B.Sc. COMPUTER SCIENCE

(COGNITIVE SYSTEMS)

CHOICE BASED CREDIT SYSTEM (CBCS)

Curriculum and Syllabus

Regular (2024 – 2025)

DEPARTMENT OF COMPUTER SCIENCE

FACULTY OF ARTS, SCIENCE, COMMERCE AND MANAGEMENT

KARPAGAM ACADEMY OF HIGHER EDUCATION

(Deemed to be University)

(Established Under Section 3 of UGC Act, 1956)

(Accredited with A+ Grade by NAAC in the Second Cycle)

Eachanari (Post), Coimbatore – 641 021.
Tamil Nadu, India
Phone No. 0422-2980011 - 15 Fax No: 0422-2980022-23

E mail ID: info@kahedu.edu.in

Web: www.kahedu.edu.in

KARPAGAM ACADEMY OF HIGHER EDUCATION

(Deemed to be University)
(Established Under Section 3 of UGC Act, 1956)

FACULTY OF ARTS, SCIENCE, COMMERCE AND MANAGEMENTUNDER – GRADUATE PROGRAMMES

(REGULAR PROGRAMME)

REGULATIONS
(2024)

CHOICE BASED CREDIT SYSTEM (CBCS)

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Eachanari Post, Coimbatore - 641 021, India

PROGRAM OUTCOMES (POs):

By the end of the programme, our graduates will

1. **Disciplinary knowledge:** Possess a profound understanding of the foundational concepts, theories, methodologies, and practices within the discipline of Computer Science.
2. **Communication Skills:** Emerge as confident communicators capable of articulating complex concepts, advocating for their viewpoints, and engaging in meaningful discourse to address contemporary issues and drive positive change.
3. **Critical thinking:** Master advanced critical thinking skills, analyzing complex issues, and solving problems through evidence-based decision-making.
4. **Problem solving:** Excel in problem-solving, applying analytical techniques and creative thinking to address complex challenges in the field of Computer Science.
5. **Analytical reasoning:** Emerge as adept analytical thinkers, equipped to tackle challenging problems, make informed decisions, and contribute to the advancement of knowledge in the field of Computer Science.
6. **Research-related skills:** Demonstrate proficiency in data analysis, critical appraisal, and ethical research practices, contributing original insights to the advancements in Computer Science.
7. **Cooperation/Team work:** Develop strong cooperation and teamwork skills, collaborating effectively with diverse peers to achieve common goals.
8. **Scientific reasoning:** Excel in scientific reasoning, applying logic and evidence to analyze phenomena, solve problems, and advance knowledge in the area of Computer Science.
9. **Reflective thinking:** Master reflective thinking, fostering self-awareness and insight to evaluate experiences, perspectives, and actions critically.
10. **Information/digital literacy:** Excel information and digital literacy, adeptly locating, evaluating, and ethically using diverse sources of information
11. **Self-directed learning:** Be empowered individuals to take ownership of their educational journey, fostering autonomy, critical thinking, and adaptability.
12. **Multicultural competence:** Be enabled to effectively navigate diverse contexts, fostering empathy, understanding, and collaboration across cultures.
13. **Moral and ethical awareness/reasoning:** Possess the capacity to critically analyze ethical issues from various perspectives and apply ethical principles to real-world situations.
14. **Leadership readiness/qualities:** Develop the skills and attributes necessary to effectively lead and inspire others.
15. **Lifelong learning:** Foster a commitment to lifelong learning by cultivating curiosity, critical thinking, and a growth mindset.

PROGRAM SPECIFIC OUTCOMES (PSOs).

Cognitive Systems

PSO 1: Graduates will be proficient in designing, developing, testing, and maintaining reliable software systems. They will have the ability to integrate hardware and software components effectively, considering scalability, performance, and security requirements.

PSO 2: Graduates will be skilled in designing, developing, and deploying cognitive systems. They will apply their expertise in areas such as virtualization and cloud computing, client relationship management, infrastructure management, IT infrastructure library, and robotic process automation to design and develop advanced systems.

PROGRAMME EDUCATIONAL OUTCOMES (PEOs)

Computer Science (Cognitive Systems)

PEO I: Graduates will develop a deep understanding of cognitive systems, artificial intelligence, and machine learning to design and implement intelligent solutions for complex problems.

PEO II: Graduates will continuously adapt to technological advancements in cognitive computing and foster innovation in the development of AI-driven applications.

PEO III: Graduates will apply ethical considerations in the development and deployment of cognitive systems, ensuring responsible use of AI technologies in society.

PEO IV: Graduates will effectively collaborate with professionals from various disciplines, leveraging cognitive technologies to solve interdisciplinary challenges.

DEPARTMENT OF COMPUTER SCIENCE
FACULTY OF ARTS, SCIENCE COMMERECE AND MANAGEMENT
UG PROGRAM (CBCS) – B.Sc. Computer Science (Cognitive Systems)
(2024–2025 Batch and onwards)

Course Code	Name of the course	Category	Outcomes		Instruction hours/week/ Credits				Maximum Marks			Page No
			PO	PSO	L	T	P	C	CIA	ESE	Total	
									40	60	100	
SEMESTER I												
24LSUT101/ 24LUH101/ 24LUM101/ 24LUS101/ 24LUF101	Language I (Tamil I/ Hindi I/ Malayalam I/ Sanskrit I/ French I)	AEC 1	-	-	4	-	-	3	40	60	100	1
24ENU101	English I	MDC 1	2,3,7,12	-	3	-	-	3	40	60	100	13
24CGU101	Operating Systems	Major 1	1,3,4,5,6,13	1	5	-	-	3	40	60	100	15
24CGU102	Data Structures	Major 2	1,3,4,5,6,8	1,2	5	-	-	3	40	60	100	17
24CGUA101	Numerical Methods	Minor1	3,4	-	4	-	-	4	40	60	100	19
24CGU111	Operating Systems - Practical	Major 3	1,3,4,5,6,8,9,10,11,15	1	-	-	3	2	40	60	100	21
24SEC111	Problem Solving using Worksheets – Practical	SEC 1	1,3,5,10	2	-	-	4	3	40	60	100	23
24VAC101	Yoga for Youth Empowerment	VAC 1	1,12	1,2	2	-	-	2	100	-	100	24
		Semester Total			**23**	-	**07**	**23**	**380**	**420**	**800**	
SEMESTER II												
24LSUT201/ 24LUH201/ 24LUM201/ 24LUS201/ 24LUF201	Language II (Tamil II/ Hindi II/ Malayalam II/ Sanskrit II/ French II)	AEC 2	-	-	4	-	-	3	40	60	100	26
24ENU201	English II	MDC 2	2,3,9	-	3	-	-	3	40	60	100	37
24CGU201	Computer Networks	Major4	1,3,4,5,6,8	1,2	3	-	-	2	40	60	100	39
24CGU202	Object Oriented Programming using C++	Major5	1,3,4,5,6	1,2	3	-	-	3	40	60	100	41
24CGU203	Community Engagement and Social Responsibility	Major6	1,2,3,4,5,6,7,8,10,15	2	2	-	-	2	40	60	100	43
24CGUA201	Probability and Statistics	Minor2	3,4,5,6	-	4	-	-	4	40	60	100	45

24CGU211	Computer Networks – Practical	Major7	1,3,5,8, 9,10,11 ,14	1,2	-	-	3	2	40	60	100	47
24CGU212	Object Oriented Programming using C++ - Practical	Major8	3,4,5,6	2	-	-	3	2	40	60	100	49
24SEC211	Web Programming - Practical	SEC 2	1,3,4,5, 7,10	1	-	-	3	3	40	60	100	51
24VAC201	Environmental Studies	VAC2	1,8,9,1 1,12,13 ,15	1,2	2	-	-	2	100	-	100	52
Semester Total					**21**	**-**	**09**	**26**	**460**	**540**	**1000**	
Semester – III												
24LSUT301/ 24LUH301/ 24LUM301/ 24LUS301/ 24LUF301	Language III (Tamil III/ Hindi III/ Malayalam III/ Sanskrit III/ French III)	AEC 3	-	-	4	-	-	3	40	60	100	54
24ENU301	English III	MDC 3	1,2,3,4	-	3	-	-	3	40	60	100	63
24CGU301	Infrastructure Management	Major 9	1,3,4,5, 6,8	1,2	3	-	-	2	40	60	100	65
24CGU302	Python Programming	Major10	1,3,6,8, 9,11	1,2	3	-	-	3	40	60	100	67
24CGU303	Virtualization and Cloud	Major 11	1,3,6,8	1,2	3	-	-	2	40	60	100	69
24CGU304	Information Technology Infrastructure Library	Major 12	1,3,4,5, 7,8,10, 11,12,1 4,15	1	3	-	-	2	40	60	100	71
24CGU311	Infrastructure Management - Practical	Major 13	1,3,4,5, 6	1,2	-	-	3	1	40	60	100	73
24CGU312	Python Programming - Practical	Major 14	1,3,4,5, 6,8,11	1	-	-	3	1	40	60	100	74
24CGU313	Virtualization and Cloud - Practical	Major 15	1,5,6,8, 10	2	-	-	3	1	40	60	100	76
24VAC301	Indian Knowledge System	VAC 3	9,11,12 ,13,15	2	2	-	-	1	100	-	100	78
24CGU391	Internship*	Summer Internship	-	-	-	-	-	2	100	-	100	80
Semester Total					**21**	**-**	**9**	**21**	**560**	**540**	**1100**	

Semester - IV												
24LSUT401/ 24LUH401/ 24LUM401/ 24LUS401/ 24LUF401	Language IV (Tamil IV/ Hindi IV/ Malayalam IV/ Sanskrit IV/ French IV)	AEC 4	-	-	4	-	-	3	40	60	100	81
24ENU401	English IV	SEC 3	1,2,4	-	3	-	-	3	40	60	100	89
24CGU401	Programming in JAVA	Major 16	1,3,4,5, 8	1,2	3	-	-	3	40	60	100	91
24CGU402	Database Management System	Major 17	1,3,4,5, 6,8,10	2	3	-	-	2	40	60	100	93
24CGU403	Cyber Security	Major 18	1,3,4,5, 8,9,10, 11,12	1,2	2	-	-	1	40	60	100	95
24CGU404	Process Management	Major 19	1,3,4,6, 8,11	1,2	2	-	-	2	40	60	100	98
24CGU405	Campus to Corporate	Major 20	2,7,9,1 0,11,12 ,15	1,2	2	-	-	2	40	60	100	100
24CGUA401	Operations Research	Minor 3	3,4,5,6	-	4	-	-	4	40	60	100	102
24CGU411	Programming in JAVA - Practical	Major 21	1,2,4,5, 6,8	1,2	-	-	3	1	40	60	100	104
24CGU412	Database Management System – Practical	Major 22	1,3,4,5, 6,8,10	1,2	-	-	2	1	40	60	100	106
24VAC401	Universal Human Values	VAC 4	3,4,5,7, 15	1	2	-	-	1	100	-	100	108
Semester Total					**25**	-	**05**	**23**	**500**	**600**	**1100**	
Semester – V												
24CGU501	Client Relationship Management	Major 23	1,3,4,5, 6,8,10	1,2	4	-	-	3	40	60	100	111
24CGU502	Introduction to Digital Technology	Major 24	1,3,4,6, 8	1,2	3	-	-	2	40	60	100	113
24CGU503	Software Testing	Major 25	1,3,4,6, 8,9	1,2	3	-	-	2	40	60	100	115
24CGUA501	Basics of Accounting	Minor 4	1,3,4,7, 8,9,11	2	6	-	-	6	40	60	100	117
24CGU511	Client Relationship Management - Practical	Major 26	1,3,4,5, 7,8,12	1,2	-	-	4	2	40	60	100	119
24CGU512	Introduction to Digital Technology – Practical	Major 27	1,3,4,5, 6,8	1,2	-	-	5	2	40	60	100	121

24CGU513	Software Testing - Practical	Major 28	1,3,4,6, 8,11	1,2	-	-	5	2	40	60	100	123
24CGU591	Internship*	Summer Internship	-	-	-	-	-	2	100	-	100	125
Semester Total					**16**	**-**	**14**	**21**	**380**	**420**	**800**	
Semester – VI												
24CGU601	Major Elective	Major 29	-	-	6	-	-	4	40	60	100	126
24CGU602A	Machine Learning	Major 30	1,3,4,5, 6,8	1,2	6	-	-	4	40	60	100	136
24CGU602B	Natural Language Processing		1,4,5,6, 8	1,2								138
24CGUA601	Entrepreneurship	Minor 5	1,2,7,1 0,11,12 ,13,15	1,2	6	-	-	4	40	60	100	140
24CGU611A	Machine Learning - Practical	Major 31	1,3,4,5, 6,8	1,2	-	-	4	2	40	60	100	142
24CGU611B	Natural Language Processing - Practical		1,4,5,6, 8	1,2								144
24CGU691	Project	Minor Project	-	-	-	-	8	4	40	60	100	146
ECA / NCC / NSS / Sports / General Interest etc			Good									
Semester Total					**18**	**-**	**12**	**18**	**200**	**300**	**500**	
Total					**124**	**-**	**56**	**132**	**2480**	**2820**	**5300**	
Semester – VII												
24CGU701	Deep Learning	Major 32	1,2,3,4, 5,6,8,1 1	1,2	6	-	-	5	40	60	100	147
24CGU702	Full Stack Development	Major 33	1,3,4,6, 8,11	1,2	6	-	-	5	40	60	100	149
24CGUA701	Statistical Computing	Minor6	1,3,4,5, 6,8,10	1,2	6	-	-	4	40	60	100	151
24CGU711	Deep Learning - Practical	Major 34	1,3,4,5, 6,8,11	1,2	-	-	6	3	40	60	100	153
24CGU712	Full Stack Development - Practical	Major 35	1,3,4,6, 8	1,2	-	-	6	3	40	60	100	155
Semester Total					**18**	**-**	**12**	**20**	**200**	**300**	**500**	

Semester – VIII - A												
24CGU801	Data Science	Major 36	1,3,4,6,8	1,2	6	-	-	5	40	60	100	157
24CGU802	Big Data Analytics	Major 37	1,4,8,10,14,15	1,2	6	-	-	5	40	60	100	159
24CGUA801	Organizational Behaviour	Minor7	1,2,7,9,10,11,12,13,14,15	1,2	6	-	-	4	40	60	100	161
24CGU811	Data Science - Practical	Major 38	1,3,4,6,8	1,2	-	-	6	3	40	60	100	163
24CGU812	Big Data Analytics - Practical	Major 39	,1,4,8,10,14,15	1,2	-	-	6	3	40	60	100	165
Semester Total					**18**	**-**	**12**	**20**	**200**	**300**	**500**	
Semester –VIII – B												
24CGU801B	Research Methodology and IPR	Major 36	1,3,4,5,6,8,13	1,2	6	-	-	4	40	60	100	167
24CGUA811	Statistical Analysis using R - Practical	Minor 7	-	-	-	-	6	4	40	60	100	169
24CGU891	Research Project / Preparation of Research Project	Project	1,3,4,5,6,8,9,10	1,2	-	-	18	12	120	180	300	171
Semester Total					**06**	**-**	**24**	**20**	**200**	**300**	**500**	
Grand Total					**160**	**-**	**80**	**172**	**2880**	**3420**	**6300**	

24LSUT101 **LANGUAGE I: TAMIL I** **4H -3C**

Instruction Hours / Week: L: 4 T: 0 P: 0 **Marks:** Internal: **40** External: **60** Total: **100**

End Semester Exam: 3 Hours

இலக்கிய இன்பம்

பாடத்திட்டப் பொதுநோக்கம்

- மாணவர்களுக்குத் தமிழ்மொழி வரலாறு மற்றும் இலக்கியங்களின் வழியாக வாழ்வியல் மதிப்புகளை உணர்த்துதல்.
- சிந்தனைத் திறனையும், படைப்பாக்கத் திறனையும், கருத்து வெளிப்பாட்டுத் திறனையும் மேம்படுத்துதல்.
- வேலைவாய்புக்குரிய வகையில் மொழித்திறனை மேம்படுத்துதல்.

பாடத்திட்டப் பயன்விளைவு

- தமிழ்மொழி வரலாறு குறித்த தெளிந்த அறிவு பெற்றிருத்தல்.
- வாழ்வியல் மதிப்புகளைப் பேணுவதற்குக் கருவியாக இலக்கியங்களை நாடுகின்ற மனப்பான்மை பெற்றிருத்தல்.
- படைப்பிலக்கியத்திறன் பெற்றிருத்தல்.
- இந்தியக் குடியுரிமைப்பணி முதலான போட்டித் தேர்வுகளில், விருப்பப்பாடமாக இடம்பெறுகின்ற,'தமிழ் இலக்கியவரலாறு' தமிழ் இலக்கண அறிவு மேம்பாடு பெற்றிருத்தல்.
- மொழிபெயர்ப்பியல், கணினித்தமிழ் சார்ந்த வேலைவாய்ப்புத்திறன் மேம்பாடு.

அலகு – I **10 மணிநேரம்**

சங்க இலக்கியம்–எட்டுத்தொகை-முச்சங்கங்கள் பற்றிய செய்திகள் சங்க இலக்கியத்தின் தோற்றுவாய் – எட்டுத்தொகை அறிமுகம்

சங்க இலக்கியம் - நற்றிணை - நின்ற சொல்லர் –குறிஞ்சி – தலைவி கூற்று– 1

சங்க இலக்கியம் - குறுந்தொகை - நிலத்தினும் பெரிதே–குறிஞ்சி – தலைவி கூற்று- 3

அறஇலக்கியம் - திருவள்ளுவர் – திருக்குறள் (எண்கள்-திருக்குறள் வரிசை எண்ணைக் குறிப்பன)

பாயிரம் – 8 அறவாழி அந்தணன்,13 - விண்இன்று பொய்ப்பின், 34 - மனத்துக்கண் மாசிலன் ஆதல்

இல்லற இயல் - இல்வாழ்க்கை - 41- அன்பும் அறனும் உடைத்தா 50- வையத்துள்வாழ்வாங்கு

அன்புடைமை - 80 - அன்பின்வழியது, **விருந்தோம்பல் -** 90 – மோப்பக்குழையும்,

இனியவைகூறல் - 95 – பணிவுடையன் இன்சொலன்,

செய்நன்றி அறிதல் - 103 – பயன் தூக்கார்,

புறங்கூறாமை - 190 – ஏதிலார் குற்றம், **ஒப்புரவுஅறிதல் -** 216 – பயன்மரம்
ஈகை: 228 – ஈத்துவக்கும் இன்பம், **துறவற இயல் - தவம் -** 261 – உற்றநோய்
வாய்மை - 291 – வாய்மை எனப்படுவது, **வெகுளாமை -** 306 - சினமென்னும்
இன்னாசெய்யாமை : 316-இன்னா எனத்தான் உணர்ந்தவை
நிலையாமை - 331 – நில்லாதவற்றை, **ஊழியல் - ஊழ் -** 373 – நுண்ணியநூல்
ஆள்வினை உடைமை - 618 –பொறியின்மை யார்க்கும், 620-ஊழையும் உப்பக்கம்
நட்பு - 792-ஆய்ந்தாய்ந்து, 794-குடிப்பிறந்து, 797-ஊதியம் என்பது.
காப்பியம் - சிலப்பதிகாரம்:
மங்கலவாழ்த்துப் பாடல் - பொதியில்ஆயினும் – 'கோவலன் என்பான்மன்னோ'
(14-38), 'நீலவிதானத்து' – 'நோன்புஎன்னை'(48-53).
மனையறம்படுத்த காதை - 'வார்ஒலிகூந்தலை' – 'சிறப்பின் கண்ணகிதனக்குஎன்' (84-90)
அரங்கேற்று காதை -'மாமலர்நெடுங்கண்' - 'அகம்மறந்து' (170-175).
மதுரைக்காண்டம் -கொலைக்களக்காதை,'இருமுதுகுரவர்'-
'எழுந்தனன்யான்' (67-83),'வினைவிளைகாலம்' - ' கொணர்கஈங்குஎன' (148-153)
கட்டுரை காதை - 'கடிபொழில்' - 'இல்சாபம்பட்டனிர்' (138-170)
வழக்குரைக் காதை - 'அல்லவை செய்தார்க்கு' - 'தோற்றான்உயிர்' (82-93)
வஞ்சிக் காண்டம் - நடுகல்காதை - 'மதுரைமூதூர்' - 'மன்னவர்ஏறு' (218-234)
வாழ்த்துக் காதை - 'என்னேஇஃது' - 'தோன்றுமால்' (9)
எழுத்திலக்கணம் - முதல் மற்றும் சார்பெழுத்துகள்

அலகு- 2 **10 மணிநேரம்**

சங்க இலக்கியம் – பத்துப்பாட்டு அறிமுகம்
சங்க இலக்கியம் - பதிற்றுப்பத்து : ஏழாம்பத்து- எறிபிணம் இடறிய செம்மறுக்– 65
சங்க இலக்கியம் - கலித்தொகை : அகன்ஞாலம் விளக்கும் - நெய்தல்கலி – தலைவிகூற்று- 119.
அற இலக்கியம் -முன்றுறையரையனார் - பழமொழி நானூறு 5 பாடல்கள்
காப்பியம் -மணிமேகலை : விழாவறைகாதை : 'தேவரும் மக்களும்' - 'மருங்குஎன்' (66-72)
ஊரலர் உரைத்தகாதை : 'நாவல்ஓங்கிய' - 'உண்டுகொல்'(1-17), 'கற்றுத்துறைபோகிய' – 'தீத்தொழில்படாஅள்' (32-57).
பாத்திரம் பெற்றகாதை : 'போதிநீழல்' - 'நல்அறம்கண்டனை' (73-98)

சிறைக்கோட்டம் அறக்கோட்டம் ஆக்கியகாதை -'வாழிஎம்கோ' - 'அரசுஆள்வேந்துஎன்' (129-163)

சொல்இலக்கணம் - பெயர், வினை, இடை, உரிச்சொல்- விளக்கமும்பயிற்சியும்

அலகு– 3 **10 மணிநேரம்**

அறஇலக்கியங்கள் அறிமுகம்

சங்க இலக்கியம் - பரிபாடல்: வையை : பாடல்-6. - நிறைகடல் முகந்து உராய் – சேறுஆடுபுனலதுசெலவு 1-50.

