5	Interpret and Evaluate the Global name service	K5	IV
CO6	Discuss Transaction using in distributed computing technology	K6	V

UNIT I   **(9 Hours)**

Characterization of Distributed Systems – Examples – Resource Sharing and the Web – Challenges – System Models – Architectural and Fundamental Models – Networking and Internetworking –Types of Networks – Network Principles – Internet Protocols – Case Studies: Etherent, WiFi,Bluetooth.

UNIT II   **(9 Hours)**

Interprocess Communication – The API for the Internet Protocols – External Data Representation and Marshalling – Client– Server Communication – Group Communication – Case Study –Distributed Objects and Remote Invocation – Communication between Distributed Objects –Remote Procedure Call
– Events and Notifications– Case Study: Java RMI

UNIT III   **(9 Hours)**

The OS Layer – Protection – Processes and Threads – Communication and Invocation – OS Architecture – Security – Security Techniques – Cryptographic Algorithms – Digital Signatures –Cryptography Pragmatics – Case Studies – Distributed File Systems – File Service Architecture –Sun Network File System.

UNIT IV   **(9 Hours)**

Name Services – Domain Name System – Discovery Services – Case Study: Global Name Service ,X.500 Directory Service – Clocks , Events and Process States – Synchronizing Physical Clocks –Logical Time and Logical Clocks – Global States – Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication.

UNIT V   **(9 Hours)**

Transactions – Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols –Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery – Replication and Distributed Multimedia Systems.

2.B. Topics for Self Study:

S.No.	Topics	Web Links
1	Time and Global states	https://slideplayer.com/slide/8132584/
2	Mobile and Ubiquitous Computing	https://slideplayer.com/slide/4824136/

| 3 | Distributed Multimedia System | https://slideplayer.com/slide/257363/ |
| 4 | Designing Distributed System: Google Case Study | https://www.coursera.org/lecture/cloud-computing/2-2-what-is-a-distributed-system-nvMXE/ |

2.C. Text Book:

1. George Coulouris, Jean Dollimore, Tim Kindberg, **"Distributed Systems Concepts and Design"**, 4 th Edition, Pearson Education, 2009.

2.D. Reference Books:

1. Albert Fleishman**, "Distributed Systems Software Design and Implementation"**, Springer Verlag, 2004.
2. M. L .Liu, **"Distributed Computing Principles and Applications"**, Pearson Education, 2004.

2. E. Web Links:

1. https://www.springer.com/gp/book/9783642786143/
2. https://rancher.com/blog/2019/considerations-when-designing-distributed-systems /
3. https://www.hpcs.cs.tsukuba.ac.jp/~tatebe/lecture/h23/dsys/dsd-tutorial.html

3. SPECIFIC LEARNING OUTCOMES(SLO)

Unit/ Section	Course Content	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
I	**Characterization of Distributed Systems**		
1.1	Characterization of Distributed Systems – Examples – Resource Sharing and the Web – Challenges – System Models – Architectural and Fundamental Models – Networking and Internetworking – Types of Networks – Network Principles – Internet Protocols **Case Study:**Java RMI	List the Characterization of Distributed Systems (K1)	K3
		Recall the Resource sharing and the Web (K1)	
		Explain Architectural and Fundamental Models of distributed computing system.	
		Apply networking and internetworking of the distributed computing system (K2)	
		List the types of Network (K1)	
		Build the internet protocols of Distributed Computing System (K3).	

		Apply Interthe Etherent, WiFi and Blutooth with Casestudies (K3)	
II	**Interprocess Communication**		
2.1	Interprocess Communication – The API for the Internet Protocols – External Data Representation and Marshalling – Client– Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation – Communication between Distributed Objects – Remote Procedure Call – Events and Notifications– **Case Study:** Java RMI	State the interprocess communication (K1)	K3
		Summarize the external data representation and Marshalling (K2)	
		Apply the Client, Server Communication (K3)	
		Explain the Distributed Objects and Remote Invocation (K2)	
		Build the Remote Procedure call (K3).	
		Interpret Java RMI using with events and notifications (K2)	
III	**The OS Layer**		
3.1	The OS Layer – Protection – Processes and Threads – Communication and Invocation – OS Architecture – Security – Security Techniques – Cryptographic Algorithms – Digital Signatures –Cryptography Pragmatics – Case Studies – Distributed File Systems – File Service Architecture – Sun Network File System.	Label the OS Layer of Distributed system (DS) (K1)	K4
		Explain protection processes and threads of the DS (K2)	
		Build file service Architecture (K3)	
		Examine the OS architecture of the DS (K4)	
		Classify the Security Techniques (K4)	
		Apply Cryptographic Algorithms (K3)	
		Analyze digital signatures (K)4	
		Test for the Cryptography (K4)	
		Discover sun Network file system (K4)	
IV	**Name Services**		
4.1	Name Services – Domain Name System – Discovery Services – Case Study: Global Name Service ,X.500 Directory Service – Clocks , Events and Process States – Synchronizing Physical Clocks –Logical Time and Logical Clocks – Global States – Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication.	•List the Name Services and Domain name system (K1).	K5
		•Define discovery services (K1)	
		•Evaluate Global Name Service and states (K5).	
		•Analyze the Synchronizing Physical Clocks, Logical Time and Logical Clocks and Global States (K4)	

			Justify the Distributed Mutual Exclusion (K5)	
			Classify Elections Multicast Communication (K4).	
V	**Transactions**			
5.1	Transactions – Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols –Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery – Replication and Distributed Multimedia Systems.	Name the transactions and Nested Transactions (K6)	K6
			Explain Optimistic Concurrency Control Timestamp Ordering, Comparison (K5)	K5
			Apply the Flat and Nested Distributed Transactions with Atomic Commit Protocols (K3)	K3
			Analyze the Concurrency Control in Distributed Transactions (K4)	K4
			Construct Distributed Deadlocks and Transaction Recovery (K6)	K6
			Elaborate the Replication and Distributed Multimedia Systems (K6).	K6

4.MAPPING SCHEME FOR THE PO, PSOS AND COS

U21IT6:B	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	M	M	M	L	L	L	H	M	M	L
CO2	H	H	H	M	M	M	L	L	L	H	M	M	L
CO3	M	M	M	H	H	H	L	L	L	M	H	H	L
CO4	M	M	M	H	H	H	L	L	L	M	H	H	L
CO5	L	L	L	L	L	L	H	H	H	L	L	L	H
CO6	L	L	L	L	L	L	H	H	H	L	L	L	H

L-Low   **M**-Moderate   **H**- High

5. COURSE ASSESSMENT METHODS

METHODS DIRECT:

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, Project Report, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

INDIRECT:

1. Course end survey (Feedback)

MULTIMEDIA LAB

SEMESTER: VI
CREDITS: 4

COURSE CODE: U21ITP12
HOURS/WEEK:4

1.COURSE OUTCOMES

After the successful completion of this course, the students will be able to

CO. No.	COURSE OUTCOMES	Level	Exercise
CO1	Design layouts for web pages, Paper Adverts, Broachers Covers and Package designing	K3	1-2
CO2	Use layered Photoshop document from a starting image	K3	3-4
CO3	Test the transforming and retouching images	K4	5
CO4	Create Website, animated graphics, add sound and teractivelyin Adobe Flash	K5	8,9
CO5	Apply Professional audio workstation used to mix, edit and create digital Audio in adobe Audition.	K5	10,11,12
CO6	Demonstrate film maker, editors, to combine video audio and still images	K5	10,11,12

2.A. SYLLABUS

Ex. No.	Exercise
1	Working with Text and Styles using Adobe Photoshop
2	Creating shapes and painting in Adobe Photoshop (Using Drawing tool, Pen tool, Painting tools, and Brush tools).
3	Working with Image size and Resolution in Adobe Photoshop.
4	Working with Layers in Adobe Photoshop.
5	Transforming and Retouching Images using Adobe Photoshop (Cropping, Transforming objects, Clone stamping, Retouching).
6	Working with color Adjustments in Adobe Photoshop.
7	Creating Frame-by-Frame Animation &Tweened Animation– (motion tween and shape tween) using Macromedia Flash.
8	Working with textual effects in Macromedia Flash.
9	Creating buttons and working with scenes in Macromedia Flash.
10	Creating animation with sound using Macromedia Flash.
11	Recording, Editing and Mixing audio clips using Adobe Audition.
12	Capturing, Editing and Rendering video clips using Adobe Premier