சங்க இலக்கியம் -அகநானூறு - ஈன்று புறம்தந்த எம்மும் உள்ளாள் – பாலை–

நற்றாய்கூற்று-35

அற இலக்கியம் -ஔவையார்- கொன்றை வேந்தன் (1-50 பாடல்கள்)

காப்பியம் - சூளாமணி–அரசியல்சருக்கம்- 1. நாவியே கமழும்(1131), 2. கண்மிசை கனிந்த (1132),3. விரைசெலலிவுளித்(1133), 4. அரைசர்கள் வருக (1134), 5. அருளுமாறடிகள் (1135), 6. விஞ்சையருலக (1136), 7. சொரிகதிர் (1137), 8. கரியவன் வளைந்த(1138), 9. மடித்தவா யெயிறு (1139),10. விஞ்சயரதனைக் (1140), **துறவுச்சருக்கம்** – பயாபதி மன்னனின் துறவுநெறி - 1. மன்னிய புகழி(1840), 2. திருமகிழலங்கன் (1841) , 3. ஆங்கவ ரணைந்த (1842),4. அலகுடன் விளங்கு (1843), 5. தன்னையோர் அரசனாக்கி (1844), 6. சென்றநாள்(1845), 7. எரிபுரை (1846.), 8. பிறந்தனர்(1847), 9. பிறந்தநாம் (1848), 10. தொகைமலர் (1849) 11. ஒழுகிய(1850).

பொருள் இலக்கணம் - அகத்திணை மற்றும் புறத்திணை இலக்கணங்கள்.

அலகு- 4 **10 மணிநேரம்**

சிற்றிலக்கியங்கள் தோற்றமும் வளர்ச்சியும்

சங்க இலக்கியம் - ஐங்குறுநூறு : தாய்சாப்பிறக்கும் – தோழிகூற்று – மருதம் - களவன்பத்து: 24

சங்க இலக்கியம் - புறநானூறு : உற்றுழிஉதவியும்-183, பல்சான்றீரே – பொதுவியல்-195

அற இலக்கியம் – வேதநாயகம் பிள்ளை -நீதி நூல்- தேர்ந்தெடுக்கப்பட்ட 5 பாடல்கள் மட்டும்

சின்னவோர் பொருள், கடவுளை வருத்தி, எப்புவிகளும், வைத்தவர், ஈன்றவர்.

காப்பியம் – கம்பராமாயணம் – சுந்தரகாண்டம் (தேர்ந்தெடுக்கப்பட்ட பாடல்கள்

மட்டும்) வண்மையில்லை 84 - தாய் ஒக்கும் 171 - ஒரு பகல் 284 - எதிர் வரும் 314 – தருவனத்துள் 327 - எண் இலா 328 - சொல் ஒக்கும் 413 – இவ்வண்ணம் 559 - எண் அரு 598 - தடுத்து இமையாமல் 1979 - தோள் கண்டார் 1008 – மைந்தரை 1339 – அந்நகர் 1445 - சிவந்த வாய் 1550 - ஏய வரங்கள் 1593 –

நின்மகன் 1526 – ஆழிசூழ் 1601 – மன்னவன் 1604 – பின்னும் 1752 – கிள்ளையொடு 1701 – எந்தையும் 2159 - பஞ்சி ஒளிர் 2762 - மயில் உடை 3248 – ஆண்டு 3390 –மற்றுஇனி 3812- கண்டனன் 5249 – வேலையுள் 6037 – மண்ணொடும் 6038- வாங்கிய 6170 – இங்குஉள 6172 – கண்டனென் 6031 - பைய பைய 6174 – அந்நெறி 6185 – குகனொடும் 6507 –கூவி 7131 –மாக்கூடு 7760 – அற்றவன் 9168 - ஆள் ஐயா 7271 - கார்நின்ற-10043.

கடிதப்பயிற்சி

1. வேலைவேண்டி விண்ணப்பம் எழுதுதல்
2.பல்கலைக்கழகப் பன்னாட்டுக் கருத்தரங்கச் செய்தியை நாளிதழில் வெளியிட வேண்டி நாளிதழின் பதிப்பாசிரியருக்குக் கடிதம்
3. கருத்தரங்கப் பங்கேற்புக்கான அனுமதிக் கடிதம்
4. பல்கலைக்கழக விழாவுக்குத் தலைமையேற்க வேண்டி, மாவட்ட ஆட்சியருக்கு விண்ணப்பம்.

அலகு – 5 **8 மணிநேரம்**

காப்பியங்கள் - தோற்றமும் வளர்ச்சியும்

சங்க இலக்கியம் - பத்துப்பாட்டு: சிறுபாணாற்றுப்படை

வானம் வாய்த்த – யாம் அவண்நின்றும் வருதும் (அடிகள்: 84-143),

செய்நன்றி அறிதலும் – நல்லியக்கோடனை நயந்தனிர் செலினே (207-269).

அற இலக்கியம் – குமரகுருபரர் - நீதி நெறி விளக்கம் (தேர்ந்தெடுக்கப்பட்ட 5 பாடல்கள் மட்டும்)

உறுதி பயப்ப, முயலாது வைத்து, உலையாமுயற்சி, காலம் அறிந்து, மெய்வருத்தம்

கடிதப்பயிற்சி

5. கல்விக் கடன்வேண்டி வங்கிமேலாளருக்கு விண்ணப்பம்
6. வசிப்பிடத்திற்கு அடிப்படை வசதிவேண்டி வட்டாட்சியருக்கு விண்ணப்பம்
7. விருதுபெற்ற நண்பனுக்குப் பாராட்டுக் கடிதம்
8. புத்தகங்கள் அனுப்பி உதவவேண்டி, பதிப்பகத்தாருக்கு விண்ணப்பம்.

மொத்த மணிநேரம் 48

பார்வை நூல்கள்

1. **கற்பகச் சோலை – தமிழ்ப்பாட நூல், இலக்கிய நெறிகள்,** தமிழ்த்துறை வெளியீடு, கற்பகம் உயர்கல்விக்கழகம், கோயம்புத்தூர் – 21.
2. **தமிழ் இலக்கிய வரலாறு, முனைவர் கா.கோ. வேங்கடராமன்,** கலையக வெளியீடு, நாமக்கல்.

இணையதளம்

1. www.tvu.org.in
2. www.maduraitamilproject.com

இதழ்கள்

1. International Research Journal of Indian Literature, irjil.in
2. International Tamil Research Journal, iorpress.in

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**2.8**	**2.6**	**2.4**	**-**	**-**	**-**	**-**	**-**	-	**-**	**-**	-	-	-	-	-	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester I

24LUH101 **LANGUAGE I: HINDI I** **4H-3C**

(Prose, Non-Detailed, Nibandh, Grammar)

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required

COURSE OBJECTIVES(CO):

- Understand the text styles and grammatical elements
- Discuss the content of a reading passage
- Develop an interest in the appreciation of short stories

COURSE OUTCOMES (COs):

- Develop an interest in the appreciation of literature.
- Discuss and respond to content of a reading passage.
- Learning the literacy knowledge of Hindi specially reading and writing.
- Learning the literary knowledge specially reading and understanding of Hindi short Stories
- Learning the history of Hindi literature.

UNIT -I **9 HOURS**

a) Prose - Bharathiya Sangrah
b) Non-Detailed - Naya Mehman
c) Nibandh - Anushasan
d) Grammar - Bhasha Aur Vyakaran

UNIT -II **9 HOURS**

a) Prose - Pahtha Pani Nirmal
b) Non-Detailed - Eakankki ki Visheshatha
c) Nibandh - Onam
d) Grammar – Varna Vichar , Sangya

UNIT -III **10 HOURS**

a) Prose – Rashtriya Pitha Mahathma
b) Non-Detailed – Maha Bharat ki Eak Sanjh
c) Nibandh – Eakatha Ka Mahathva
d) Grammar – Sarvanam , Gender

UNIT-IV **10 HOURS**

a) Prose – Gapshap
b) Non-Detailed – Yahang Sona Mana Hai
c) Nibandh – Ganga Pradhushan Ki Samasya
d) Grammar – Number , Karak , Visheshan

UNIT-V **10 HOURS**

a) Prose – Nindha Ras
b) Non – Detailed Eakanki ki Katha Vasthu
c) Nibandh – Paropkar
c) Nibandh – Paropkar
d) Grammar - Kriya , Kriya Visheshan **TOTAL: 48 HOURS**

REFERENCE BOOKS:

I. Prose :Nuthan Gathya Sangrah (lesson-1,5,6,8,9).

Editor : Jayaprakash

Publisher : Sumithra Prakasan,

16|5.Hasting Road,

Illahabad.211001.

II. Non-detailed: Naveen Ekhanki Sangrah

Editor : Dr. Srimathi Malathi Tiwari

Publisher: Sumithra Prakashan,

204.Leela Apartment,

Ashok Nagar, Illahabad-211001.

III. Nibandh : Subod Hindi Nibandh

Editor : Dr. Braj Kishor Prasad Sing

Publisher: Manoj Publication

1583-84 Dariba Kala, Chandni Chouk,

Delhi – 110006.

IV Grammar: Sugam Hindi Vyakaran

Writer: Pro. Vamshidhar & Dharmapal

Publication: Shiksha Bharathi,

Kashmir Gat, Delhi - 110006

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO14	PO14	PO15	PSO2	PSO1
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**2.8**	**2.4**	**2.4**	**-**	**-**	**-**	**-**	**-**	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester I

24LUM101 LANGUAGE I : MALAYALAM I 4H-3C

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not required

COURSE OBJECTIVE (CO):

- Improves grammatical knowledge
- Will continue to read and learn about articles and think about them
- It is possible to read and understand short stories and understand the thoughts and life ofthe people of this state.

COURSE OUTCOME (COs):

- Understand the text styles and grammatical elements
- Discuss the content of a reading passage
- Develop an interest in the appreciation of short stories
- Comprehend the grammatical structures and sentence making
- Understand the language and developing English to Malayalam translation skill

	PART I MALAYALAM PAPER I	
Unit No.		**HOURS**
I	Novel – Pathummayude Aadu - Vaikam Muhammed Basheer	**10**
II	Novel- - Pathummayude Aadu - Vaikam Muhammed Basheer	**10**
III	Short Story - Ente Priyappeta Kadhakal – Akbar Kakkattil)	**09**
IV	Short Story - Ente Priyappeta Kadhakal – Akbar Kakkattil)	**10**
V	Composition &Translation(English to Malayalam)	**09**
	TOTAL	**48**

TEXT BOOKS:

1. Novel- PathummayudeAadu - Vaikam Muhammed Basheer(D.C.Books, Kottayam, Kerala)
2. Short Story - Ente Priyappeta Kadhakal – Akbar Kakkattil)(D.C. Books, Kottayam, Kerala)
3. Expansion of ideas, General Eassay and Translation. (A simple passage)

REFERENCE BOOKS:

1. Malayala Novel Sahithya Charitram-K.M.Tharakan (N.B.S.Kottayam)
2. Cherukatha Innale Innu-M.Achuyuthan (D.C Books, Kottayam)
3. Sahithya CharitramPrasthanangalilude- Dr.K.M George, (D.C.Books Kottayam)
4. MalayalaSahithyavimarsam-Sukumar Azheekode (D.C.books)

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Average	-	3	3	-	-	-	3	-	-	-	-	2	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester I

24LUS101 **LANGUAGE I: SANSKRIT I** **4H-3C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

POETRY, GRAMMAR AND TRANSLATION

PREREQUISITE:

- Not required

COURSE OBJECTIVES(CO):

- The fundamental objective of the curriculum is to impart effective science education at the undergraduate level, exposing them to recent trends and developments in the subject.
- Creating scientific temper is another major objective of this curriculum.
- Another major thrust given here is to develop an environmental concern in all activities of the students. 'Go green', the motto of the syllabus emphasizes the urgent need to conserve nature without destruction of natural resources.

COURSE OUTCOMES (COs) :

- **Critical Thinking** :Take informed actions after identifying the assumptions that frame students' thinking and actions.
- **Problem Solving**: Understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired.
- **Effective Communication**: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
- **Effective Citizenship**: Demonstrate empathetic social concern and equity centered national development.
- **Environment and Sustainability**: Understand the issues of environmental contexts and sustainable development.

UNIT I **9 HOURS**

Introduction to Poetry, Definition of Poetry

UNIT II **9 HOURS**

Five Maha Kavyas

UNIT III **10 HOURS**

Text Prescribed : Raghuvamsa (Canto – 1) First Ten Slokas

UNIT IV **10 HOURS**

Text Prescribed : Raghuvamsa (Canto – 1) Slokas Eleven to Thirty

UNIT V **10 HOURS**

Text Prescribed : Raghuvamsa (Canto – 1) Slokas Thirty One to Fifty

Grammar: Text prescribed : Sanskrit Self Teacher
By Dr.V.Varadhachari
(Present tense and Declension of „a" endingnouns (Masculine)

TOTAL: 48 HOURS

TEXT BOOKS:

1.Raghuvamasa (Canto – 1)R.S.Vadhyar and Sons Palghat, Kerala

2.Sanskrit Self Teacher By Dr.V.VaradhachariT.S.Sriraman 32, Tank Bund Road Near Loyola College, Nungambakkam Chennai 600 034.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**2.6**	**2.6**	**2.8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester I

24LUF101 **LANGUAGE I: FRENCH I** **4H-3C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

LEÇON, COMMUNICATION, GRAMMAIRE, VERBES, LEXIQUE, CULTURE

PREREQUISITE:

- Not Required

COURSE OBJECTIVES (CO):

- To enable the learner to communicate effectively and appropriately.
- To develop and integrate the use of the four language skills.
- To train students to acquire proficiency in French by reading different genres of literature and learning grammar.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Retrieve fundamentals of French language to construct error free sentences.	Apply
CO2	Construct and maintain social relationships.	Analyze
CO3	Construct business letters, proposals and E-Mail communication	Apply
CO4	Adopt the skills of planning, structuring, and delivery techniques in group discussions and presentations.	Understand
CO5	Classify communication skills in business environment	Understand

Unite – I **9 HOURS**

a) Leçon -Bienvenue
b) Communication -Un cours de francais,Entrer en contact saluer,
c) Verbes - être ou avoir
d) Lexique -Les couleurs, l' alphabet
e) Culture -La France

Unité - II **9 HOURS**

a) Leçon -Bonjour ça va ?
b) Communication -Demander et dire,Comment ça va
c) Verbes - Les verbes réguliers en –er.
d) Lexique - Les Pays et les nationalités , Les animaux domestiques, Les jours de la semaine.
e) Culture - La France et la Francophonie

Unité - III **10 HOURS**

a) Leçon - Salut ! Je m'appelle Agnès
b) Communication - Se présenter et présenter quelqu'un Demander et dire la date
c) Grammaire - Les pronoms personnels sujets ,Les verbes être et avoir , Les articles définis et indéfinis
d) Verbes - Les verbes aller et venir
e) Lexique - Les mois de l'année, Les nombres de 0 à 69 » La famille (1)
f) Culture - La France physique et politique

Unité IV **10 HOURS**

a) Leçon	- Qui est-ce ? Dans mon sac, j ' ai
b) Communication	- Demander et répondre poliment ,Demander des informations Personnelles
c) Grammaire	- La formation du feminine, La formation du pluriel , Le adjectifs possessifs
d) Verbes	-Les verbes ir et re
e) Lexique	-Les professions ,Quel ques objets ,La fiche d'identité
f) Culture	-Les symbols de la France,

Unité V **10 HOURS**

a) Leçon	- Il est comment ? Allô ?
b) Communication	- Décrire l'aspect physique et le caractère Parler au téléphone
c) Grammaire	- La formation du féminin , La phrase interrogative i.Qu'est-ce que... ? La phrase négative
d) Verbes	- Le verbe Faire
e) Lexique	- L'aspect physique , Le caractère, Les prépositions de lieu , Les nombres à partir de 70
f) Culture	- Les frontiers de la france,les villes connues en france.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Cocton Marie –Noëlle , Duplex Dorothée, Heu Elodie , Kasazian Emilie, Ripaud Delphine, 2015, Saison 1- Méthode de francais, Didier, paris.
2. Cocton Marie – Noëlle, Dupleix, Heu Elodie, Kasazian Emilie ,Ripaud Deldphin, 2015, Saison 1 – Cahier d'activites , Dider ,Paris.

REFERENCE BOOKS :

1. Anne Akyüz,Bernadette Bazelle- Shahmael,JoëlleBonenfant, Marie- Françoise Gliemenn, 2005, Les exercices de grammaire,Hachette FLE, Paris.
2. Christian Beaulieu, Je, 2015, pratique Exercises de grammaire A1, Dider,Paris,2015
3. Nathalie BIE, philippe santinan, 2005, Grammaire pour adolescents-250 exercises, CLE International , Paris.

WEBSITES :

1. http:// enseigner.tv5 monde.com/
2. bonjourdumonde.com /exercises/contenu/le – francais-du- tourisme.html
3. http://www.bonjurdefrance.com/
4. https://www.lepointdufle.net/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Average	-	3	3	-	-	-	3	-	-	-	-	2	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

24ENU101 **ENGLISH I** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**
End Semester Exam: 3 Hours

PREREQUISITE:

- Not required

COURSE OBJECTIVES (CO):

- To enable the learner to communicate effectively and appropriately.
- To develop and integrate the use of the four language skills.
- To train students to acquire proficiency in English by reading different genres of literature and learning grammar.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Retrieve fundamentals of English language to construct error free sentences.	Apply
CO2	Construct and maintain social relationships.	Analyze
CO3	Construct business letters, proposals and E-Mail communication	Apply
CO4	Adopt the skills of planning, structuring, and delivery techniques in group discussions and presentations.	Understand
CO5	Classify communication skills in business environment	Understand

UNIT-I **8 HOURS**

LISTENING: Listening –Types of Listening
SPEAKING: Face to Face Conversation
READING: Reading – Types of Reading
WRITING: Jumbled Sentences
LITERATURE: Ode on a Grecian Urn by John Keats
GRAMMAR: Parts of Speech

UNIT- II **7 HOURS**

LISTENING: Principles of Listening Skills
SPEAKING: Descriptions
READING: Reading Techniques
WRITING: Paragraph Writing
LITERATURE: Of Friendship by Francis Bacon
GRAMMAR: Articles

UNIT- III **7 HOURS**

LISTENING: Barriers of Listening
SPEAKING: Telephone Conversations
READING: Reading Comprehension Passages
WRITING: Precise Writing
LITERATURE: The Umbrella man by Roald Dahl
GRAMMAR: Tense

UNIT- IV **7 HOURS**

LISTENING : Story Narrations
SPEAKING : Group Discussion
READING : Reading Reports and profiles
WRITING : Letter Writing
LITERATURE: Tyger by William Blake
GRAMMAR : Subject and Predicate-Question Tags

UNIT V **7 HOURS**

LISTENING: Listening Strategies
SPEAKING: Interview Skills
READING: Tips for MOC- Anchoring
WRITING: Circular Writing and Summary Writing
LITERATURE: Short story: Rapunzel by the Brothers Grimm
GRAMMAR: Framing Questions

TOTAL: 36 HOURS

TEXT BOOKS:

1. Board of Editors, Acrostic I (2024). Karpagam Academy of Higher Education.

REFERENCE BOOKS:

1. Martin's, St (2013). Oxford Handbook of Writing: Handbook of Writing. Cambridge University Press.
2. Julian Treasure ,Sound Business, (2012). Oxford University Press
3. Hornby, A,S.(1975). The Guide to patterns and usage in English: oxford university Press.
4. Ellis, R.(1990). Instructed second language acquisition, Oxford: oxford university Press New York:Pergamon Press.