2.B. Topics for Self Study

S.No.	Topics	Web Links
1	Create Pongal Greeting card using Photoshop	https://www.javatpoint.com/programs-list#string
2	Create animated text using in Adobe Flash	https://www.javatpoint.com/programs-list#singly-linked-list
3	Create image ,video and audio using in Premier pro	https://beginnersbook.com/2014/07/java-program-to-get-ip-address/
4	Create Christmas audio song using in Adobe Audition	https://www.w3resource.com/java-exercises/sorting/index.php

3. SPECIFIC LEARNING OUTCOMES (SLO)

Ex.No	Lab Exercises	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
1	Working with Text and Styles using Adobe Photoshop	● List the name of the text(K1) ● Explain styles(K2) ● Apply text and styles on the selected text(K3). ● Test for edit and work with text(K4) ● Develop the text and styles(K3) ● Make use of the text and styles using Adobe Photoshop(K3)	K3
2	Creating shapes and painting in Adobe Photoshop (Using Drawing tool, Pen tool, Painting tools, and Brush tools).	● Define Shapes(K1) ● Explain shapes(K2) ● Apply shapes and paint in Adobe Photoshop(K3) ● Test for painting, drawing, pen and brush tool from tool box(K4) ● Develop shapes with layer(K3) ● Experiment with paint and shapes(K3) .	K3
3	Working with Image size and Resolution in Adobe Photoshop.	● Define Size of the image(K1) ● Explain Resolution of the image(K2) ● Apply image size and Resolution(K3) ● Test for image size(K3)	K3

		● Develop Image into workspace(K3) ● Experiment with size and resolution (K3).	
4	Working with Layers in Adobe Photoshop.	● Define Layers(K1) ● Explain Layer palate(K2) ● Apply Layer style(K3) ● Make Use of Layer style(K3) ● Test for Layer one by one(K4) ● Experiment with Layer style Transforming(K3)	K3
5	Transforming and Retouching Images using Adobe Photoshop (Cropping, Transforming objects, Clone stamping, Retouching).	● Classify transform,cropping,clone stamping and Retouching(K4) ● Apply Cropping, clone stamping(K3) ● Make Use of Retouching the area of the image(K3) ● Test for an image and transform the image(K4) ● Analyze an image using with transforming and retouching(K4)	K4
6	Working with color Adjustments in Adobe Photoshop.	● Define color adjustments(K1) ● Explain hue, saturation of the color property(K5) ● Apply colors on the image(K3) ● Make Use of color adjustments of the image(K6) ● Build an image (K3) ● Evaluate the color adjustment of an Image(K5)	K5
7	Creating Frame-by-Frame Animation &Tweened Animation–(motion tween and shape tween) using Macromedia Flash.	● Define Macromedia Flash(K1) ● Explain frame(K5) ● Apply animation(K3) ● Develop frame by frame (K3) ● Test for motion of an image(K4) ● Evaluate tween on an image(K5)	K5
8	Working with textual effects in Macromedia Flash.	● Define textual(K1) ● Explain textual effects(K5) ● Apply textual effects on text(K3) ● Make use of animation of text(K6) ● Test for textual effects(K5) ● Assess text effects on text(K5)	K5

9	Creating buttons and working with scenes in Macromedia Flash.	● Define buttons with text and image(K1) ● Explain scenes with the image(K5) ● Apply buttons on an image and text(K3) ● Test for flash on text(K5) ● Create buttons and working with scenes(K6)	K5
10	Creating animation with sound using Macromedia Flash.	● Define animation with sound(K1) ● Explain animation with sound using flash(K5) ● Apply animation with sound an image(K3) ● Test for animation of an image(K5) ● Create animation with sound(K6) ● Evaluate animation with sound an image(K5)	K5
11	Recording, Editing and Mixing audio clips using Adobe Audition.	● Define recording(K1) ● Explain Editing and mixing with Audio(K5). ● Apply audio clips using adobe audition(K3) ● Use recording, edit, mix an image(K6) ● Create recording editing with audio(K6) ● Evaluate audition with image and text(K5)	K6
12	Capturing, Editing and Rendering video clips using Adobe Premier	● Define Capturing, editing and rendering(K1) ● Explain Video clips(K5) ● Apply Editing and audio(K3) ● Make use of video clips on images (K6) ● Create video clips using adobe premier (K6) ● Evaluate Capturing, Editing and Rendering video clips using Adobe Premier(K5)	K6

4. MAPPING SCHEME FOR THE PO, PSOS AND COS

U21ITP12	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	H	M	H	H	H	H	H	M	M	L
CO2	H	H	H	M	M	M	M	H	H	H	M	M	L
CO3	H	H	H	M	M	M	H	H	H	H	M	M	L
CO4	M	M	M	H	H	H	H	H	H	M	H	H	L
CO5	M	M	M	H	H	H	H	H	H	M	H	H	L
CO6	M	M	M	H	H	H	H	H	H	M	H	H	L

L – Low   **M** – Moderate   **H** – High

5.COURSE ASSESSMENT

METHODS DIRECT:

1.   Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2.   Cooperative Learning Report, Assignment, Group Discussion, project Report,
         Report, Seminar.
3.   Pre/Post Test, Viva, Report for each Exercise.
4.   Lab Model Examination & End Semester Practical Examination

INDIRECT:

   1. Course end survey (Feedback)

PYTHON PROGRAMMING LAB

SEMESTER: VI   **COURSE CODE   : U21ITP13**
CREDITS: 4   **HOURS/WEEK: 4**

1.COURSE OUTCOMES:
After the successful completion of this course, the student will be able to

CO.No.	1.COURSE OUTCOMES	Level	Exercises
CO1	Apply the basic concepts of programming using Python	K3	1-6
CO2	Construct the program using built in functions of List and string	K3	7-13
CO3	Test for mapping using Dictionary	K4	14-16
CO4	Asses the execution speed of the program using recursion	K5	17-19
CO5	Evaluate the basic operations of file creation	K5	20-22
CO6	Build the program using Object oriented concepts	K6	23-25

2.A. SYLLABUS
1.   Write a program to calculate the average of numbers in a given list.
2.   Write a program to accept three digits and print all possible combinations from the digits.
3.   Write a program to count number of digits in a number.
4.   Write a program to compute prime factors of an integer.
5.   Write a program to find LCM and GCD of two numbers.
6.   Write a program to check if a number is a perfect number.
7.   Write a program to remove the duplicate items from a list.
8.   Write a program to find union and intersection of two lists.
9.   Write a program to swap the first and last value of a list.
10.   Write a program to count the number of vowels in a string.
11.   Write a program to calculate the number of digits and letters in a string.
12.   Write a program to form a new string by exchanging the first and the last characters.
13.   Write a program to add a key-value pair to the dictionary.
14.   Write a program to map two lists into dictionary.
15.   Write a program to sum all the items in a dictionary.
16.   Write a program to check common letters in two input strings.
17.   Write a program to find the Fibonacci series using recursion.
18.   Write a program to flatten a nested list using recursion.
19.   Write a program to find the length of a list using recursion.

20. Write a program to count the number of words in a text file.
21. Write a program to copy the contents of one file into another.
22. Write a program to read the contents of a file in reverse order.
23. Write a program to append, delete and display elements of a list using classes.
24. Write a program to create a class which performs basic calculator operations.
25. Write a program to create a class and get all possible subsets from a set of distinct integers.