WEB SITES:

1. https://langster.org/en/blog/fundamentals-of-english-grammar-everything- you- need-to-know/
2. https://medium.com/@phonicstandardvideo.am/fundamentals-of-english- grammar-for-novices-24b355d2cd83

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Average	**-**	**3**	**3**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester I

24CGU101 **OPERATING SYSTEMS** **5H -3C**

Instruction Hours / Week: L: 5 T: 0 P: 0 **Marks:** Internal: **40** External: **60** Total: **100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To Know the basics of an operating systems and skills to implement on Process Management.
- To provide the basic Knowledge of Memory and its management in OS and understanding about the Client and Server OS.
- To have an Experimental Learning with file systems and its structure.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Extend the fundamentals of an operating system	Understand
CO2	Apply the Concept of Scheduling and its algorithm.	Apply
CO3	Demonstrate memory partitions and its techniques.	Understand
CO4	Develop an Experimental Exposure in File allocations	Apply
CO5	Demonstrate the installation of client and server OS	Understand

UNIT I INTRODUCTION TO OPERATING SYSTEMS **12 HOURS**

Computer Basics: Definition of a Computer - Characteristics and Applications of Computers – Block Diagram of a Digital Computer – Classification of Computers based on size and working. Hardware Basics: Central Processing Unit – I/O Devices-Memory Devices- Secondary storage devices. Operating System Basics: OS Definition, Functions, OS as a Resource Manager, Types of OS, Evolution of OS, Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

UNIT II PROCESS MANAGEMENT **12 HOURS**

Basic Concepts, Process Scheduling, Operations on Processes, Inter-process Communication, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling

UNIT III MEMORY MANAGEMENT **12 HOURS**

Memory Management Strategies, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory Management, Demand Paging, Page Replacement Techniques andAlgorithms.

UNIT IV STORAGE MANAGEMENT **12 HOURS**

File Concept, Access Methods, Directory Structure, Protection, Implementing File Systems, File System Structure, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery

UNIT V OPERATING SYSTEMS **12 HOURS**

Introduction to Linux: Versions, Components, Features; Installation of Linux OS, Managing Directories, Managing Files. Introduction to Windows: Versions, GUI Components, Features; Installation of Client OS and Server OS, Installation of Roles and Features, Managing Users and Groups, Managing Devices and Printers, Storage Management, Managing and Monitoring of Server,Backup & Restoration

TOTAL: 60 HOURS

TEXT BOOKS:

1. Greg Tomsho, 2017, Guide to Operating System, 5th Edition.
2. William PanekTylor Wentworth, 2010, Microsoft Windows 7 Administration, Wiley Publishing.

REFERENCE BOOKS:

1. Charles Edge, Chris Barker Ehren Schwiebert, 2010, Beginning MaC OsX Snow Leopard Server.
2. Mitch Tulloch, 2009, Windows 7 Essential Guidance.

WEBSITES:

1. https://searchitchannel.techtarget.com/tip/Windows-7-user-accounts-and-groups-management
2. https://docs.microsoft.com/
3. https://www.microsoft.com/en-in/evalcenter/evaluate-windows-server-2012

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	1	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO2	1	-	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-	2	-
CO5	-	-	-	3	3	2	-	-	-	-	-	-	2	-	-	-	-
Average	1	-	1	3	3	2	-	-	-	-	-	-	2	-	-	2	-

1 - Low, 2 - Medium, 3 - Strong, '-' – No Correlation

24CGU102 **DATA STRUCTURES** **5H -3C**

Instruction Hours / Week: L: 5 T: 0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Programming Fundamentals

COURSE OBJECTIVES (CO):

- To understand the fundamental concepts of data structures and learn linear data structures lists, stacks, and queues.
- To apply Tree and Graph structures and understand sorting, searching and hashing algorithms.
- To develop application using data structures.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Identify appropriate data structure as applicable to specified problem definition	Apply
CO2	Apply the concept of stack, queue and linked list	Apply
CO3	Construct a tree and perform various operations on a tree along with implementation	Apply
CO4	Build the solution for solving various computing problems using graph data structure	Apply
CO5	Illustrate sorting and searching techniques	Understand

UNIT I ARRAYS AND STACKS **14 HOURS**

Definition, Structure and properties of algorithm – Development of an algorithm – data structures and algorithms – Data Structure definition and classification – **Arrays:** Introduction – array operations – Number of elements in an array – Representation of arrays in memory – Applications of arrays. **Stacks:** Introduction- Stack Operations – Applications of stacks: Evaluations of postfix expressions.

UNIT II QUEUES AND LINKED LISTS **12 HOURS**

Queues: Introduction – Operations on queues – Circular Queues – Other types Queue –Applicationof Linear queues : Time sharing system– **Linked Lists:** Introduction – Singly linked lists – Circularly linked lists – Doubly Linked Lists – Application of Linked List-Polynomial addition.

UNIT III TREES **12 HOURS**

Tree: Introduction – Trees Definitions and basic terminologies – representation of tress – **Binary Trees:** Basic terminologies and types – Representation of Binary Trees – Binary tree traversals – Threaded of Binary Tree – Applications of Tress- Expression trees.

UNIT IV GRAPHS **10 HOURS**

Introduction – Graph terminology – Representation of Graphs –Operations on Graphs – Applications of Graph – Topological Sort – Minimum Spanning Tree – Finding Shortest paths – Articulation Points, Bridges, and Biconnected Components, Strongly connected components – Eulerian Tour – Hamiltonian Tour.

UNIT V SORTING, SEARCHING AND HASHING **12 HOURS**

Sorting: Introduction – Bubble sort – Selection sort –Insertion Sort – Bucket / Radix Sort – MergeSort – Quick Sort – Heap Sort – Tree sort – Shell Sort – **Searching:** Linear – Binary search – Merging. **Hashing:** Introduction – Direct Address table – Hash Table – Hash Function – Resolvingcollisions: Synonyms Chaining– Open Addressing – Rehashing.

TOTAL: 60 HOURS

TEXT BOOKS:

1. R. S. Salaria, 2022, Data structures & Algorithms Using C, 5th Edition, Khanna Book Publishing Co. Pvt. Ltd., SRS Enterprises, New Delhi.
2. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft, 2022, Data Structures and Algorithms, 1st edition, Pearson.

REFERENCE BOOKS:

1. Jean Paul Tremblay and Paul G. Sorensen, 2017, An Introduction to Data Structures with Applications, 2nd Edition, Tata McGraw Hill, New Delhi.
2. Vijayalakshmi Pai G.A, 2017, Data Structures and Algorithms – Concepts, Techniques and Applications, 1st Edition, McGraw Hill Education, New Delhi.

WEBSITES:

1. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html
2. https://www.docsity.com/en/data-structures-and-algorithm-explaination-and-types/8851110/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	3	-	-	-	3	-	-	-	-	-	-	-	2	-
CO2	3	-	-	3	2	-	-	3	-	-	-	-	-	-	-	-	3
CO3	3	-	1	3	2	-	-	3	-	-	-	-	-	-	-	-	-
CO4	3	-	1	3	2	-	-	3	-	-	-	-	-	-	-	2	3
CO5	3	-		3	2	1	-	3	-	-	-	-	-	-	-	-	-
Average	3	-	1	3	2	1	-	3	-	-	-	-	-	-	-	2	3

1 – Low, 2 – Medium, 3 – Strong, '-' – No Correlation

24CGUA101 **NUMERICAL METHODS** **4H -4C**

Instruction Hours / Week: L: 4 T: 0 P: 0 **Marks:** Internal: **40** External: **60** Total: **100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Understanding of basic calculus.

COURSE OBJECTIVES (CO):

- To learn the fundamental methods for solving numerical algebraic and transcendental equations.
- To understand various techniques for solving simultaneous linear algebraic equations.
- To gain knowledge of interpolation, numerical differentiation, numerical integration, and numerical solutions of ordinary differential equations.

COURSE OUTCOMES (COs):

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

COs	Course Outcomes	Blooms Level
CO1	Apply numerical analysis which has enormous application in the field of science.	Apply
CO2	Implement numerical methods to solve systems of simultaneous linear algebraic equations.	Apply
CO3	Summarize the principles of Gregory-Newton forward and backward and Lagrange's Interpolation formulas.	Understand
CO4	Explain numerical differentiation and numerical integration formulas.	Understand
CO5	Implement numerical methods to solve ordinary differential equations.	Apply

UNIT I SOLUTIONS OF NUMERICAL ALGEBRAIC AND TRANSCENDENTAL EQUATIONS **10 HOURS**

Bisection method - Iteration method - False Position method - Newton's method.

UNIT II SOLUTION OF SIMULTANEOUS LINEAR ALGEBRAIC EQUATION **10 HOURS**

Gauss elimination method - Gauss Jordon method - Gauss Jacobi method - Gauss Seidel methods.

UNIT III INTERPOLATION **10 HOURS**

Gregory-Newton forward and backward interpolation formula – Equidistant terms with one or more missing values - Lagrange and Inverse Lagrange Interpolation formula.

UNIT IV NUMERICAL DIFFERENTIATION AND INTEGRATION **9 HOURS**

Numerical Differentiation: Newton's forward difference and Newton's backward difference formula. Numerical Integration: Trapezoidal Rule and Simpson 's Rule.

UNIT V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS **9 HOURS**

Taylor's series - Euler's method – Modified Euler's method - Runge-Kutta methods (Fourth order Runge - Kutta method only).

TOTAL: 48 HOURS

TEXT BOOKS:

1. Kandasamy, P., Thilagavathi K. and Gunavathi K. 2015, Numerical Methods, Published by Chand & Company Pvt. Ltd., New Delhi.

2. Jain M.K., Iyengar S.R.K., and Jain R.K. 2012, Numerical Methods for Scientific and Engineering Computation, New Age International Publishers, New Delhi.

REFERENCE BOOKS:

1. Veera Rajan T. and Ramachandran T. 2008, Numerical Methods with Programs in C, Tata McGraw-Hill Publishing company limited, New Delhi.
2. Bradie B. 2007, A Friendly Introduction to Numerical Analysis, Pearson Education, India.

WEBSITES:

1. https://testbook.com/maths/bisection-method
2. https://kanchiuniv.ac.in/coursematerials/Numerical%20-%20Algebraic%20equations.pdf
3. https://youtu.be/TIWRyzzFUYQ?si=rK4kUBpTzVpavVdU
4. https://theengineeringmaths.com/wp-content/uploads/2017/11/num-diff-integ-web.pdf

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	-	-	**1**	**2.6**	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

24CGU111 **OPERATING SYSTEMS - PRACTICAL** **3H - 2C**

Instruction Hours / Week: L: 0 T: 0 P: 3 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To Know the Installation and configuration of an operating systems and provide students with the basic knowledge and skills Implement disk Partition.
- To provide the basic Knowledge of Logical OS installation.
- To have an Experimental Learning with Client server communication and provide understanding to create group policy in Windows 2012.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Interpret the fundamentals of an Installation and Configurationof an operating system.	Understand
CO2	Apply the Concept of Disk Partition and DNS, DHCP Server.	Apply
CO3	Demonstrate OS monitoring and managing using Administrative Tools and ADS.	Understand
CO4	Have an Experimental Exposure in Client Server Communication.	Apply
CO5	Summarize the group policy in Windows 2012.	Understand

List of Programs

1. Installation of Linux OS (CentOS)
    - Explain the steps to Install the Linux OS
    - Demonstrate Working with Directories in Linux (pwd, cd, absolute and relative paths, ls, mkdir, rmdir, file, touch, rm, cp. mv, rename, head, tail, cat, tac, more, less, strings, chmod)
    - Demonstrate Working with Files in Linux (ps, top, kill, pkill, bg, fg, grep, locate, find, date, cal, uptime, whoami, finger, uname, man, df, du, free, whereis, which)
2. Installation of Windows Client OS
    - Explain the steps to Install the Client OS
    - Install a Virtual Machine with Windows Client OS
3. Managing Windows Client OS
    - Explain the steps to Create Users and Groups
    - Demonstrate the usage of Devices and Printers
    - Demonstrate the usage of Disk Management Console
4. Installation of Windows Server OS
    - Explain the steps to Install the Server OS
    - Install a Virtual Machine with Windows Server OS
5. Managing Windows Server OS
    - Demonstrate how to Install Roles and Features

- Demonstrate the Usage of Server Storage Management
- Explain the various Management and Monitoring requirements
- Explain the Backup Types and steps to take Backups

TEXT BOOKS:

1. Greg Tomsho. 2017, Guide to Operating System", 5th Edition.
2. William Panek Tylor Wentworth. 2010, Microsoft Windows 7 Administration, Wiley Publishing

REFERENCE BOOKS:

1. Charles Edge. 2010, Chris Barker Ehren Schwiebert, Beginning MaC OsX Snow Leopard Server.
2. Mitch Tulloch. 2009, Windows 7 Essential Guidance.

WEBSITES:

1. https://searchitchannel.techtarget.com/tip/Windows-7-user-accounts-and-groups-management
2. https://docs.microsoft.com/
3. https://www.microsoft.com/en-in/evalcenter/evaluate-windows-server-2012

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	2	3	3	-	-	2	-	-	-	-	-	-	-	2	-
CO2	1	-	2	3	3	-	-	2	-	-	-	-	-	-	-	2	-
CO3	-	-	2	3	3	-	-	2	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	3	-	-	2	-	-	1	-	-	-	-	2	-
CO5	-	-	-	3	-	1	-	-	1	1	1	-	-	-	1	-	-
Average	1	-	2	3	3	1	-	2	1	1	1	-	-	-	1	2	-

1 - Low, 2 - Medium, 3 - Strong, '-' – No Correlation

24SEC111 PROBLEM SOLVING USING WORKSHEETS – PRACTICAL 4H-3C

Instruction Hours / Week: L: 0 T: 0 P: 4 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Programming Fundamentals

COURSE OBJECTIVES (CO):

- To Experiment the functions in Microsoft Excel to perform basic calculations and to convert number to text and text to number.
- To Create applications using VBA code in Excel and construct formulas, including the use of built-in functions, and relative and absolutereferences.
- To Demonstrate the macros and provide the understanding about Formatting the Excel sheets, design an interactive worksheet.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Experiment with the functions in Microsoft Excel to perform basic calculations and to convert number to text and text to number.	Apply
CO2	Build an application using VBA code	Apply
CO3	Construct formulas and make use of built-in functions	Apply
CO4	Demonstrate the Macros	Understand
CO5	Interpreting the formatting of Excel sheets	Understand
CO6	Construct an Interactive worksheet	Apply

List of Programs

1. Create sales dashboard (such as Market wise, Product wise, quarter wise sales) in Excel using VBA code.
2. Create randomized quiz question paper in Excel using VBA code.
3. Design an attendance tracker using login time of the employee in Excel using VBA code. to perform the operation like if employee is late, and then lock the system.

TEXT BOOKS:

1. Mike Mc Grath. (2017). Excel VBA In Easy Steps BPB Publications.
2. Jeff Webb, Steve Saunders. (2014), Programming Excel with VBA and .NET: Solve Real-World Problems with Excel, Kindle Edition.

WEBSITES:

1. https://www.coursera.org/lecture/excel-vba-for-creative-problem-solving-part-2/all-about-worksheets.
2. https://docs.microsoft.com/en-us/office/vba/library-reference/concepts/getting-started-with-vba-in- office.

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	2	-	1	-	2	-	-	-	-	-	-	3
CO3	3	-	3	3	2		-	2	-	-	-	-	-	-	-	-	3
CO4	3	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	3
CO5	3	-	-	2	2	1	-	-	-	-	-	-	-	-	-	-	-
Average	3	-	3	2.3	2	1.5	-	1.5	-	2	-	-	-	-	-	-	3

1 - Low, 2 - Medium, 3 - Strong, '-' – No Correlation

Semester I

24VAC101 YOGA FOR YOUTH EMPOWERMENT 2H -2C

Instruction Hours/ Week: L:2 T: 0 P:0 **Marks:** Internal**:100** External**:--** Total**:100**

End Semester Exam: - Hours

PREREQUISITE:

- Not Required

COURSE OBJECTIVES(CO):

- To create awareness about Yoga and Physical Health
- To providing Value Education to improve the students character understanding Greatness of Life force and Mind
- To know about five aspects of life and to develop good Qualities and eliminating bad ones
- To Learn introspection practices like Analysis of Thoughts, Moralization of Desires, Neutralization of Anger and Eradication of Worries Diversity in Men (Why Men Differ).
- To understand about the yoga, life and practice Yogasanas.

COURSE OUTCOMES (COs):

Learners should be able to

COs	Course Outcomes	Blooms Level
CO1	Understand the concepts of about Yoga and Physical Health	Understand
CO2	Study the concepts a Greatness of Life force and Mind	Understand
CO3	Learn the aspects of Personality Development - Sublimation	Understand
CO4	Practices Human Resource Development	Apply
CO5	Understand about the yoga, life and Law of Nature	Apply

UNIT I YOGA AND PHYSICAL HEALTH 5 HOURS

Manavalakalai (SKY) Yoga: Introduction Education as a means for youth empowerment-Greatress of Education Yoga for youth Empowerment. Simplified Physical Exercises Hand, Leg, Breathing, Eye exercises Kapalabathi, Makarasana Part I, Makarasana Part II, Body Massage, Acupressure, Relaxation exercises Benefits Yogasanas 1: Pranamasana Hastha Uttanasana Pada Hasthasana - AswaSanjalana Asana ThuvipathaasvaSarjalana asana AstangaNamaskara - Bhujangasana Atha Muktha Savasana AswaSanjalanaAsara Pada Hasthasana-Hastha UttanasanaPranamasana - Pranayama: Naddisudei-Clearance Practice-Benefits - Simplified Physical Exercise-Kayakalpa Practices - Meditation Practices.

Philosophy of life: Purpose of life Philosophy of life (Needs Protections Virtues Development of knowledge) Five Types of duties-Protection of the natural resources

UNIT II GREATNESS OF LIFE FORCE AND MIND 5 HOURS

Reasons for Diseases Natural reasons (Genetic/imprints, Planetary Position, Natural calamities and climatic changes) Unnatural reasons (Food habits, Thoughts, Deeds) Philosophy of Kaya Kalpa: Physical body-Sexual vital fluid-Life force- Bio-Magnetism-Mind Maintaining youthfulness: Postponing old age seven components - Importance of sexual vital fluid Transformation of food into Measure and method in five aspects of life-Controlling undue Passion.

Kayakalpa practice: Aswini Mucra-Ojas breath-Benefits of Kaya Kapa.