2.B.Topics for Self Study

S.No.	Topics	Web Links
1	Develop a program to calculate standard deviation	**https://www.geeksforgeeks.org/python-statistics-stdev/**
2	Create a program to find the factorial using recursion	**https://www.programiz.com/python-programming/examples/factorial-recursion/**
3	Create a program to find the minimum and maximum element of a set of 'N' Numbers	**https://www.geeksforgeeks.org/python-maximum-minimum-set/**
4	Create a program to find the transpose of the given matrix	**https://www.tutorialspoint.com/python-program-to-find-the-transpose-of-a-matrix/**

3. SPECIFIC LEARNING OUTCOMES (SLO)

Ex. No	Lab Exercises	Learning Outcomes	Highest Bloom's Taxonomic Levels of Transaction
1	Calculate the average of numbers in a given list	● Choose decision making statements in Python ● Make use of arithmetic operators. ● Construct python program to calculate the sum and average ● Organize the flow of control. ● Plan the results.	K3
2	Accept a three digits And print all possible combination from the digits	● Select the looping statement. ● Build a Python program to print all possible combination of digits. ● Develop a program to calculate the factorial of the given number. ● Organize the flow of control. ● Experiment with the results.	K3
3	Count the number of digits in a number	● Construct a while looping ● Develop a Python program to count the number of digits in a number.	K3

		● Build a program to print the number in reverse order ● Experiment with the results.	
4	Compute the prime factors of an integer	● Apply looping statement. ● Construct a Python program to compute the prime factors of an integer ● plan program to check whether the given number is prime or not ● Experiment with the results.	K3
5-6	To find LCM and GCD	● Choose if statement ● Develop a Python program to find LCM and GCD ● Construct a program to check if a number is a perfect number ● Build the flow of control. ● Experiment with the results.	K3
7-9	Remove the duplicate items from a list	● Make use of list in Python ● Develop a Python program to remove the duplicate elements ● Construct a program to swap the first and last value and find the union and intersection of two list ● Experiment with the results.	K3
10-13	Count the number of vowels in a string	● Apply string functions. ● Develop a Python program to count the number of vowels in a strings ● Build a program to calculate the number of digits and letters in a string and also swap the first and last characters of a string. ● Construct the program to check common letters in two input string ● Experiment with the results.	K3
14-16	Add a key-value pair to the dictionary	● List the Dictionary function. ● Examine a Python program to add a key-value pair to the Dictionary ● Inspect a program to map two lists into dictionary and also find the sum of all the items in dictionary ● Test for the results.	K4
17-19	Generating Fibonacci numbers using recursive function	● Determine the use of recursive function. ● Asses a Python program to print Fibonacci series of given integer value using recursion. ● Recommend a program to find the length of the string and also flatten a nested list using recursion	K5

		● Evaluate the results..	
20-22	Count the number of words in a text file.	● Determine the file operations. ● Interpret a Python program to count the number of words in a Text file ● Justify a program to copy the contents of one file into another file and also display the content of file in reverse order ● Evaluate the results.	K5
23-25	Create a class which performs basic calculator operations	● Construct classes and objects. ● Develop a Python program to create a class which performs basic calculator operations. ● Create a Python program to append, delete and display elements of a list using classes and also get all possible subsets from a set of distinct integer ● Test the results.	K6

4. MAPPING SCHEME FOR THE PO, PSOS AND COS

U21ITP13	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	M	H	H	M	H	M	L	H	M	H	M	H
CO2	H	H	H	H	H	M	M	L	H	M	H	M	H
CO3	H	M	H	H	M	M	H	M	H	M	H	H	H
CO4	H	M	H	H	H	M	M	M	H	M	H	H	H
CO5	H	M	M	H	M	M	M	L	M	M	H	M	H
CO6	H	M	H	H	M	H	H	L	H	M	H	M	H

L-Low   **M-Moderate**   **H- High**

5. COURSE ASSESSMENT
 METHODS DIRECT:

1. Continuous Assessment Test T1, T2 (Practical Components): Closed Book.
2. Pre/Post Test, Viva, Report for each Exercise.
3. Lab Model Examination & End Semester Practical Examination.