UNIT III PERSONALITY DEVELOPMENT – SUBLIMATION **5 HOURS**

Mental Frequencies: Beta, Alpha, Theta and Delta wave Agna Meditation explanation benefits. Shanti meditation: Shanthi Meditation explanation-benefits - Thuriya Meditation: Thuriya Meditation explanation-benefits - Benefits of Blessing Self blessing (Auto suggestion) Family blessing Blessing the others World blessing- Divine protection

Human Values: Set-cortio- Sell-confidence Honesty Contentment Humility Modesty To erance Adjustment- Sacrifice-Forgiveness Punty (Bocy, Dress, Enviorment) Physica purity- Mental purity-Spiritualpurity. Social Values: Nonviolence-Service Patriotism-Equality Respect for parents and elders care and protection Respect for teacher Punctuality-Time Management

UNIT IV HUMAN RESOURCE DEVELOPMENT **4 HOURS**

Morality (virtues):Importance of Introspection: 1 Mine (Ego, Possessiveness) Six Evi Temperaments-Greed-Anger-Miserliness Immoral sexual passion - Inferionty and superiority Complex - Vengeance Maneuvering of Six Temperaments: Contentment-Tolerance-Charity-Chastity -Equality-Pardon (Forgiveness) - Five essential Qualities acquired through Meditation: Perspicacity Magnanimity Receptivity Adaptability-Creativity (Improved Memory Power)

UNIT V LAW OF NATURE **5 HOURS**

Ten stages of the Mind - Five kosas of the mind Maintaining good Relationships Thought- Importance of thoughts - Reasons for Thoughts Practice of Analysis of ThoughtsDefinition of Desire-Root causes for desires Types of desires Desires Essential for success Practice for Moralization of Desires Thought-Reformation-Frugality. Anger- Reasons for Anger-Anger and Peace Ill effects of anger Tolerance and Forgiveness - Neutralization of Anger- practice. Diversity in Men (Why Men Differ) Love and compassion, Eradication of Worries: Reasons for Worries-Fout types of worries Il effects-results-Practice for Eradication of Worries

YOGA PRACTICES: Thandasana Chakrasana (sideways) Vruchasana Thirikonasana Varasana

TOTAL: 24 HOURS

REFERENCE BOOKS:

1. Kayakapam Thathuvagnani Vethathiri Maharishi
2. Light on yoga BKS.lyenger
3. ManavalakalaPart-1-Thathuvagnani Vethathiri Maharishi.
4. Manavalakala part-2-Thathuvagnani Vethathiri Maharishi
5. Mind ThathuvagnariVethathir Maharishi
6. Simplified Physical Exercises- ThathuvagnaniVethathiri Maharishi
7. Sound Health through yoga - Dr.Chandrasekaran
8. The world orcer of Holistic unity- ThathuvagnaniVethathiri Mahanshi
9. Thirukkural-Rev. Dr.G.U.pope
10. Yoga for modern age ThathuvagnaniVethathin Maharishi

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	-	-	-	3	-	-	-	2	-
CO2	2	-	-	-	-	-	-	-	-	-	-	3	-	-	-	2	3
CO3	2	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3
CO4	2	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3
CO5	2	-	-	-	-	-	-	-	-	-	-	3	-	-	-	2	-
Average	2	-	-	-	-	-	-	-	-	-	-	3	-	-	-	2	3

1 - Low, 2 - Medium, 3 - Strong, '-' – No Correlation

24LSUT201 **LANGUAGE II: TAMIL II** **4H – 3C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

இலக்கிய நெறிகள்

பாடத்திட்டப் பொதுநோக்கம்

- மாணவர்களுக்குத் தமிழ்மொழி வரலாறு மற்றும் இலக்கியங்களின் வழியாக வாழ்வியல் மதிப்புகளை உணர்த்துதல்.
- சிந்தனைத் திறனையும், படைப்பாக்கத் திறனையும், கருத்து வெளிப்பாட்டுத் திறனையும் மேம்படுத்துதல்.
- வேலைவாய்புக்குரிய வகையில் மொழித்திறனை மேம்படுத்துதல்.

பாடத்திட்டப் பயன்விளைவு

- தமிழ்மொழி வரலாறு குறித்த தெளிந்த அறிவு பெற்றிருத்தல்.
- வாழ்வியல் மதிப்புகளைப் பேணுவதற்குக் கருவியாக இலக்கியங்களை நாடுகின்ற மனப்பான்மை பெற்றிருத்தல்.
- படைப்பிலக்கியத்திறன் பெற்றிருத்தல்.
- இந்தியக் குடியுரிமைப்பணி முதலான போட்டித் தேர்வுகளில், விருப்பப்பாடமாக இடம்பெறுகின்ற,'தமிழ் இலக்கியவரலாறு' தமிழ் இலக்கண அறிவு மேம்பாடு பெற்றிருத்தல்.
- மொழிபெயர்ப்பியல், கணினித்தமிழ் சார்ந்த வேலைவாய்ப்புத்திறன் மேம்பாடு.

அலகு – I 8 மணிநேரம்

நாயன்மார்கள் : தமிழ் இலக்கிய வரிசையில் திருமுறைகளும் நாலாயிரத் திவ்யப்பிரபந்தமும் – பன்னிரு திருமுறைகள் அறிமுகம் – திருமுறை ஆசிரியர்களின் இலக்கியப் பங்களிப்பு

சைவம்-பெரியபுராணம் - காரைக்கால் அம்மையார் புராணம் .

முக்கூடற்பள்ளு - 2 பாடல்கள் - சித்திரக்காலிவாலான் (நெல் வகைகள்)

குற்றாலத் திரிகூடமால்வரை (மீன்வகைகள், காளை வகைகள்)

கவிதை : மகாகவி பாரதியார் - யோகசித்தி

கவிதை : கவிமணி தேசிக விநாயகம் பிள்ளை - வாழ்க்கைத் தத்துவங்கள்

கவிதை : கவிஞர் சுகந்திசுப்பிரமணியம் - புதையுண்டவாழ்க்கை

சிறுகதை : மகாமசானம் - புதுமைப்பித்தன்

இலக்கணம் - வாக்கியஅமைப்பு : தனிவாக்கியம் – தொடர்வாக்கியம் – கலவைவாக்கியம் -தன்வினை வாக்கியம் – பிறவினை வாக்கியம்-

செய்வினை, செயப்பாட்டு வினைவாக்கியம், கட்டளைவாக்கியம் – வினாவாக்கியம் – உணர்ச்சி வாக்கியம். நன்னூல் – பொதுவியல் - அறுவகைவினா (385) - எண்வகைவிடை (386).

அலகு– 2 **12 மணிநேரம்**

ஆழ்வார்கள் : இலக்கியப் பங்களிப்பு - திவ்யப் பிரபந்தத்தில் பக்திநெறியும் இலக்கிய நயமும்

உரைநடை : தோற்றமும் வளர்ச்சியும்

வைணவம் : பெரியாழ்வார் திருமொழி: 3 -ஆம் பத்து – பத்தாம் திருமொழி 'நெறிந்தகருங்குழல் மடவாய்' – சீதைக்கு அனுமன் தெரிவித்த அடையாளம்.

கவிதை - கவிஞர் வைரமுத்து – வித்தியாசமான தாலாட்டு

சிற்பி பாலசுப்பிரமணியன் - பாரதி எங்கள் கண்மணி

அரங்க பாரி - கண்ணீர்! கண்ணீர்!

தமிழலங்காரம் – வண்ணச்சரபம் தண்டபாணி சுவாமிகள் - 10 பாடல்கள் 1. கடல் நீரில் கல்மிதக்கும், 2. வண்டமிழ் ஆற்றுதி, 3. கோளத்தை முட்டி 4. எக்காலம்என்று, 5. கடவூர் மயானத்தொர், 6. தேவாதிதேவன், 7. விண்மாரி, 8. தேவர்முனிவர், 9. அழுதேங்கிநஞ்சிட்ட,
10. அத்தனை பொத்து.

சிறுகதை : ஆர். சூடாமணி - அந்நியர்கள்

கட்டுரை : ஆளுமைத்திறன் அறிவோம்- தன்னம்பிக்கை மாதஇதழிலிருந்து

அணிஇலக்கணம் : உவமையணி – பிறிதுமொழிதல் அணி – சிலேடை அணி – தீவக அணி- ஏகதேச உருவக அணி – வேற்றுமையணி – பின்வருநிலையணி

அலகு - 3 **10 மணிநேரம்**

புதுக்கவிதை - தோற்றமும் வளர்ச்சியும்

சிற்றிலக்கியம் -தோற்றமும்வளர்ச்சியும்

மதுரைசொக்கநாதர் - தமிழ்விடுதூது – தமிழின் சிறப்பு பாடியருள பத்துப்பாட்டும் - விளம்பக்கேள்.

கவிதை- ஈரோடுதமிழன்பன் – இன்னொரு சுதந்திரம்

சிறுகதை - கு. அழகிரிசாமி - இருவர் கண்ட ஒரேகனவு

கட்டுரை - ஔவைதுரைசாமி - ஏட்டில் இல்லாத இலக்கியம்

படைப்பிலக்கியப் பயிற்சிகள் - மரபுக்கவிதை, புதுக்கவிதை, சிறுகதை, கட்டுரை படைப்பாக்க உத்திகள் – பயிற்சிகள்

அலகு – 4 **10 மணிநேரம்**

சிறுகதை - தோற்றமும் வளர்ச்சியும்

கலிங்கத்துப்பரணி – தேவாசுரம், உடலின்மேல், நெடுங்குதிரை மிசைக்கலணை, விருந்தினரும் வறியவரும், தரைமகள் தன்கொழுநன்றன், பொருதடக்கை
வாளெங்கே, வெயில்தாரை.

அருள்தரும் பூங்கோதையன்னை அந்தாதி - 11பாடல்கள் 1. பகவன்பெயரை,
2. மெல்லியல்மேலை, 3.வாலின்குரங்கு, 4.தவளேஇவள், 5.சுரக்கும் திருவருட், 6. வதிவாய்விளைபயில், 7. உறைவான், 8.பச்சைப்பேர், 9.வித்தகம், 10.துணையாய், 11.கலந்தார்.

கவிதை - கவிஞர்தாமரை - தொலைந்துபோனேன்

சிறுகதை – அம்பை - வல்லூறுகள்

கட்டுரை- முனைவர் ப. தமிழரசி - நொய்யல்,

சொல்லின் செல்வர் ரா.பி.சேதுப்பிள்ளை - காளத்திவேடனும் கங்கைவேடனும்

மொழிபெயர்ப்புப் பயிற்சிகள் : தமிழ்-ஆங்கில மொழிபெயர்ப்புப் பயிற்சிகள் -2.

அலகு – 5 **8 மணிநேரம்**

நாட்டுப்புற இலக்கியங்கள் – அறிமுகம்

கவிதை – புரட்சிக்கவிஞர் பாரதிதாசன் - தமிழின் இனிமை

கவிதை - கவிஞர் அறிவுமதி – நட்புக்காலம்

சிறுகதை - நாஞ்சில்நாடன் - இந்நாட்டு மன்னர்

கீழடி - வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம்

மொழிபெயர்ப்புப் பயிற்சிகள் : ஆங்கிலம் - தமிழ் மொழிபெயர்ப்புப் பயிற்சிகள்-2.

மொத்த மணிநேரம் 48

பார்வை நூல்கள்

1. **கற்பகச் சோலை – தமிழ்ப்பாட நூல், இலக்கிய நெறிகள்,** தமிழ்த்துறை வெளியீடு, கற்பகம் உயர்கல்விக்கழகம், கோயம்புத்தூர் – 21.
2. **தமிழ் இலக்கிய வரலாறு, முனைவர் கா.கோ. வேங்கடராமன்,** கலையக வெளியீடு, நாமக்கல்.

இணையதளம்

1. www.tvu.org.in
2. www.maduraitamilproject.com

இதழ்கள்

1. **International Research Journal of Indian Literature, irjil.in**
2. **International Tamil Research Journal, iorpress.in**

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**2.6**	**2.8**	**2.6**	**-**	**-**	**-**	**-**	**-**	-	**-**	**-**	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

24LUH201 **LANGUAGE II: HINDI II** **4H -3C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

MODERN POETRY, DRAMA, NOVEL, GRAMMAR

PREREQUISITE:

- Not Required

COURSE OBJECTIVES(CO):

- Understand the text styles and grammatical elements
- Discuss the content of a reading passage
- Develop an interest in the appreciation of short stories

COURSE OUTCOMES (COs) :

- Basic knowledge of Hindi language will be improved.
- Knowledge of glossaries will increase.
- Hindi language expression will rise.
- Learners will enrich their grammar in Hindi.
- The desire to read literature, such as the essay on a poem, develops.

UNIT-I **9 HOURS**

a) Poetry – Nagarjun
b) Drama -Dhruva Swamini
c) Novel - Nirmala , Thotharam
d) Grammar – Kaal , Theen Prakar

UNIT-II **9 HOURS**

a) Poetry – Sita , Ram
b) Drama – Mandhakini , Koma
c) Novel – Mansaram , Jiyaram
d) Grammar – Upsarg, Prathyay

UNIT-III **10 HOURS**

a) Poetry – Lakshman, Valmiki
b) Drama – Ramaguptha , Chandhraguptha
c) Novel – Sudha, Bhuvan Mohan Singh
d) Grammar – Sabda Vyutpathi

UNIT-IV **10 HOURS**

a) Poetry -Vishvaamithra, Thrijada
b) Drama –Sikhar Swami,Shakraj
c) Novel – Udhaybanulaal, Siyaram
d) Grammar – Sambandh Chochak

UNIT-V **10 HOURS**

a) Poetry – Bhagirath , Sagar
b) Drama – Khingal , Mihirdev , Prohith
c) Novel – bhalchandra Sinha,Kalyani, Rangili Bai
d) Samuchchaybodhak, Vishmayathibodhak

TOTAL: 48 HOURS

REFERENCE BOOKS:

1. Modern Poetry : Bhoomija
   Writer : Nagarjun
   Editors : Somdev & shobhakanth
   Publisher : Rdha Krishna Publication
   New Delhi - 110051
2. Drama : Dhruva Swamini
   Writer : Jaysankar Prasad
   Publisher : Sakshi Publication
   S 16,Naveen Shahdhara
   Delhi – 110032
3. Novel : Nirmala
   Writer : Premchandh
   Publisher : Prabhath Prakashan
   4/19 Asaf Ali Road
   New Delhi – 110002
4. Grammar : Sugam Hindi Vyakaran
   Writer : Pro. Vamsidhar & Dharmapal
   Publisher : Siksha Bharathi
   Madharsa Road
   New Delhi – 110006.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	O14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**3**	**2.4**	**2.4**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester II

24LUM201 **LANGUAGE II: MALAYALAM II** **4H -3C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not required

COURSE OBJECTIVE(CO):

- A basic understanding of contemporary poetry can be gained and the nature ofmodern poetry can be realized.
- Realizing the nature of drama and its nature and improving the knowledge ofreading and understanding the nature of contemporary plays.
- Understands the benefits of correspondence and can enhance thecorrespondence you need.

COURSE OUTCOME(COs):

- Get a basic understanding of Memories
- It will create basic knowledge about Environmental Psychology.
- It will create awareness about our environment.
- Knowledge is gain about our country, culture etc.
- It will be an eye opener to the students towards our Mother Earth.

	PART I – MALAYALAM II	
Unit No.		**Hours**
I	Novel -Enmakaje	**10**
II	Novel – Enmakaje	**10**
III	Memmories – Neermaathalam Pootthakaalam	**10**
IV	Memmories – Neermaathalam Pootthakaalam	**9**
V	Translation(English to Malayalam)	**9**
	TOTAL	**48**

TEXT BOOKS:

1. Emakaje – AmbikasuthanMangad – DC Books Kottayam,Kerala
2. NeermaathalamPootthakaalam - Madhavikutty -DC Books Kottayam, Kerala

REFERENCE BOOKS:

1. Athmakathasahithyam Malayalathil-Dr.Vijayalam Jayakumar (N.B.S.Kottayam) Malayala Novel SahithyaCharitram-K.M.Tharakan (N.B.S.Kottayam) SahithyaCharitramPrasthanangalilude- Dr.K.M George,
2. (D.C.Books Kottayam)
3. MalayalaSahithyavimarsam-Sukumar Azheekode (D.C.books)

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Average	-	3	3	-	-	-	3	-	-	-	-	2	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester II

24LUS201 **LANGUAGE II: SANSKRIT II** **4H-3C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PROSE, GRAMMAR AND TRANSLATION

PREREQUISITE:

- Not required

COURSE OBJECTIVES(CO):

- The fundamental objective of the curriculum is to impart effective science education at the undergraduate level, exposing them to recent trends and developments in the subject.
- Creating scientific temper is another major objective of this curriculum.
- Another major thrust given here is to develop an environmental concern in all activities ofthe students. 'Go green', the motto of the syllabus emphasizes the urgent need to conserve nature without destruction of natural resources.

COURSE OUTCOMES (COs) :

- **Critical Thinking** :Take informed actions after identifying the assumptions that frame students' thinking and actions.
- **Problem Solving**: Understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired.
- **Effective Communication**: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
- **Effective Citizenship**: Demonstrate empathetic social concern and equity centered national development.
- **Environment and Sustainability**: Understand the issues of environmental contexts and sustainable development.

UNIT I **9 HOURS**

Introduction to Sanskrit Prose, Important prose works in Sanskrit

UNIT II **9 HOURS**

Balaramayana – Balakanda

UNIT III **10 HOURS**

Balaramayana – Ayodhyakanda

UNIT IV **10 HOURS**

Balaramayana – Aranyakanda

UNIT V **10 HOURS**

Athmanepada Declension of ending nouns (feminine)

Passages from Sanskrit Self Teacher (Simple sentences)

TOTAL: 48 HOURS

TEXT BOOK:

1. Balaramayana – a simple prose version.R.S. Vadhyar and sons,Palghat, Kerala.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester II

24LUF201 **LANGUAGE II: FRENCH II** **4H -3C**

(Leçon, Communication, Grammaire, Verbes, Lexique, Culture)

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60 T**otal**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required

COURSE OBJECTIVES (CO):

- To make the students to speak and write errors free French.
- To help the students develop their listening, speaking, reading and writing skills.
- Introducing literary works to the students to enhance their analytical and aesthetic skills.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Strengthen the foundation of the language.	Remember
CO2	Standardize and demonstrate understanding of LSRW skills.	Understand
CO3	Utilize fundamentals of language for reading, writing and effective communication.	Apply
CO4	Enhancing the reading skill to build the leadership quality.	Apply
CO5	Develop the moral and aesthetic values.	Evaluate

Unité - I **9 HOURS**

a) Leçon	- Les loisirs
b) Communication	- Parler de ses goûts et de ses préférences
c) Grammaire	- Les adjectifs interrogatifs , Les nombres ordinaux, L'heure, Les pronoms personnels COD
d) Verbes	-savoir et connaitre
e) Lexique	- Les loisirs, Les activités quotidiennes ,Les matières
f) Culture	- les grands fleuves de france.

Unité - II **9 HOURS**

a) Leçon	- La routine
b) Communication	- Décrire sa journée
c) Grammaire	- Les verbes pronominaux, Les verbes du premier groupe en -e_er, -é_er, -eler, -eter, Le verbe prendre
d) Verbes	- manger, boire
e) Lexique	- Le temps et l'heure ,La fréquence
f) Culture	- les bandes dessinees.

Unité - III **10 HOURS**

a) Leçon	-Où faire ses courses
b) Communication	- Au restaurant : commander et commenter
c) Grammaire	- Les articles partitifs, Le pronom en (la quantité) très ou beaucoup ? La phrase négative
d) Verbes	- les verbs irregulliers

	e) Lexique	- Les aliments, Les quantités, Les commerces et les commerçants
	f) Culture	-Les plats francais

Unité -IV **10 HOURS**

a) Leçon	- Decourvez et dégustez
b) Communication	- Inviter et répondre ,à une invitation
c) Grammaire	- L'impératif ,Il faut, c'est/ il est,future proche
d) Verbes	- Les verbes devoir, pouvoir, savoir, vouloir
e) Lexique	- Demander et dire le prix, Les services, Les moyens de paiement
f) Culture	- Le festival du mot

Unité - V **10 HOURS**

a) Leçon	- Tout le monde s'amuse, Les ados au quotidien
b) Communication	- Décrire une tenue , Écrire un message amical
c) Grammaire	-Les adjectifs demonstratives, La formation du féminin Le pronom indéfini on, passé compose'.
d) Verbes	- Les verbes du premier groupe en –yer, Les verbes voir et sortir
e) Lexique	- Les sorties Situer dans le temps, La famille ,(2) Les vêtements et les accessoires
f) Culture	- Le pays des gourmands

TOTAL: 48 HOURS

TEXT BOOKS:

1. Cocton Marie –Noëlle , Duplex Dorothée, Heu Elodie , Kasazian Emilie, Ripaud Delphine, 2015, **Saison 1- Méthode de francais,** Didier, paris.
2. Cocton Marie – Noëlle, Dupleix, Heu Elodie, Kasazian Emilie ,Ripaud Deldphin, 2015, **Saison 1 – Cahier d'activites ,** Dider ,Paris.

REFERENCE BOOKS :

1. Anne Akyüz,Bernadette Bazelle- Shahmael,JoëlleBonenfant, Marie- Françoise Gliemenn, 2005, **Les exercices de grammaire,**Hachette FLE, Paris.
2. Christian Beaulieu, Je pratique, 2015**, Exercises de grammaire A1,** Dider, Paris.
3. Nathalie BIE, philippe SANTINAN, 2005, **Grammaire pour adolescents-250 exercises,** CLE International , Paris.

WEBSITES :

1. http:// enseigner.tv5 monde.com/
2. bonjourdumonde.com /exercises/contenu/le – francais-du- tourisme.html
3. http://www.bonjurdefrance.com/
4. https://www.lepointdufle.net/

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Average	--	2.5	2.5	-	-	-	-	-	2	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester II

24ENU201 **ENGLISH II** **3H -3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not required

COURSE OBJECTIVES (CO):

- To make the students to speak and write errors free English.
- To help the students develop their listening, speaking, reading and writing skills.
- Introducing literary works to the students to enhance their analytical and aesthetic skills.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Strengthen the foundation of the language.	Remember
CO2	Standardize and demonstrate understanding of LSRW skills.	Understand
CO3	Utilize fundamentals of language for reading, writing and effective communication.	Apply
CO4	Enhancing the reading skill to build the leadership quality.	Apply
CO5	Develop the moral and aesthetic values.	Evaluate

UNIT-I **8 HOURS**

LISTENING : Listening for Pleasure
SPEAKING : Developing speaking skills
READING : Reading strategies
WRITING : Developing a story with pictures
LITERATURE: Refuge Mother and Child by Chinua Achebe (Poetry)
GRAMMAR : Voice

UNIT- II **7 HOURS**

LISTENING : Listening for Pleasure (Story)
SPEAKING : Oral presentation
READING : Reading Passages
WRITING : Essay writing
LITERATURE : Prose: Dimensions of Creativity by A.P.J. Abdul Kalam (Story)
GRAMMAR : Subject, verb, agreement

UNIT-III **7 HOURS**

LISTENING : Dictation
SPEAKING : Public speaking and secrets of good delivery
READING : Note Making
WRITING : Writing agendas, memos and minutes
LITERATURE: River by A.K. Ramanujan
GRAMMAR : Degrees of comparison

UNIT- IV **7 HOURS**

LISTENING : Listening to instructions and announcements
SPEAKING : Debating
READING : Silent reading and methods of reading
WRITING : Writing Notices
LITERATURE: Two Gentlemen of Verona by A.J. Cronin
GRAMMAR : Phrases and clauses

UNIT-V **7 HOURS**

LISTENING : Testing listening
SPEAKING : Situational Conversation
READING: Developing reading activities
WRITING : E - Mail Writing
LITERATURE: The Postmaster by Rabindranath Tagore
GRAMMAR : Direct and indirect speech

TOTAL: 36 HOURS

TEXT BOOK:

1. Board of Editors (2024), Acrostic II. Karpagam Academy of Higher Education

REFERENCE BOOKS:

1. Martin's, St (2013). Oxford Handbook of Writing: Handbook of Writing. Cambridge University Press.
2. Julian Treasure, Sound Business, (2012). Oxford University Press
3. Hornby, A,S.(1975). The Guide to patterns and usage in English: oxford university Press.
4. Ellis, R. (1990). Instructed second language acquisition. Oxford: oxford university Press.

WEBSITES:

1. https://shortstoryproject.com/stories/the-postmaster/
2. https://www.gradesaver.com/rabindranath-tagore-short-stories/study- guide/summary-the-postmaster

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Average	--	**2.5**	**2.5**	-	-	-	-	-	**2**	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester II

24CGU201 COMPUTER NETWORKS 3H -2C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Computer Architecture, Operating Systems

COURSE OBJECTIVES (CO):

- To Understand the Fundamentals of software defined networks and the OSI Reference Models.
- To gain the knowledge in protocol, topology, wired and wireless communications and familiarize with IP Addressing and Subnetting with Advanced versions.
- To learn the functions of network layer and the various routing Algorithms and introduce the protocols of Monitoring Network Devices.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Summarize the fundamentals of networking and OSI Reference Models.	Understand
CO2	Apply basic knowledge about the topologies, protocols andtypes of communications available in networking.	Apply
CO3	Build an IP addressing and explain its functions.	Apply
CO4	Develop a routing Algorithm in a network and demonstrate how data packet will reach to the intended destination.	Apply
CO5	Develop various protocols of Monitoring Network Devices	Apply

UNIT I NEED OF NETWORK 8 HOURS

Network classifications LAN, MAN, WAN, Data and signals analog and digital, periodic analog signals, digital signals, bit rate, baud rate, bandwidth, Transmission impairments - attenuation, distortion and noise, Data Communication protocols & standards, Network models - OSI model layers and their functions, TCP/IP protocol suite.

UNIT II BANDWIDTH UTILIZATION AND MULTIPLEXING 7 HOURS

Multiplexing - FDM, TDM, spread spectrum - Frequency hopping spread spectrum, Direct sequence spread spectrum, Transmission media - guided and unguided media, Switching message,circuit and packet switched networks, Datagram networks and virtual circuit networks.

UNIT III IP ADDRESSING 7 HOURS

IP Addressing Version 4 – IP Addressing Version 6 – Subnetting- Advanced VLSM - Switch Basic VLAN - VTP / CDP - Subnetting Basic Version 4 - Routing Static.

UNIT IV ROUTING ALGORITHMS 7 HOURS

Routing algorithms – Congestion Control Algorithms, CISCO IOS / Managing / Password recovery, Routing Dynamic Routing protocols OSPF RIP EIGRP, Network Advanced Routing Dynamic Routing protocols – OSPF RIP EIGRP.

UNIT V MONITORING 7 HOURS

Monitoring Network Devices – Overview of ACL\NAT\WAN\Wireless

TOTAL: 36 HOURS

TEXT BOOKS:

1. David J. Wetherall, Andrew S.Tanenbaum, (2018). Computer Networks, 7th Edition, Pearson Education.
2. Behrouz A. Forouzan, (2016). Data Communication and Networking", 8th Edition, Tata McGraw Hill.

REFERENCE BOOKS:

1. Silviu Angelescu, (2016). CCNA Certification All-In-One for Dummies, Wiley Publishing. Inc.

WEBSITES:

1. https://www.geeksforgeeks.org/basics-computer-networking/
2. https://www.cisco.com/c/en_in/solutions/small-business/resource-center/networking/networking-basics.html
3. http://ecomputernotes.com/computernetworkingnotes/communication-networks/describe-the-different-transmission-media
4. https://www.tutorialspoint.com/ipv4/ipv4_addressing.htm
5. https://en.wikipedia.org/wiki/IPv6_address
6. https://en.wikipedia.org/wiki/Cisco_IOS

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	-	3	-	3	-	-	3	-	-	-	-	-	-	-	-	2
CO2	2	-	3		3	-	-	3	-	-	-	-	-	-	-	3	2
CO3	2	-	3	1	3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	2	-	3	1	3	-	-	3	-	-	-	-	-	-	-	3	-
CO5	-	-	3	1	3	1	-	3	-	-	-	-	-	-	-	3	2
Average	2	-	3	1	3	1	-	3	-	-	-	-	-	-	-	3	2

1 - Low, 2 - Medium, 3 - Strong, '-' – No Correlation

Semester II

24CGU202 OBJECT ORIENTED PROGRAMMING USING C++ 3H -3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To understand how C++ improves C with object-oriented feature and learn the syntax and semantics of classes in C++ programming language.
- To learn how to perform operator overloading and inheritance and learn how to design C++ using pointers.
- To learn file handling in C++.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Compare the difference between top-down and bottom-up approach.	Understand
CO2	Apply the concepts of object-oriented programming in constructor and destructor.	Apply
CO3	Apply the major object-oriented concepts toimplement inheritance and polymorphism.	Apply
CO4	Apply pointer concepts in C++.	Apply
CO5	Summarize the concepts of file handling.	Understand

UNIT I INTRODUCTION 8 HOURS

Principles of object-oriented programming: Basic concepts of object-oriented programming – Benefits of OOP – Applications of OOPs – Structure of C++ Program C++ Tokens – Control Statement – Decision Making Statements- Loop Statements - Inline Functions – Friend Function - Function Overloading.

UNIT II CONTROL STRUCTURE, FUNCTIONS AND CONSTRUCTORS 7 HOURS

Classes and Objects: Specifying a class – Creating Objects – Accessing Class Members – Defining Member Functions – Static Data Members – Static Member Functions - Array of Objects – Friend Functions. Constructors and Destructors: - Constructors – Parameterized Constructors - Multiple Constructors in a Class – Constructors with Default Arguments - Copy Constructor - Dynamic Constructor – Destructors.

UNIT III OPERATOR OVERLOADING AND INHERITANCE 7 HOURS

Operator overloading: Defining operator overloading – overloading unary operators – overloading binary operators – overloading binary operators using friends – type conversions. Inheritance: - Inheritance – defining derived classes – single, multilevel, multiple, hierarchical inheritance- hybrid inheritance – virtual base classes – abstract classes.

UNIT IV POINTERS AND I/O OPERATIONS 7 HOURS

Pointers: Pointers to objects – this pointer – pointers to derived classes – virtual functions- Pure Virtual Functions. Managing console I/O operations: - C++ streams – C++ stream classes – unformatted I/O operations – formatted console I/O operations – Managing output with manipulators.

UNIT V FILE MANAGEMENT **7 HOURS**

Files - Classes for file stream operations – Opening and Closing a file – sequential input and output operations – updating a file random access – Command Line Arguments. Templates and Exceptions: Templates – class templates – function templates – member function templates – exception handling.

TOTAL: 36 HOURS

TEXT BOOKS:

1. Antonio Mallia, Francesco Zoffoli. (2019). C++Fundamentals, Packt Publishing, Ltd.
2. Joel Murach, Mary Delamater. (2018). C++ Programming , Mike Murach& Associates Inc.
3. Stefan Bjornander. (2016). C++ Windows Programming, Published byPackt Publishing Ltd.
4. Richard L. Stegman. (2016). Focus on Object-oriented Programming with C++,6th Edition, CreateSpace Independent Publishing Platform.

REFERENCE BOOKS:

1. Bjarne Stroustroup. (2014). Programming - Principles and Practice using C++,2nd Edition, Addison-Wesley.
2. Harry, H. Chaudhary. (2014). Head First C++ Programming: The Definitive Beginner'sGuide, First Create space Inc, O-D Publishing, LLC USA.
3. Debasish Jana. (2014). C++ And Object-Oriented Programming Paradigm, Published by PHI Learning Pvt. Ltd.

WEBSITES

1. www.programmingsimplified.com
2. www.programiz.com / cpp-programming
3. www.cplusplus.com
4. www.learncpp.com
5. www.udemy.com
6. https://nptel.ac.in/courses/106101208/
7. http://172.16.13.33/course/view.php?id=599

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	2
CO2	-	-	-	3	2	-	-	-	-	-	-	-	-	-	-	1	-
CO3	-	-	-	3	2	-	-	-	-	-	-	-	-	-	-	2	2
CO4	2	-	-	3	-	2	-	-	-	-	-	-	-	-	-	-	2
CO5	2	-	-	3	-	2	-	-	-	-	-	-	-	-	-	2	-
Average	2	-	1	3	2	2	-	-	-	-	-	-	-	-	-	1.5	2

1 - Low, 2 - Medium, 3 - Strong, '-' – No Correlation

Semester II

24CGU203 COMMUNITY ENGAGEMENT AND SOCIAL RESPONSIBILITY 2H -2C

Instruction Hours/week: L:2 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To gain insights into the structures, challenges, and opportunities within communities
- To explore ethical frameworks and dilemmas related to community engagement and social responsibility
- To develop skills in monitoring, evaluating, and reporting on the outcomes of community engagement efforts to ensure effectiveness and accountability.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Understand the concept, ethics, and spectrum of community engagement	Understand
CO2	Recognize the significance in local community development and rural culture.	Understand
CO3	Know the rural development programs, institutions	Understand
CO4	Analyze the role of local administration in fostering community involvement and social networking.	Analyz
CO5	Develop skills in conducting community engaged research with a focus on ethics, rural distress, poverty alleviation, and disaster mitigation.	Apply

UNIT I INTRODUCTION AND PRINCIPLES 8 HOURS

Concept, Ethics and Spectrum of Community engagement, Local community, Rural culture and Practice of community engagement - Stages, Components and Principles of community development, Utility of public resources. Contributions of self-help groups

UNIT II RURAL DEVELOPMENT 8 HOURS

Rural Development Programs and Rural institutions Local Administration and Community Involvement- Social contribution of community networking, Various government schemes. Programmes of community engagement and their evaluation.

UNIT III COMMUNITY AND RESEARCH 8 HOURS

Community Engaged Research and Ethics in Community Engaged Research Rural Distress, Rural Poverty, Impact of COVID-19 on Migrant Laborers, Mitigation of Disaster

TOTAL: 24 HOURS

TEXT BOOK:

1. Principles of Community Engagement, (2011).2nd Edition, NIH Publication No. 11-7782.

WEBSITES:

1. https://youtu.be/-SQK9RGBt7o
2. https://www.uvm.edu/sites/default/files/community_engagement_handout.pdf (Community Engagement)
3. https://www.atsdr.cdc.gov/communityengagement/pce_concepts.html (Perspectives of Community)
4. https://egyankosh.ac.in/bitstream/123456789/59002/1/Unit1.pdf (community concepts)
5. https://sustainingcommunity.wordpress.com/2013/07/09/ethics-and-community-engagement/(Ethics of community engagement)
6. https://www.preservearticles.com/sociology/what-are-the-essential-elements-of-community/4558 (Elements of Community)
7. https://www.yourarticlelibrary.com/sociology/rural-sociology/rural-community-top-10-characteristics-of-the-rural-community-explained/34968 (features of rural community)
8. https://www.mapsofindia.com/my-india/government/schemes-for-rural-development-launched-by-government-of-india (Government programmes for rural development)
9. https://www.yourarticlelibrary.com/sociology/rural-sociology/rural-community-top-10-characteristics-of-the-rural-community-explained/34968 (rural lifestyle)
10. https://www.insightsonindia.com/social-justice/issues-related-to-rural-development/government-schemes-for-rural-development-in-india/ (schemes for rural development)
11. https://www.mpgkpdf.com/2021/09/community-development-plan-in-hindi.html?m=1
12. https://images.app.goo.gl/sNF2HMWCuCfkqYz56
13. https://images.app.goo.gl/VaMNNMEs77XyPMrP7

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-
CO2	3	2	-	-	3	-	2	1	-	2	-	-	-	-	-	-	1
CO3	3	-	2	3	-	2	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	2	-	-	2	-	1	-	3	-	-	-	-	2	-	1
CO5	3	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**3**	**2.5**	**2**	**2**	**3**	**2**	**2**	**1**	**-**	**2.5**	**-**	**-**	**-**	**-**	**2**	**-**	**1**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

24CGUA201 **PROBABILITY AND STATISTICS** **4H -4C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Basic understanding of algebra, arithmetic, elementary statistics, and probability.

COURSE OBJECTIVES (CO):

- To understand the basic concepts in probability theory and the nature of uncertainty.
- To develop the ability to work with discrete and continuous probability distributions, understand their properties, and apply the Central Limit Theorem.
- To equip students with skills in univariate and bivariate analysis, including measures of central tendency, dispersion, correlation, regression, and the construction of index numbers.

COURSE OUTCOMES (COs):

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

COs	Course Outcomes	Blooms Level
CO1	Understand the counting principles, probability rules, and theorems to solve probability problems.	Understand
CO2	Apply probability distributions such as Binomial, Poisson, Uniform, Normal, and Exponential to real-world scenarios.	Apply
CO3	Solve measures of central tendency and dispersion to data sets.	Apply
CO4	Utilize the correlation or regression methods to find the relationship between two variables.	Apply
CO5	Understand the basic concept of index numbers and weighted index numbers.	Understand

UNIT I BASICS OF PROBABILITY **10 HOURS**

Trial, event -Sample space – Mutually exclusive event – Exclusive and exhaustive events – Dependent and independent events – Simple and compound events – Mathematical properties – Counting Principle for equally likely outcomes; probability rule -; Law of Total Probability, Addition and multiplication theorem, Combinations and Permutations. Conditional Probability Bayes Rule.

UNIT II DISCRETE AND CONTINUOUS PROBABILITY DISTRIBUTIONS **10 HOURS**

Random variables (discrete and continuous) - Mathematical expectation - Binomial distribution - Poisson distribution and its properties. Central Limit theorem, Uniform distribution - Normal distribution -conditions and properties, Standard normal distribution - Exponential distribution.

UNIT III BASICS OF STATISTICS AND UNI VARIATE ANALYSIS **10 HOURS**

Meaning and definition of statistics - Frequency Distribution, Concepts of measurement, scales of measurement of data, Different types scales (ratio, interval, nominal and ordinal); Measures of central tendency: Arithmetic Mean, Median, Mode. Measures of dispersion – Range, Coefficient of range - Quartile deviation - Coefficient of Quartile deviation - Standard deviation and Coefficient of variation.

UNIT IV BIVARIATE ANALYSIS **9 HOURS**

Correlation – Meaning and definition - Scatter diagram –Karl Pearson's Correlation Coefficient. Rank Correlation. Regression: Regression in two variables – Properties of Regression, uses of Regression.

UNIT V INDEX NUMBERS **9 HOURS**

Definition – Types of Index numbers – Problems in the construction of index numbers – Construction of simple index numbers – Simple aggregate method and Simple average of price relatives using A.M, G.M – Construction of weighted index numbers – Laspeyre's, Paasche's, Dorbish Bowley's, Marshall Edge worth and Fisher's ideal index numbers - Simple problems.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Pillai, R.S.N. and Bagavathi, V. (2002). Statistics, S. Chand & Company Ltd, New Delhi.
2. Srivastava, T.N. and Shailaja Rego. (2012). Statistics for Management, 2nd Edition, McGraw HillEducation, New Delhi.
3. Evans James, R. (2017). Business Analytics, 2nd Edition, Pearson Education, New Delhi.

REFERENCE BOOKS:

1. Dinesh Kumar, U. (2017). Business Analytics: The Science of Data - Driven Decision Making, Wiley, New Delhi.
2. Sheldon Ross, (2007). Introduction to Probability Model, Ninth Edition, Academic Press, Indian Reprint.
3. Robert V. Hogg, Joseph W. McKean and Allen T. Craig., (2007). Introduction to Mathematical Statistics, Pearson Education, Asia.
4. Irwin Miller and Marylees Miller, John E. Freund, (2006). Mathematical Statistics with Application, Seventh Edition, Pearson Education, Asia.

WEBSITES:

1. https://ocw.mit.edu/courses/mathematics/18-05-introduction-to-probability-and-statistic spring-2014/
2. https://www.youtube.com/watch?v=COI0BUmNHT8&list=PLyqSpQzTE6M_JcleDbrV nE0PixKs2JE
3. https://nptel.ac.in/courses/110107114/
4. http://172.16.25.76/course/view.php?id=1642

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	1	3	-	2	-	-	-	-	-	-	-	-	-	-	-
Average	**-**	**-**	**1**	**3**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester II

24CGU211 COMPUTER NETWORKS- PRACTICAL 3H - 2C

Instruction Hours/week: L:0 T:0 P:3 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To Understand the Fundamentals of software defined networks and the OSI Reference Models.
- To gain the knowledge in protocol, topology, wired and wireless communications and familiarize with IP Addressing and Subnetting with Advanced versions.
- To learn the functions of network layer and the various routing Algorithms and introduce the protocols of Monitoring Network Devices.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Summarize the fundamentals of networking and OSI Reference Models.	Understand
CO2	Make use of basic knowledge about the topologies, protocols andtypes of communications available in networking	Apply
CO3	Build an IP addressing and explain its functions	Apply
CO4	Build a routing Algorithm in a network and demonstrate howdata packet will reach to the intended destination.	Apply
CO5	Develop various protocols of Monitoring Network Devices	Apply

List of Programs

1. Installation of Cisco Packet Tracer
2. Configuration of Cisco Packet Tracer
3. Basic Switch Setup
4. Configuring Switch Interfaces
5. VLAN and VTP Configuration
6. Basic Router Setup
7. Configuration of Static Routes
8. Configuration of IP Routing using RIP

TEXT BOOKS:

1. David J.Wetherall, Andrew S.Tanenbaum,(2018). Computer Networks, 7th Edition, Pearson Education.
2. Behrouz A. Forouzan,(2016).Data Communication and Networking", 8th Edition, Tata McGraw Hill.
3. SilviuAngelescu, (2016). CCNA Certification All-In-One for Dummies, Wiley Publishing. Inc.