INDIRECT
1. Course end survey (Feedback)

INTERNET OF THINGS LAB

SEMESTER: VI   COURSE CODE: U21ITP14
CREDITS: 4   HOURS/WEEK: 4

1.COURSE OUTCOMES:

After the successful completion of this course, the students will be able to

CO. No.	1.COURSE OUTCOMES	Level	Exercise
CO1	Build an interface to toggle LED with delay	K3	1
CO2	Make use of LED dimmer and weather Monitoring	K3	2 – 3
CO3	Examine the temperature data to show in LCD display and controlling DC motor	K4	4 – 5
CO4	Interpret the time in seven segment display and display sensor data in a web application	K5	6 – 7
CO5	Build a home appliances control with IR and send sensor data to cloud	K5	8 – 9
CO6	Create an indoor air quality and garbage monitoring system	K6	10

2.A. SYLLABUS

Ex. No.	Exercise
1.	Interfacing LED to Toggle with delay
2.	LED Dimmer using Pulse Width Modulation
3.	Weather Monitoring using DHT11
4.	Display Temperature Data with LCD interfacing
5.	DC Motor Controlling.
6.	Time Display using 7-Segment Display
7.	Display Sensor Data using Web Application
8.	Home Appliances control with IR Receiver using IR-Remote.
9.	Sending Sensor Data to Thing-Speak Cloud
10.	Indoor Air-Quality and Garbage Monitoring System

2.B. Topics for Self Study

S.No.	Topics	Web Links
1	Water Quality Monitoring System	https://create.arduino.cc/projecthub/chanhj/water-quality-monitoring-system-ddcb43?ref=tag&ref_id=iot&offset=2
2	IoT Pet Feeder	https://create.arduino.cc/projecthub/circuito-io-team/iot-pet-feeder-10a4f3?ref=tag&ref_id=iot&offset=3
3	IOT Smart Energy Grid	https://nevonprojects.com/iot-smart-energy-grid/
4	IOT Car Parking System	https://nevonprojects.com/iot-car-parking-system/

3. SPECIFIC LEARNING OUTCOMES (SLO)

Ex. No.	Lab Exercises	Learning Outcomes	Highest Bloom's Taxonomic Level of Transaction
1	**Interfacing LED to Toggle with delay**	● Model the creation of android Construct a module with LED ● Apply python programming to interface with GPIO ● Identify the output from digital ports.	K3
2	**LED Dimmer using Pulse Width Modulation**	● Model the creation of android Construct a module with LED ● Apply python programming to interface with GPIO ● Identify the output from Analog ports.	K3
3	**Weather Monitoring using DHT11**	● Construct a module with DHT11 sensor ● Apply python programming to interface with GPIO ● Identify the output from DHT11 sensor	K3
4	**Display Temperature Data with LCD interfacing**	● Construct a module with Temperature Sensor and 6x4 LCD display ● Apply python programming to interface with GPIO ● Identify the output from temperature sensor and display in LCD display	K3
5	**DC Motor Controlling.**	● Analyze DC motor and required IC ● Examine the motor interfacing with Microcontroller ● Test for the results from DC motor	K4
6	**Time Display using 7-Segment Display**	● Construct a module with microcontroller and 7 Segment Display ● Apply python programming to interface with GPIO ● Identify the output from 7 Segment display	K4

7	**Display Sensor Data using Web Application**	● Construct a module with microcontroller and sensors ● Apply python programming to interface with GPIO ● Identify the output from web application	K4
8	**Home Appliances control with IR Receiver using IR-Remote.**	● Analyze IR receiver and remote ● Examine the IR sensor and interface with microcontroller ● Test for the results to manually change the IR remote operation	K5
9	**Sending Sensor Data to Thing-Speak Cloud**	● Construct a cloud Interface through internet with microcontroller ● Build Device to send data ● Test the security using Key ● Elaborate the result as cloud application control	K5
10	**Indoor Air-Quality and Garbage Monitoring System**	● Build Air quality module using sensors ● Construct Garbage management module with sensors ● Test the result in application.	K6

4. MAPPING (CO, PO, PSO)

U21ITP14	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	H	L	H	M	L	M	H	H	M	M
CO2	H	H	H	H	L	H	M	L	M	H	H	M	M
CO3	H	H	H	H	L	H	M	L	M	H	H	M	M
CO4	H	H	H	H	L	H	M	L	M	H	H	M	M
CO5	H	H	H	H	L	H	M	L	M	H	H	M	M
CO6	H	H	H	H	L	H	M	L	M	H	H	M	M

L – Low   **M** – Moderate   **H** – High

5. COURSE ASSESSMENT METHODS

DIRECT:

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1. Course end survey (Feedback)