WEBSITES:

1. https://www.geeksforgeeks.org/basics-computer-networking/
2. https://www.cisco.com/c/en_in/solutions/small-business/resource-center/networking/networking-basics.html
3. http://ecomputernotes.com/computernetworkingnotes/communication-networks/describe-the-different-transmission-media

4. https://www.tutorialspoint.com/ipv4/ipv4_addressing.htm
5. https://en.wikipedia.org/wiki/IPv6_address
6. https://en.wikipedia.org/wiki/Cisco_IOS
7. http://ecomputernotes.com/computernetworkingnotes/communication-networks/describe-the-different-transmission-media
8. https://www.tutorialspoint.com/ipv4/ipv4_addressing.htm
9. https://en.wikipedia.org/wiki/IPv6_address
10. https://en.wikipedia.org/wiki/Cisco_IOS

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	-	2	-	3	-	-	-	-	-	-	-	-	-	-	2	3
CO2	2	-	2	-	-	-	-	-	3	3	-	-	-	-	-	2	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
CO4	-	-	-	-	3	-	-	1	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	3	1	-	-	1	-	2	-
Average	2	-	2	-	3	-	-	1	3	3	1	-	-	1	-	2	3

1 - Low, 2 - Medium, 3 - Strong, '-' – No Correlation

Semester II

24CGU212 OBJECT ORIENTED PROGRAMMING USING C++ - PRACTICAL 3H - 2C

Instruction Hours/week: L:0 T:0 P:3 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Understanding of Object-Oriented Concepts

COURSE OBJECTIVES (CO):

- To understand how C++ improves C with object-oriented feature and learn the syntax and semantics of classes in C++ programming language.
- To learn how to perform operator overloading and inheritance and learn how to design C++ using pointers.
- To learn file handling in C++.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Compare the difference between top-down and bottom-up approach.	Understand
CO2	Apply the concepts of object-oriented programming in constructor and destructor.	Apply
CO3	Apply the major object-oriented concepts toimplement inheritance and polymorphism.	Understand
CO4	Apply pointer concepts in C++.	Apply
CO5	Summarize the concepts of file handling.	Understand

List of Programs

1. Write a C++ program to print sum of digits.
2. Write a C++ program to check palindrome number.
3. Write a program to swap numbers using friend function.
4. Write a program to perform multiplication of two matrices using operator overloading.
5. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers.
6. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
7. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).
8. Write a C++ Program to store GPA of n number of students and display it where n is the number of students entered by user (Memory Management).
9. Write a program to demonstrate the try, catch block in C++.
10. Write a C++ program that uses a single file for both reading and writing the data.

TEXT BOOKS:

1. Antonio Mallia, Francesco Zoffoli. (2019). C++Fundamentals, Packt Publishing, Ltd.
2. Joel Murach, Mary Delamater. (2018). C++ Programming, Mike Murach& Associates Inc.
3. Stefan Bjornander. (2016). C++ Windows Programming, Published by Packt Publishing Ltd.

REFERENCE BOOKS:

1. Richard L. Stegman. (2016). Focus on Object-oriented Programming with C++,6th Edition,CreateSpace Independent Publishing Platform.
2. Bjarne Stroustroup.(2014). Programming Principles and Practice using C++, 2nd Edition, Addison-Wesley
3. Harry, H. Chaudhary. (2014). Head First C++ Programming: The Definitive Beginner's Guide,First Create space Inc, O-D Publishing, LLC USA.
4. Debasish Jana. (2014). C++ And Object-Oriented Programming Paradigm, Published by PHILearning Pvt. Ltd.

WEBSITES:

1. www.programmingsimplified.com
2. www.programiz.com / cpp-programming
3. www.cplusplus.com
4. www.learncpp.com
5. www.udemy.com
6. https://nptel.ac.in/courses/106101208/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	3	2	-	-	-	-	-	-	-	-	-	-	-	2
CO3	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	2
CO5	-	-	-	3	2	2	-	-	-	-	-	-	-	-	-	-	-
Average	-	-	1	3	2	2	-	-	-	-	-	-	-	-	-	-	2

1 - Low, 2 - Medium, 3 - Strong, '-' – No Correlation

Semester II

24SEC211 WEB PROGRAMMING - PRACTICAL 3H - 3C

Instruction Hours/week: L:0 T:0 P:3 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To understand the principles of creating an effective web page and understand the basics of HTML, DHTML, XML and JavaScript.
- To understand the principles XML documents and design tables and frames in HTML.
- To provide a calculations and validations using JavaScript.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Infer the principles of web languages to create effective web page.	Understand
CO2	Model a simple static webpage using the web languages likes HTML, DHTML and XML.	Apply
CO3	Build the web page with XML document	Apply
CO4	Construct tables and frames using HTML List Tags	Apply
CO5	Make use of the validations and calculations in JavaScript	Apply

List of Programs

1. Using Formatting Tag
2. Implementation of Table Tags
3. Using List Tags
4. Implementation of frames and frame sets
5. XML and XML documents
6. Java script to perform validations
7. Java script to perform calculations

TEXT BOOKS:

1. Akshi Kumar. (2018). Web Technology Theory and Practice. Chapman and Hall/CRC
2. M.Srinivasan. (2012). Web Technology: Theory and Practice, Pearson Publishers.
3. P. K. Yuen, V. Lau . (2003). Practical Web Technologies Pearson Publishers.

WEBSITES:

1. www.w3schools.com
2. www.javatpoint.com

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	1	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	2	-	-	-	-	-	2	-	-	-	-	-	2	-
CO5	-	-	-	-	3	-	2	-	-	2	-	-	-	-	-	2	-
Average	3	-	1	2	3	-	2	-	-	2	-	-	-	-	-	2	-

1 - Low, 2 - Medium, 3 - Strong, '-' – No Correlation

Semester II

24VAC201 **ENVIRONMENTAL STUDIES** **2H -2C**

Instruction Hours/week: L:2 T:0 P:0 **Marks:** Internal**:100** External**: -** Total**:100**

End Semester Exam: -

PREREQUISITE:

- Student should know about fundamentals of environment.

COURSE OBJECTIVES (CO):

- To create awareness about structure and functions of various ecosystems.
- To develop an attitude of concern for the natural resources availability and its environment protection.
- To learn about the environment, resources available, biodiversity and its conservation.

COURSE OUTCOMES (COs):

On completion of the course, students are able to

COs	Course Outcomes	Blooms Level
CO1	Define the structure and functions of various ecosystems	Remember
CO2	Learn the ethical, cross-cultural, and historical context of natural resources and the methods for conservation	Understand
CO3	Predict current scenarios and find ways for the protection and betterment of habitat	Analyze
CO4	Analyze the interactions between social and environmental problems	Apply
CO5	Develop systems concepts and methodologies to analyze and understand interactions between social and Environmental processes	Create

UNIT I INTRODUCTION - ENVIRONMENTAL STUDIES & ECOSYSTEMS 5 HOURS

Environment Definition, Scope and Importance; Ecosystem, Structure, classification, and functions of ecosystem. Energy flow, Food chains and food webs, Ecological succession. Forest ecosystem, Grassland Ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT II NATURAL RESOURCES - RENEWABLE AND NON-RENEWABLE RESOURCES 5 HOURS

Natural resources - Renewable and Non–renewable resources. Land resources, Land degradation, desertification. Forest resources – Deforestation: Causes and impacts due to mining. Water resources-Use and over-exploitation of surface and groundwater.

UNIT III BIODIVERSITY AND ITS CONSERVATION 5 HOURS

Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity. Values of Biodiversity - Ecological, economic, social, ethical, aesthetic value. Bio-geographical classification of India. Hot-spots of biodiversity. Endangered and endemic species of India. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.

UNIT IV ENVIRONMENTAL POLLUTION 4 HOURS

Definition, causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution. Nuclear hazards and human health risks.

UNIT V SOCIAL ISSUES AND THE ENVIRONMENT 5 HOURS

Concept of sustainability and sustainable development. Climate change, global warming, ozone layer depletion, acid rain and its impacts on human communities and agriculture. Environment Laws (Environment Protection Act, Air Act, Water Act, Wildlife Protection Act, Forest Conservation Act).

TOTAL: 24 HOURS

TEXT BOOKS:

1. Anonymous. 2004. A Text book for Environmental Studies, University Grants Commission and Bharat Vidypeeth Institute of Environmental Education Research, New Delhi.
2. Anubha Kaushik., and Kaushik, C.P.(2008). Perspectives in Environmental Studies, 3rd Edition, New Age International Pvt. Ltd. Publications, New Delhi.
3. Arvind Kumar,(2009). A Textbook of Environmental Science, APH Publishing Corporation, New Delhi.
4. Mishra, D.D,(2010). Fundamental Concepts in Environmental Studies. S. Chand & Company Pvt. Ltd., New Delhi.
5. Odum, E.P., Odum, H.T. and Andrews, J. (1971). Fundamentals of Ecology, Philadelphia: Saunders.
6. Sing, J.S., Sing. S.P. and Gupta, S.R.(2014). Ecology, Environmental Science and Conservation, S. Chand & Publishing Company, New Delhi.
7. Tripathy. S.N., and Sunakar Panda. (2011). Fundamentals of Environmental Studies, 3rd Edition, Vrianda Publications Private Ltd, New Delhi.
8. Uberoi, N.K. (2010). Environmental Studies, 2nd Edition, Excel Books Publications, New Delhi.

REFERENCE BOOKS:

1. Botkin., and Keller, (2014). Environmental Science: Earth as a Living Planet. 9th Edition, Wiley
2. Rajagopalan, R. (2016). Environmental Studies: From Crisis to Cure, Oxford University Press.
3. Singh, M.P., Singh, B.S., and Soma, S. Dey,(2004). Conservation of Biodiversity and Natural Resources, Daya Publishing House, New Delhi.
4. Verma, P.S., and Agarwal V.K(2016). Environmental Biology (Principles of Ecology). S. Chand and Company Ltd, New Delhi.
5. Bruce Rittmann and Perry Mc Carty, Environmental Biotechnology: Principles and Applications,(2020). 2nd Edition.

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2
CO2	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2
CO3	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2
CO4	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2
CO5	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2
Average	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2

1-Low; 2-Medium; 3-Strong; '-' No correlation

24LSUT301 **LANGUAGE III: TAMIL III** **4H - 3C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

தமிழ் இலக்கிய வரலாறு

பாடத்திட்டப் பொதுநோக்கம்

- தமிழ் மொழியின் சிறப்புகளை அறியச் செய்தல்.
- முச்சங்கங்கள் சங்ககால இலக்கண நூல்கள் பற்றித் தெரிந்து கொள்ளுதல்.
- பல்வேறு சமயம் சார்ந்த இலக்கியங்களை ஒப்பீடு செய்தல்,தொன்ம இலக்கியங்களை அறியச் செய்தல்

பாடத்திட்டப் பயன்விளைவு

- சங்க இலக்கிய மேன்மைகள்- திணைக்கோட்பாடுகள் அறிவு பெற்றிருத்தல்.
- வேற்றுமொழிப் படையெடுப்புகளுக்குஈடுகொடுத்து நிற்கும்திறன் குறித்து அறிதல்.
- ஐம்பெருங்காப்பியங்கள் ஐஞ்சிறுகாப்பியங்களின் சிறப்பை உணர்தல்.
- பிற அறநூல்களின் கருத்துக்களைத் தெரிந்து கொள்ளுதல்.
- செம்மொழியின் சிறப்பையும், தொன்மையையும் அறிதல்.

அலகு:1 சங்க இலக்கியம் **10 மணிநேரம்**

தமிழ் இலக்கிய வரிசை-அறிமுகம்-முச்சங்க வரலாறு-பாட்டும் தொகையுமாகிய சங்க இலக்கியத் தொகுப்பு-அறிமுகம்-எட்டுத்தொகையில் அகத்திணை-புறத்திணை-பத்துப்பாட்டில் அமைந்த ஆற்றுப்படை இலக்கியங்கள்-பத்துப்பாட்டில் அகமும் புறமும்-புலவர்களும் பாடல்களும்-பெண்பாற் புலவர்கள்.

அலகு: 2 அற இலக்கியமும் காப்பியமும் **10 மணிநேரம்**

திருக்குறள்-அமைப்பு-இலக்கியச் சிறப்பு-உலகப் பொதுமைத் தன்மை-பொருட் சிறப்பு-இலக்கியச் சிறப்பு-நாலடியார் முதலாக குமரகுருபரரின் நீதிநெறிவிளக்கம் ஈறாக அமைந்த நீதி இலக்கியங்கள்-நீதி நூல்களில் அகமும் புறமும்-தமிழ் இலக்கிய வரிசையில் ஐம்பெருங் காப்பியங்களும், ஐஞ்சிறு காப்பியங்களும்- சிலம்பும் மணிமேகலையும் – இரட்டைக்காப்பியங்கள்- கம்பராமாயணம்-பெரியபுராணம் - சீறாப்புராணம்-தேம்பாவணி-இராவண காவியம்.

அலகு:3 திருமுறைகளும் திவ்யப்பிரபந்தமும் **10 மணிநேரம்**

தமிழகத்தில் பக்தி இயக்கத்தின் தோற்றமும் வளர்ச்சியும்-பன்னிரு திருமுறைகளும், பதிநான்கு சித்தாந்த சாத்திரங்களும்-திவ்யப்பிரபந்தமும், இராமானுஜ நூற்றந்தாதி முதலான வைணவ இலக்கியங்களும்.

அலகு: 4 சிற்றிலக்கியங்களும் இக்கால இலக்கியங்களும்

10 மணிநேரம்

குற்றாலக்குறவஞ்சி, முக்கூடற்பள்ளு, மதுரை மீனாட்சியம்மை பிள்ளைத்தமிழ், மதுரை சொக்கநாதர் தமிழ்விடு தூது, அழகர் கிள்ளைவிடு தூது முதலான சிற்றிலக்கிய வரிசை-தமிழில் புதுக்கவிதை இயக்கங்களின் தோற்றமும் வளர்ச்சியும்-தமிழ்ப் புதுக்கவிதை வடிவங்கள்-தமிழின் நாடக

இலக்கியங்கள்- மனோண்மணீயம் – தமிழின் உரைநடை இலக்கிய வளர்ச்சி-தமிழின்பம் முதலான உரைநடை நூல்கள்-தமிழில் சிறுகதை இலக்கிய வளர்ச்சி-இருபதாம் நூற்றாண்டுச் சிறுகததைகள்-தமிழில் புதின இலக்கியங்கள்-இக்கால இலக்கியங்களில் காலந்தோறும் தனி மனிதப் பதிவுகளும், சமுதாயப் பதிவுகளும்.

அலகு: 5 தமிழின் ஐந்திலக்கணம் **8 மணிநேரம்**

தமிழின் எழுத்து – சொல் – பொருள் – யாப்பு - அணி இலக்கணச் சிந்தனைகள் .

பாடநூல்:

தமிழ் இலக்கிய வரலாறு - மொழிகள் துறை - தமிழ்ப்பிரிவு, கற்பகம் உயர்கல்விக்கழகம், கோயம்புத்தூர் -21.

மொத்த மணிநேரம் 48

பார்வை நூல்கள்:

1. தமிழ் இலக்கிய வரலாறு – தமிழண்ணல், மீனாட்சி புத்தக நிலையம்-மதுரை.
2. தமிழ் இலக்கிய வரலாறு – வேங்கடராமன்.கா.கோ. கலையகம் பதிப்பகம், நாமக்கல்.
3. புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு-சுந்தரமூர்த்தி.செ, அவ்வை பதிப்பகம், திருவாரூர்.
4. தற்காலத் தமிழ் இலக்கிய வரலாறு - கவிஞர் திலகம் மானூர் புகழேந்தி, நிலாப் பதிப்பகம், 63,பாரதிதாசன் நகர், இராமநாதபுரம், கோவை – 641045.

இணையதளம்

1. www.tvu.org.in
2. www.maduraitamilproject.com

இதழ்கள்

1. International Research Journal of Indian Literature, irjil.in
2. International Tamil Research Journal, iorpress.in

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**3**	**2.6**	**2.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester III

24LUH301 **LANGUAGE III: HINDI III** **4H-3C**

(Story, History of Hindi Literature, Novel, Letter Writing)

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required

COURSE OBJECTIVES (CO):

- Knowledge of contemporary drama contents of Hindi literature
- Learn novels and its techniques. The ability to read novels and express criticism about it and the ability to express social thoughts will improve
- There will also be litigation messages in Hindi and news on speech techniques

COURSE OUTCOMES (COs):

- Develop an interest in the appreciation of literature.
- Discuss and respond to content of a reading passage.
- Learning the literacy knowledge of Hindi specially reading and writing.
- Learning the literary knowledge specially reading and understanding of Hindi short Stories
- Learning the history of Hindi literature

UNIT-I **9 HOURS**

a) Story – Bade Ghar Ki Beti
b) Hindi Bhasha Ka Vikas
c) Novel – Ramnath,Jalpa
d) Letter Writing –Personal Letter

UNIT-II **9 HOURS**

a) Story – Puraskar
b) Kaal Vibhajan , Char Prakar
c) Ramesh Babu ,Devdeen
d) Letter Writing – Leave Letter

UNIT-III **10 HOURS**

a) Story – Usne Kaha Tha
b) Literature – Adhikaal
c) Indhubhooshan, Rathna,Johra
d) Letter Writing – Letter for the Publisher

UNIT-IV **10 HOURS**

a) Story – Paanchminte
b) Poorva Madhya Kaal
c) Manibhooshan,Dhayanath,Rameshwari
d) Letter Writing – Application for job

UNIT-V **10 HOURS**

a) Story – kafan
b) Reethi Kaal,Adhunik Kaal
c) Dheen Dhayal,Manaki,
d) Letter Writing – Complaint Letter

TOTAL: 48 HOURS

REFERENCE BOOKS:

1.Story : Kahani Manjari
Publisher : D.B.Hindi Prachar Sabha
T.Nagar , Chennai – 600017

2.History of Hindi
Literature : Hindi Sahithya ka Saral Ithihas
Writer : Rajnath Sharma.A
Publisher : Vinoth Pusthak Mandir
Aagra – 02

3.Novel : Gaban
Writer : Premchandh
Publisher : Rajkamal Prakashan
New Delhi – 110002

4.Letter Writing : Sumitha Hindi Nibandh Aur Pathra Lekhan
Writer : Sri Sharan
Publisher : Kalda Publication
Mukhar Ji Nagar, Delhi - 09

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**2.6**	**2.6**	**2.8**	**-**	**-**	**-**	**-**	**-**	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester III

24LUM301 **LANGUAGE III: MALAYALAM III** **4H -3C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not required

COURSE OBJECTIVE (CO):

- May have knowledge of the contents of primitive poetry Learn about contemporary poetry and its techniques.
- Interest in reading poetry and the ability to express social thoughts will improve
- This will help you to understand the basics of Malayalam Poetry and to understand Malayalam literature properly

COURSE OUTCOME (COs):

- Get a basic knowledge of the history of Malayalam literature.
- Enhances the art and taste of Malayalam literary works
- Literary genres can be learned
- Create more to read and enjoy Malayalam poetry
- Get the basic Knowledge of poetry techniques

Unit No	PART I – MALAYALAM III	Hours
I	Poetry – Chinthavishtayaya Seetha	**10**
II	Poetry – Chinthavishtayaya Seetha	**10**
III	Poetry – Mrugasikshakan-(Murgasikshakan,Kausalya,Varavu,Vittupoku Ekalavyan,Mazha) 6 poetries	**10**
IV	Poetry – Mrugasikshakan-(Kayal,Karkkadakam,Bhagavatham,Vazhivakkile naikutty,Edavelayil oru nimisham,Verumoru kathu) 6 poetries	**09**
V	Poetry - Aayisha	**09**
	TOTAL	**48**

TEXT BOOKS:

1. Chinthavishtayaya Seetha –Kumaranasan,Kerala Book Store Publishers.
2. Mrugasikshakan – Vijayalakshmi,DC Books, Kottayam
3. Aayisha – VayalarRamavarma - Kerala Book Store Publishers

REFERENCE BOOKS:

1. Kavitha SahithyaCharitram-Dr.M.Leelavathi (Kerala SahithyaAcademy,Trichur)
2. Kavitha Dwani-Dr.M.Leelavathi (D.C.Books, Kottayam)
3. Aadhunika SahithyacharithramPrasthanangalilude-Dr.K.M.George (D.C.Books, Kottayam)
4. Padya SahithyaCharithram – T.M.Chummar (Kerala SahithyaAcademy,Trichur)

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	3	2.5	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester III

24LUS301 LANGUAGE III: SANSKRIT III 4H - 3C

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not required

COURSE OBJECTIVES (CO):

- The fundamental objective of the curriculum is to impart effective science education at the undergraduate level, exposing them to recent trends and developments in the subject.
- Creating scientific temper is another major objective of this curriculum.
- Another major thrust given here is to develop an environmental concern in all activities ofthe students. 'Go green', the motto of the syllabus emphasizes the urgent need to conserve nature without destruction of natural resources.

COURSE OUTCOMES (COs) :

- **Critical Thinking** :Take informed actions after identifying the assumptions that frame students' thinking and actions.
- **Problem Solving**: Understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired.
- **Effective Communication**: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
- **Effective Citizenship**: Demonstrate empathetic social concern and equity centered national development.
- **Environment and Sustainability**: Understand the issues of environmental contexts and sustainable development.

UNIT I **9 HOURS**

History of Sanskrit Drama and its origin.

UNIT II **9 HOURS**

Important Sanskrit Dramas and important authors.

UNIT III **10 HOURS**

Text Prescribed: "Dutavakyam" of Bhasa, (First half)

UNIT IV **10 HOURS**

Text Prescribed: "Dutavakyam" of Bhasa, (Second half)

UNIT V **10 HOURS**

Translation : From the known passages of the above text.

TOTAL: 48 HOURS

TEXT BOOK :

1."Dutavakyam of Bhasa" R.S.Vadhyar and Sons Palghat, Kerala.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**2.6**	**2.2**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester III

24LUF301 **LANGUAGE III: FRENCH III** **4H - 3C**

(Histoire, Histoire De La Littérature Frencais, Roman, Rédaction De Lettres)

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required

COURSE OBJECTIVES (CO):

- To enable students to recognizenative accent and usage of French language.
- To help students to become autonomous and self-directed French language learners.
- To produce entrepreneurs among students by making them French language trainers and take communicative French to schools and colleges around.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Identify new words by employing vocabulary building techniques.	Apply
CO2	Build correct sentence structures and grammatical patterns in oral and written communication	Apply
CO3	Develop the ability to speak French language with the way of pronunciation.	Understand
CO4	Follow leadership, work ethics and management principles	Analyze
CO5	Express values and skills gained through effective communication to other disciplines.	Analyze

Unite – I **9 HOURS**

a) Leçon - Vivre la ville,,Visiter une ville
b) Communication - Indiquer le chemin
c) Grammaire - La comparaison,Les prépositions avec les noms géographiques,Les pronoms personnels COI
d) Lexique - La ville, Les lieux de la ville, Les transports
e) Culture - Le français : une ouverture sur le monde

Unité – II **9 HOURS**

a) Leçon -• On vend ou on garde ?
b) Communication - Demander des renseignements touristiques
c) Grammaire - Le pronom y (le lieu), La position des pronoms compléments Les verbes du premier groupe en -ger et -cer,
d) Les verbes ouvrir et accueillir
e) Lexique - Les points cardinaux,Les prépositions de lieu (2)
f) Culture -Le français : une ouverture sur le monde

Unité – III **10 HOURS**

a) Leçon
b) Communication- permetter,defendre.

c) Grammaire -La formation du pluriel (2) Les adjectifs de couler, Les adjectifs beau, nouveau, vieux

d) Lexique - Les couleurs, Les formes,Les me

e) culture - les grandes fleuves en Francais.

Unite – IV **10 HOURS**

a) Leçon - Félicitations !

b) Communication - Décrire un objet

c) Grammaire - Les pronoms relatifs qui et que, L'imparfait, Les verbes connaître, écrire, mette et vendre

d) Lexique - Les mesures, L'informatique DIRE, LIRE, ECRIRE , Les sons [E] / [O] / [Œ]

e) Culture - Les lieux de la ville.

Unité - V **10 HOURS**

a) Leçon -En voyage !

b) Communication -• Présenter ses vœux, Faire une réservation

c) Grammaire - Les pronoms démonstratifs,La question avec Inversion,Les adverbes de manière,

d) Lexique -Les voyages,L'aéroport et l'avion,Les fêtes

e) Culture -Noël

TOTAL: 48 HOURS

TEXT BOOKS:

1. Cocton Marie –Noëlle , Duplex Dorothée, Heu Elodie , Kasazian Emilie, Ripaud Delphine, 2015, **Saison 1- Méthode de franca**is, Didier, paris.
2. Cocton Marie – Noëlle, Dupleix, Heu Elodie, Kasazian Emilie ,Ripaud Deldphin, 2015, S**aison** 1 – **Cahier d'activites** , Dider ,Paris.

REFERENCE BOOKS:

1. Anne Akyüz,Bernadette Bazelle- Shahmael,JoëlleBonenfant,2005, **Marie- Françoise Gliemenn,Les exercices de grammaire,Hachette FLE, Paris.**
2. Christian Beaulieu,2015, **Je pratiqu**e, Exercises de grammaire A1, Dider,Paris.
3. Nathalie BIE, philippe SANTINAN,2005,**Grammaire pour adolescents-250 exercises, CLE International , Paris.**

WEBSITES:

1. http:// enseigner.tv5 monde.com/
2. bonjourdumonde.com /exercises/contenu/le – francais-du- tourisme.html
3. http://www.bonjurdefrance.com/
4. https://www.lepointdufle.net/

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**3**	**2.5**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

24ENU301 **ENGLISH III** **3H - 3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not required

COURSE OBJECTIVES (CO):

- To enable students to recognizenative accent and usage of English language.
- To help students to become autonomous and self-directed English language learners.
- To produce entrepreneurs among students by making them English language trainers and take communicative English to schools and colleges around.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Identify new words by employing vocabulary building techniques.	Apply
CO2	Build correct sentence structures and grammatical patterns in oral and written communication	Apply
CO3	Develop the ability to speak English language with the correct pronunciation.	Understand
CO4	Follow leadership, work ethics and management principles	Analyze
CO5	Express values and skills gained through effective communication to other disciplines.	Analyze

UNIT-I **8 HOURS**

LISTENING: Listening Comprehension-Listening for Specific Information- Interpreting Chartsand Diagrams

UNIT- II **7 HOURS**

SPEAKING: Essentials of effective Communication- **Telephone Skills**: UnderstandingTelephone Conversation-Handling Calls-Leaving Messages-Making Requests-Giving Instructions and Orders.

UNIT-III **7 HOURS**

READING: Reading with a purpose-Skimming and Scanning-Locating Main Points-Reading Critically- Sequencing of Sentences-Reading Comprehension

UNIT- IV **7 HOURS**

WRITING: Descriptive and Narrative-Safety Instructions- Suggestions-Expansion ofAbbreviations-Spellings Rules

Translation- Translating Short Sentences and Passages from English to Tamil

UNIT-V **7 HOURS**

VOCABULARY: Synonyms-Antonyms-Prefixes-Suffixes- Idioms- Different Types of English-Homonyms and Homophones (British and American)

TOTAL: 36 HOURS

TEXT BOOKS:

1. Board of Editors (2024). Proficiency in Communication I. Karpagam Academy of Higher Education

REFERENCE BOOKS:

1. Martin's, St (2013). Oxford Handbook of Writing: Handbook of Writing. Cambridge University Press.
2. Wren & Martin, (2008). High School English Grammar & Composition, S.Chand & Company Ltd,Board of Editors,
3. Krashen, Stephen D (1982). Principles and Practice in Second Language Acquisition, New York:Pergamon Press

WEB SITES:

1. https://www.scribbr.com/
2. https://www.quora.com/

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**3**	**2.5**	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester III

24CGU301 INFRASTRUCTURE MANAGEMENT 3H - 2C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Fundamental IT Knowledge

COURSE OBJECTIVES (CO):

- To learn the installation and configuration process for System Center 2012 R2 Operations Manager standard and DataCenter features.
- To acquire knowledge on monitor services, devices, and operations for many computers in a single console by showing state, health, and performance information, as well as alerts generated for availability, performance, configuration and security situations.
- To design and provision custom views to relevant support teams and understand how to deploy agents, creating dashboards and custom visualizations.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Build the Operations Manager Standard and Data CenterFeatures using installation and Process Configurations.	Apply
CO2	Develop the knowledge of configuration for Cloud-BasedClient Management.	Apply
CO3	Construct the SCOM with client Deployment.	Apply
CO4	Make use of the concepts of security manual agents	Apply
CO5	Demonstrate the Role Based Security on SQL Reporting services.	Understand

UNIT I WINDOWS 10 CLIENT OS 8 HOURS

Introducing Windows 10, Overview of Deploying Windows 10, Configure Devices and Drivers, Perform Post installation Configuration Tasks, Managing Apps in Windows

UNIT II INTRODUCTION TO SCCM 8 HOURS

System Center Configuration Manager Overview, SCCM Features and Capabilities, SCCM Setup & Installation, Configuration Manager Basics, Deploying SCCM Client, User and Device Collections in SCCM

UNIT III MANAGING SYSTEMS WITH SCCM 7 HOURS

Application Management using SCCM, Operating System Deployment using SCCM, Endpoint Protection using SCCM, Troubleshooting SCCM Server, Troubleshooting SCCM Clients, Creating Reports using SCCM Reports

UNIT IV - INTRODUCTION TO SCOM 7 HOURS

System Center Operations Manager Overview, SCOM Features and Capabilities, SCOM Setup & Installation, Operations Manager Basics, Deploying SCOM Clients, Management Packs in SCOM

UNIT V- MONITORING SYSTEMS WITH SCOM 6 HOURS

Managing & Administering SCOM Environment, Managing Alerts using SCOM, Creating Custom Management Packs and Alerts, Troubleshooting SCOM Server, Troubleshooting SCOM Clients, Creating Reports using SCOM Reporting.

TOTAL: 36 HOURS

TEXT BOOKS:

1. Kerrie Meyler, Gerry Hampson. (2018). System Center Configuration Manager Current Branch Unleashed System" 1st Edition.
2. SlawekLigus. (2012)., Effective Monitoring and Alerting: For Web Operations" 1st Edition.

WEBSITES:

1. http://systemcentermvp.com/2017/05/10/operations-manager-basic-concepts-nutshell/
2. http://techgenix.com/introduction-system-center-operations-manager-2012-part1/
3. https://www.business.com/articles/microsoft-scom-for-beginners/
4. https://docs.microsoft.com/en-us/system-center/scom/manage-agentless-monitoring

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	1	3	1	-	3	-	-	-	-	-	-	-	1	2
CO2	3	-	2	1	-	-	-	3	-	-	-	-	-	-	-	-	2
CO3	3	-	2	-	3	-	-	3	-	-	-	-	-	-	-	2	-
CO4	3	-	-	-	3	-	-	3	-	-	-	-	-	-	-	1	-
CO5	3	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	2
Average	3	-	2	1	3	1	-	3	-	-	-	-	-	-	-	1.3	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

24CGU302 **PYTHON PROGRAMMING** **3H-3C**

Instruction Hours / Week: L: 3 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Basic Programming Skills

COURSE OBJECTIVES (CO):

- To describe the core syntax, semantics and Algorithms of Python programming language and understand the basic process of structuring the data, Expressions and statements.
- To discover the need for working with the control statements and functions.
- To illustrate the process of structuring the data using lists, dictionaries, and tuples and infer the File handling concepts in Python

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Interpret the fundamental Python syntax and semantics and be fluent in the use of Algorithmic problem solving	Understand
CO2	Outline the basic process of structuring the data, Expressions and Statements.	Understand
CO3	Build Python Programming using Control Statements.	Apply
CO4	Explain Python programs by utilizing the data structures like lists, dictionaries, tuples and sets	Understand
CO5	Construct program using File Handling Functions like Open, Read and write	Apply

UNIT I - ALGORITHMIC PROBLEM SOLVING **8 HOURS**

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, inserta card in a list of sorted cards, and guess an integer number in a range, Towers of Hanoi.

UNIT II - DATA, EXPRESSIONS, STATEMENTS **7 HOURS**

Python interpreter and interactive mode; values and types: int, float, Boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modulesand functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance betweentwo points.

UNIT III - CONTROL FLOW, FUNCTIONS: CONDITIONALS **7 HOURS**

Boolean values and operators, conditional (if), alternative (if-else), chained-conditional (if-else if-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters,local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

UNIT IV - LISTS, TUPLES, DICTIONARIES **7 HOURS**

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, merge sort, histogram.

UNIT V - FILES, MODULES, PACKAGES **7 HOURS**

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count,copy file.

TOTAL: 36 HOURS

TEXT BOOKS:

1. Kenneth A. Lambert, Martin Osborne. (2018). Fundamentals of Python: First Programs, Cengage Learning, 2nd edition.
2. Karl Beecher. (2017). Computational Thinking: A Beginner's Guide to Problem Solving and Programming, 1st Edition, BCS Learning & Development Limited.
3. Robert Sedgewick, Kevin Wayne, Robert Dondero. (2016). Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd.

REFERENCE BOOKS:

1. Allen B. Downey. (2016). Think Python: How to Think Like a Computer Scientist, 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers.
2. Timothy A. Budd. (2015). Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd.
3. John V Guttag. (2013). Introduction to Computation and Programming Using Python, Revised and expanded Edition, MIT Press.

WEBSITES:

1. http://docs.python.org/3/tutorial/index.html.
2. http://interactivepython.org/courselib/static/pythonds.
3. http://www.ibiblio.org/g2swap/byteofpython/read/.

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-		-	3	-	-	-	-	-	1
CO2	-	-	3	-	-	-	-	-	2	-	3	-	-	-	-	2	-
CO3	-	-	3	3	-	3	-	3	-	-	-	-	-	-	-	-	1
CO4	-	-	3	-	-	-	-	-	-	-	3	-	-	-	-	2	1
CO5	-	-	-	3	-	3	-	3	-	-	3	-	-	-	-	2	-
Average	1	-	3	3	-	3	-	3	2	-	3	-	-	-	-	2	1

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester III

24CGU303 VIRTUALIZATION AND CLOUD 3H-2C

Instruction Hours / Week: L: 3 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Cloud Computing Models

COURSE OBJECTIVES (CO):

- To understand basic concepts of distributed computing, provide a good understanding of the concepts, standards in Cloud computing.
- To introduce the concept of Virtualization with Resource Monitoring and Management.
- To provide the concept of Virtual Machine using DRS acquire Knowledge about the data racks, centers and extends with need of datacenters.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Classify the Concepts of Distributed Computing.	Understand
CO2	Demonstrate the Data Center Architecture with Real time applications like CISCO	Understand
CO3	Rephrase the Virtualization systems with Host operating systems and Guest Operating systems.	Understand
CO4	Build the Model based on cloud computing services like AWS, GAE	Apply
CO5	Interpret the concepts of Virtual Machines like vSphere HA and DRS with Host Maintenance.	Understand

UNIT I DISTRIBUTED SYSTEMS 8 HOURS

Distribute a system - Distributed algorithm - Distributed Data Stores - Distributed Computing - File Systems - Distributed Messaging - Distributed Applications – Distributed Transaction - Parallel and distributed computing - Applications.

UNIT II DATA CENTER 7 HOURS

Data Center Overview, Data Center Evolution, Modern Business Requirements for Data Center, Making Agile Datacenter, Data Center Transformations, Future of Data Centers

UNIT III VIRTUALIZATION 7 HOURS

Define Virtualization, Need of Virtualization, Virtualization Technologies, Uses of Virtualization, Planning for Virtualization, Virtualization Pitfalls.

UNIT IV CLOUD 7 HOURS

Cloud Fundamentals, Benefits of Cloud Computing, Type of Clouds, Cloud Computing Services, Cloud Computing Architecture, Virtualization and Cloud Computing, Grid Computing vs Cloud Computing, Security Concerns

UNIT V HYBRID CLOUD 7 HOURS

Hybrid Cloud Fundamentals, Benefits of a Hybrid Cloud, Key Considerations for Hybrid Cloud, Components of Hybrid Cloud, Hybrid Cloud Deployment Models, Managing Hybrid Cloud Environments.

TOTAL: 36 HOURS

TEXT BOOKS:

1. Jean Dollimore formerly of Queen Mary, Tim Kindberg. (2017) Distributed SystemsConcepts and Design, 5th Edition Cambridge University, University of London
2. Venkata Josyula, Malcolm Orr, Greg Page. (2016). Cloud Computing: Automating the Virtualized Data Center, 1st Edition.

REFERENCE BOOK:

1. Brian J.S. Chee, Curtis Franklin Jr. (2014). Cloud Computing: Technologies and Strategiesof the Ubiquitous Data Center", 1st Edition.

WEBSITES:

1. https://www.ibm.com/support/knowledgecenter/en/SSAL2T_8.2.0/com.ibm.cics.tx.doc/concepts/c_wht_is_distd_comptg.html
2. https://www.w3schools.in/cloud-computing/cloud-virtualization/
3. http://www.vmwarearena.com/what-is-vmware-vsphere-beginners-guide-to-vmware- virtualization/
4. https://aws.amazon.com/getting-started/tutorials/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	3	-	3	-	-	-	-	-	-	-	2	3
CO2	3	-	2	-	-	3	-	3	-	-	-	-	-	-	-	2	-
CO3	3	-	2	-	-	3	-	3	-	-	-	-	-	-	-	-	3
CO4	3	-	-	-	-	3	-	3	-	-	-	-	-	-	-	2	1
CO5	3	-	-	-	-	3	-	3	-	-	-	-	-	-	-	-	-
Average	3	-	2	-	-	3	-	3	-	-	-	-	-	-	-	2	2.3

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester III

24CGU304 INFORMATION TECHNOLOGY INFRASTRUCTURE LIBRARY 3H-2C

Instruction Hours/Week: L: 3 T: 0P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- IT Service Management

COURSE OBJECTIVES (CO):

- To Understand Key concepts of IT service management using ITIL service Models and acquire Knowledge about the Four dimensions of Service Design in ITIL.
- To understand the process management and risk management and know the Evolution and Challenges in providing IT Infrastructure Services.
- To understand the event management and SNOC concepts.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Interpret the fundamental Knowledge about the IT service Management and Service Models.	Understand
CO2	Build proficiency in the Four Dimensions of Service Design.	Apply
CO3	Rephrase the Exposure with the process and risk Management.	Understand
CO4	Experiment with the Evolution and Challenges in the IT InfrastructureServices.	Apply
CO5	Summarize the Event Management, scope of Event Management and the value of organization	Understand

UNIT I INTRODUCTION TO ITIL 4 8 HOURS

IT Service Management in the modern world, About ITIL v4, The structure and benefits of theITIL v4 Framework

UNIT II KEY CONCEPTS OF SERVICE MANAGEMENT 7 HOURS

Value and Value Co-Creation, Stakeholders, Products and Services, Service Relationships andValue

UNIT III ITIL 4 DIMENSION MODEL OF IT SERVICE MANAGEMENT 7 HOURS

Organization & People; Information & Technology; Partners & Suppliers; Value Streams & Processes, External factors

UNIT IV ITIL SERVICE VALUE SYSTEM 7 HOURS

Service Value System (SVS) Overview; Opportunity, demand, and Value; Guiding Principles; Governance; Service Value Chain (SVC); Continual Improvement; Practices

UNIT V ITIL MANAGEMENT PRACTICES 7 HOURS

General Management Practices; Service Management Practices; Technical Management Practice

TOTAL: 36 HOURS

TEXT BOOKS:

1. Service Support (CCTA): Part 15 (IT Infrastructure Library)
2. Nwabueze Ohia, (2018). IT Infrastructure Risk & Vulnerability Library: A Consolidated Register of Operational & Technology Infrastructure Vulnerabilities for IT Assurance Professionals

REFERENCE BOOKS:

1. IT Infrastructure Risk and Vulnerability Library: A Consolidated Register of Operational and Technology Infrastructure Vulnerabilities for IT Assurance Professionals (Japanese Edition)

WEBSITES:

1. https://www.cio.com/article/272361/infrastructure-it-infrastructure-library-itil-definition-and-solutions.html
2. https://www.ibm.com/in-en/cloud/learn/it-infrastructure-library

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	3	-	2	-	-	2	1	-
CO2	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-	1	-
CO3	3	-	1	2	3	-	-	2		3	-	-	-	-	-	-	-
CO4	3	-	1	2	-	-	-	-	-	3	2	-	-	-	-	2	-
CO5	3	-	1	2	-	-	3	-	-	3	-	-	-	2	-	-	-
Average	3	-	1	2	3	-	3	2	-	3	2	2	-	2	2	1.3	-

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

24CGU311 INFRASTRUCTURE MANAGEMENT - PRACTICAL 3H-1C

Instruction Hours/Week: L: 0T: 0P:3 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Operating Systems

COURSE OBJECTIVES (CO):

- To learn the installation and configuration process for System Center 2012 R2 Operations Manager standard and DataCenter features acquire knowledge on monitor services, devices, and operations for many computers in a single console by showing state, health, and performance information, as well as alertsgenerated for availability, performance, configuration and security situations.
- To design and provision custom views to relevant support teams.
- To understand how to deploy agents and create dashboards and custom visualizations.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Build the Operations Manager Standard and Data Center Features using installation and Process Configurations.	Apply
CO2	Develop the knowledge of configuration for Cloud-Based Client Management.	Apply
CO3	Make use of the SCOM with client Deployment.	Apply
CO4	Demonstrate the concepts of security manual agents	Understand
CO5	Demonstrate the Role Based Security on SQL Reporting services.	Understand

List of Programs

1. Working with SCCM
2. Working with SCOM

TEXT BOOKS:

1. Kerrie Meyler, Gerry Hampson. (2018). System Center Configuration Manager Current Branch Unleashed System" 1st Edition.
2. SlawekLigus. (2012)., Effective Monitoring and Alerting: For Web Operations" 1st Edition.

WEBSITES:

1. http://systemcentermvp.com/2017/05/10/operations-manager-basic-concepts-nutshell/
2. http://techgenix.com/introduction-system-center-operations-manager-2012-part1/
3. https://www.business.com/articles/microsoft-scom-for-beginners/
4. https://docs.microsoft.com/en-us/system-center/scom/manage-agentless-monitoring

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	2	-	-	2	-	-	-	-	-	-	-	-	-	-	2
CO2	3	-	-	-	-	2	-	-	-	-	-	-	-	-	-	1	-
CO3	3	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2
CO4	3	-	2	1	-	-	-	-	-	-	-	-	-	-	-	2	2
CO5	3	-	2	1	-	-	-	-	-	-	-	-	-	-	-	1	-
Average	3	-	2	1	1	2	-	-	-	-	-	-	-	-	-	1.3	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester III

24CGU312 PYTHON PROGRAMMING - PRACTICAL 3H-1C

Instruction Hours/Week: L:0T: 0P: 3 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To Describe the core syntax, semantics and Algorithms of Python programming language and understand the basic process of structuring the data, Expressions and statements.
- To Discover the need for working with the control statements and functions and illustrate the process of structuring the data using lists, dictionaries, and tuples.
- To Infer the File handling concepts in Python.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Interpret the fundamental Python syntax and semantics and be fluent in the use of Algorithmic problem solving	Understand
CO2	Identify proficiency in the handling basic process of structuring the data, Expressions and Statements.	Apply
CO3	Build the Python Programming using Control Statements.	Apply
CO4	Choose Python programs by utilizing the data structures likelists, dictionaries, tuples and sets	Apply
CO5	Select program using File Handling Functions like Open, Read and write	Apply

List of Programs

1. Find the maximum of a list of numbers
2. Linear search and Binary search
3. Selection sort, Insertion sort
4. Merge sort
5. First n prime numbers
6. Multiply matrices
7. Programs that take command line arguments (word count)
8. Find the most frequent words in a text read from a file
9. Simulate elliptical orbits in Pygame
10. Simulate bouncing ball using Pygame

TEXT BOOKS:

1. Kenneth A. Lambert, Martin Osborne. (2018). Fundamentals of Python: First Programs, Cengage Learning, 2nd edition.
2. Karl Beecher. (2017). Computational Thinking: A Beginner's Guide to Problem Solving and Programming, 1st Edition, BCS Learning & Development Limited.
3. Robert Sedgewick, Kevin Wayne, Robert Dondero. (2016). Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd.

REFERENCE BOOKS:

1. Allen B. Downey. (2016). Think Python: How to Think Like a Computer Scientist, 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers.

2. Timothy A. Budd. (2015). Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd.
3. John V Guttag. (2013). Introduction to Computation and Programming Using Python, Revised and expanded Edition, MIT Press.

WEBSITES:

1. http://docs.python.org/3/tutorial/index.html.
2. http://interactivepython.org/courselib/static/pythonds.
3. http://www.ibiblio.org/g2swap/byteofpython/read/.

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	3	-	-	-	-	-	-	-	3	-	-	-	-	1	-
CO2	-	-	3	1	-	3	-	2	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	3	-	-	-	-	3	-	-	-	-	2	-
CO4	-	-	-	-	1	3	-	2	-	-	-	-	-	-	-	2	-
CO5	-	-	-	-	-	3	-	-	-	-	3	-	-	-	-	-	-
Average	1	-	3	1	1	3	-	2	-	-	3	-	-	-	-	1.6	-

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester III

24CGU313 VIRTUALIZATION AND CLOUD – PRACTICAL 3H-1C

Instruction Hours / Week: L: 0 T: 0 P: 3 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Basic IT Knowledge**,** Operating Systems

COURSE OBJECTIVES (CO):

The objective of this course is

- To understand basic concepts of distributed computing, and provide a good understanding of the concepts, standards in Cloud computing.
- To introduce the concept of Virtualization with Resource Monitoring and Management.
- To provide the concept of Virtual Machine using DRS and acquire Knowledge about the data racks, centers and extends with need of datacenters.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Illustrate the Concepts of Distributed Computing.	Understand
CO2	Build the Model based on cloud computing services like AWS,GAE	Apply
CO3	Rephrase the Virtualization systems with Host operating systemsand Guest Operating systems.	Understand
CO4	Interpret the concepts of Virtual Machines like vSphere HAand DRS with Host Maintenance.	Understand
CO5	Demonstrate the Data Center Architecture with Real time applications like CISCO	Understand

List of Programs

1. Working with hypervisors
2. Creating account in AWS
3. Exploring AWS services like storage, machine image, pricing models, data bases

TEXT BOOKS:

1. Jean Dollimore formerly of Queen Mary, Tim Kindberg. (2017) Distributed SystemsConcepts and Design, 5th Edition Cambridge University, University of London
2. Venkata Josyula, Malcolm Orr, Greg Page. (2016). Cloud Computing: Automating the Virtualized Data Center, 1st Edition.

REFERENCE BOOKS:

1. Brian J.S. Chee, Curtis Franklin Jr. (2014). Cloud Computing: Technologies and Strategiesof the Ubiquitous Data Center", 1st Edition.

WEBSITES:

1. https://www.ibm.com/support/knowledgecenter/en/SSAL2T_8.2.0/com.ibm.cics.tx.doc/concepts/c_wht_is_distd_comptg.html
2. https://www.w3schools.in/cloud-computing/cloud-virtualization/
3. http://www.vmwarearena.com/what-is-vmware-vsphere-beginners-guide-to-vmware-virtualization/
4. https://aws.amazon.com/getting-started/tutorials/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	2	-	-	-	1	-	-	-	-	-	-	1
CO3	3	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	2	-	3	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	1
Average	3	-	-	-	2	2	-	3	-	1	-	-	-	-	-	-	1

1 - Low, 2 - Medium, 3 - Strong, '-' – No Correlation

Semester III

24VAC301 **INDIAN KNOWLEDGE SYSTEM** **2H-1C**

Instruction Hours / Week: L: 2 T: 0 P: 0 **Marks:** Internal**:100** External**:-** Total**:100**

End Semester Exam: - Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To introduce students to foundational concepts in Indian Knowledge Systems (IKS), including philosophical schools, texts, and cultural practices.
- To explore the contributions of Indian mathematics, astronomy, and technology to global knowledge systems and their interdisciplinary connections.
- To analyze the ethical, philosophical, and practical implications of ancient Indian sciences and humanities in contemporary contexts.

COURSE OUTCOMES (COs):

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

COs	Course Outcomes	Blooms Level
CO1	Identify and describe key components of Indian Knowledge Systems (IKS), including Vedic and non-Vedic philosophical schools, texts such as Puranas and Itihasa, and Niti Sastras.	Understand
CO2	Analyze and evaluate the contributions of Indian mathematics and astronomy to scientific knowledge, demonstrating an understanding of their historical development and modern relevance.	Analyze
CO3	Apply foundational linguistic and phonetic principles from Sanskrit texts like Panini's Astadhyayi to understand their computational and linguistic significance.	Apply
CO4	Demonstrate proficiency in calculating and applying geometric, trigonometric, and algebraic principles from ancient Indian mathematical texts.	Apply
CO5	Critically assess the cultural, philosophical, and ethical implications of Indian sciences and humanities, including their role in shaping societal norms and values.	Analyze

UNIT 1: INTRODUCTION TO IKS **5 HOURS**

Caturdaśa Vidyāsthānam, 64 Kalas, Shilpa Śāstra, Four Vedas, Vedāṅga, Indian Philosophical Systems, Vedic Schools of Philosophy (Sāṃkhya and Yoga, Nyaya and Vaiśeṣika, Pūrva-Mīmāṃsā and Vedānta), Non-Vedic schools of Philosophical Systems (Cārvāka, Buddhist, Jain), Puranas (Maha-puranas, Upa-Puranas and Sthala-Puranas),Itihasa (Ramayana, Mahabharata), Niti Sastras, Subhasitas

UNIT 2: FOUNDATION CONCEPT FOR SCIENCE & TECHNOLOGY **5 HOURS**

Linguistics & Phonetics in Sanskrit (panini's), Computational concepts in Astadhyayi Importance of Verbs, Role of Sanskrit in Natural Language Processing, Number System and Units of Measurement, concept of zero and its importance, Large numbers & their representation, Place Value of Numerals, Decimal System, Measurements for time, distanceand weight, Unique approaches to represent numbers (Bhūta Saṃkhya System, KaṭapayādiSystem), Pingala and the Binary system, Knowledge Pyramid, Prameya – A Vaiśeṣikan approach to physical reality, constituents of the physical reality, Pramāṇa, Saṃśaya

UNIT 3: INDIAN MATHEMATICS & ASTRONOMY **5 HOURS**

Indian Mathematics, Great Mathematicians and their contributions, Arithmetic Operations,Geometry (Sulba Sutras, Aryabhatiya-bhasya), value of π, Trigonometry, Algebra, Chandah Sastra of Pingala, Indian Astronomy, celestial coordinate system, Elements of the Indian Calendar Aryabhatiya and the Siddhantic Tradition Pancanga – The Indian Calendar System Astronomical Instruments (Yantras) Jantar Mantar or Raja Jai Singh Sawal.

UNIT 4: INDIAN SCIENCE & TECHNOLOGY **5 HOURS**

Indian S & T Heritage ,sixty-four art forms and occupational skills (64 Kalas) Metals and Metalworking technology (Copper, Gold, Zinc, Mercury, Lead and Silver), Iron & Steel, Dyes and Painting Technology), Town & Planning Architecture in India, Temple Architecture, Vastu Sastra,

UNIT 5: HUMANITIES & SOCIAL SCIENCES **4 HOURS**

Health, Wellness & Psychology, Ayurveda Sleep and Food, Role of water in wellbeing Yoga way of life Indian approach to Psychology, the Triguṇa System Body-Mind-Intellect-Consciousness Complex. Governance, Public Administration & Management reference to ramayana, Artha Sastra, Kauṭilyan State.

TOTAL: 24 HOURS

TEXT BOOKS:

1. Kapur K and Singh A. K (Eds) (2005). Indian Knowledge Systems, Vol. 1. Indian Institute of Advanced Study, Shimla.
2. Nair, Shantha N. (2008) Echoes of Ancient Indian Wisdom. Hindology Books, New Delhi

REFERENCE BOOKS:

1. Reshmi ramdhoni,(2018). Ancient Indian Culture and Civilisation, star publication
2. DK Chakkrabarty, Makkhan Lal,(2014) History of Ancient India, Aryan book International publication,
3. Dr. Girish Nath Jha, Dr. Umesh Kumar Singh and Diwakar Mishra,(2016). Science and Technologyin Ancient Indian Texts, DK Print World limited,
4. Swami BB Vishnu, (2015). Vedic Science and History - Ancient Indian's Contribution to the ModernWorld, Gosai publication.

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	P012	P013	P014	P015	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	3	3	-	-	2	-	2
CO2	-	-	-	-	-	-	-	-	2	-	3	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	2
CO4	-	-	-	-	-	-	-	-	2	-	3	3	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	3	3	1	-	2	-	2
Average	-	-	-	-	-	-	-	-	2	-	3	3	1	-	2	-	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester III

24CGU391	**INTERNSHIP***	**0H-2C**

Instruction Hours / Week: L: 0 T: 0 P: 0 **Marks:** Internal**:100** External**:-** Total**:100**

End Semester Exam: - Hours

24LSUT401 **LANGUAGE IV: TAMIL IV** **4H-3C**

Instruction Hours / Week:L: 4 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

தமிழர் நாகரிகமும் பண்பாடும்

பாடத்திட்டப் பொதுநோக்கம்

- வரலாற்றுக்கு முற்பட்ட தமிழகத்தின் சிறப்பை அறியச்செய்தல்.
- தமிழின் தொன்மையை மாணர்களுக்கு எடுத்துரைத்தல்.
- பழந்தமிழர் வாழ்க்கை முறையை உணர்த்துதல்.

பாடத்திட்டப் பயன்விளைவு

- தமிழ்மொழி வரலாறு குறித்த தெளிந்த அறிவு பெற்றிருத்தல்.
- தமிழரின் மரபு சார்ந்த மொழியின் செல்வாக்கை அறிதல்.
- பழந்தமிழ் இலக்கியங்களின்வழி பண்பாடு கலாச்சாரம் போன்றவற்றை அறிதல்.
- ஐவகை நிலஅமைப்பு, வாழ்வியல் ஒழுக்கலாறுகளைப் பெற்றிருத்தல்.
- இலக்கியங்களின்வழி கலைகளின் வளர்ச்சி மற்றும் அமைப்பு முறையை அறிதல்.

அலகு – I வரலாற்றுக்கு முற்பட்ட தமிழகமும் சங்ககால வரலாறும் **10 மணிநேரம்**

வரலாறும் நிலஅமைப்பும் – வரலாற்றின் செல்வாக்கு – பல்வேறு காலங்களில் வரலாறு உண்டாக்கிய நாட்டுப் பிரிவுகள் - பழைய கற்காலம் – புதிய கற்காலம் – இரும்புக் காலம்.

அலகு – 2 தமிழின் தொன்மை **10 மணிநேரம்**

தமிழ் தோன்றிய இடம் – குமரிக்கண்டத் தமிழ் நாடுகள் – தமிழ் என்னும் பெயர் வரலாறு – திராவிட மொழிக்குடும்பம் – தமிழ்மொழிச் சிறப்பு – தமிழுக்குத் தமிழ் நாட்டவர் செய்ய வேண்டியவை – தமிழுக்கு வெளிநாட்டிற் செய்ய வேண்டியவை.

அலகு – 3 தமிழர் வாழ்வியல் **10 மணிநேரம்**

ஐவகை நிலங்கள் – களவு வாழ்க்கை – கற்பு வாழ்க்கை – அரசர் கடமை – கல்வி நிலை – தொழில் நிலை – ஆடவர் நிலை – பெண்டிர் நிலை.

அலகு – 4 கட்டடக்கலையும் தமிழர் பண்பாடும் **10 மணிநேரம்**

கட்டடக்கலை தோற்றுவாய் – முதற்கலை – கட்டடக்கலையின் பழைமை – புதிய கற்காலம் – சங்ககாலம் – கோயில்கள் – அரண்மனைகள் – கோட்டைகள் – வீடுகள் – நீர்ப்பாசனக் கட்டடக்கலை – தமிழர் கட்டடக் கலையின் தனிச்சிறப்பு.

அலகு – 5 ஆற்றங்கரை நாகரிகம் 8 மணிநேரம்

ஆறும் நாகரிகமும் – ஆறுகளின் தோற்றமும் நீளமும் – காவிரிக்கரை நாகரிகம் – இலக்கியச் சிறப்பு – கலைச்சிறப்பு – வைகைக்கரை நாகரிகம் - இலக்கியச் சிறப்பு – கலைச்சிறப்பு , நொய்யல்கரை நாகரிகம்.

மொத்த மணிநேரம் 48

பார்வை நூல்கள்

1. முனைவர் அரங்க இராமலிங்கம் (பதிப்பாசிரியர்), தமிழர் நாகரிகமும் தமிழ் மொழிவரலாறும் (தொகுதி -1, 6, 2, 5, 10), வர்த்தமானன் பதிப்பகம், தியாகராயநகர், சென்னை-17.
2. கே.கே.பிள்ளை, தமிழக வரலாறு மக்களும் பண்பாடும், உலகத்தமிழ் ஆராய்ச்சி நிறுவனம் தரமணி, சென்னை-13.
3. நா.வானமாமலை, தமிழர் வரலாறும் பண்பாடும், நியூசெஞ்சுரி புக்ஹவுஸ், சென்னை -98.

இணையதளம்

1. www.tvu.org.in
2. www.maduraitamilproject.com

இதழ்கள்

1. International Research Journal of Indian Literature, irjil.in
2. International Tamil Research Journal, iorpress.in

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**2.6**	**2.6**	**2.8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester IV

24LUH401 **LANGUAGE IV: HINDI IV** **4H-3C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

MODERN POETRY, ONE ACT, ESSAY, TRANSLATION

PREREQUISITE:

- Not Required

COURSE OBJECTIVES(CO):

- Develop an interest in the appreciation of short stories
- Comprehend the grammatical structures and sentence making
- Understand the language and developing English to Hindi translation skill

COURSE OUTCOMES(COs):

- Learning the literacy knowledge of Hindi specially reading and writing .
- Learning the literary knowledge specially reading and understanding of Hindi short Stories
- Learning the history of Hindi literature.
- The ability to translate from Hindi to English and from English to Hindi will be improved.
- Develop a skill in spoken Hindi.

UNIT-I **9 HOURS**

a) Poetry – Lakshmanan ke Bare Me
b) Bharath ka Bhagya
c) Essay – Dhokha
d) Translation – Lesson – 1 to 3

UNIT-II **9 HOURS**

a) Poetry – Soorpanakha Ki Visheshatha
b) Bahu Ki Vida
c) Essay – Jabaan
d) Translation– Lesson – 4 to 6

UNIT-III **10 HOURS**

a) Poetry– Kavya Ke AdharPar
b) Reed Ki Haddi
c) Essay – Kya Janvar Bhee Sochthi Hai
d) translation– Lesson – 7 to 9

UNIT-IV **10 HOURS**

a) Khanda Kavya Ke Adhar Par Panchavati
b) Rajputhni Ka Badhala
c) Essay – Shradha-Bhakthi
d) Translation– Lesson – 10 to 12

UNIT-V **10 HOURS**

a) Kavya Ke Adhar Par Prakruthik Varnan
b) Bheem Aur Raakshas
c) Essay – Adhunik Nari
d) Translation – Lesson –13 to 15

TOTAL: 48 HOURS

REFERENCE BOOKS:

1.Poetry : Panchavati

Writer : Mythili Sharan Guptha

Publisher : Bharathiya Sahithya Sangrah

Kanpur – 208002, Uttar Pradesh

2.One Act Play : Adarsh Akanki

Publisher : D.B.Hindi Prachar Sabha

T. Nagar,Chennai – 600017, Tamil Nadu

3.Essay : Nibandh Nishchay

Editor : Dr.Sharadh Ranjan

Publisher : Hindi Sahithya Sammelan Prayag

12.Sammelan Marg, Illahabadh

4.Translation : Anuvadh Abhyas – III

Publisher : D.B.Hindi Prachar Sabha

T.Nagar, Chennai – 600017, Tamil Nadu

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**3**	**2.6**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester IV

24LUM401 **LANGUAGE IV: MALAYALAM IV** **4H-3C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVE(CO):

- Knowledge of contemporary drama contents of Malayalam literature
- Learn Screen play and its techniques. The ability to read drama and expresscriticism about it and the ability to express social thoughts will improve
- There will also be litigation messages in Malayalam and news on speech techniques
- Able to write articles on their own and improve their creative skills.

COURSE OUTCOME(COs):

- Get a basic knowledge of drama
- Can read and critique Screenplay
- Create interest in art literature courses
- The hope of writing a Drama or a Screen Play
- The idea of creating new works and critique knowledge willimprove.

Unit No.	PART I – MALAYALAM IV	Hours
I	Screen Play - Perumthachan	10
II	Screen Play - Perumthachan	10
III	Drama - Saketham	10
IV	Drama - Saketham	09
V	Drama - Saaketham	09
	TOTAL	48

TEXT BOOKS:

1. Perumthachan – M.T.VasudevanNair,DC Books
2. Saketham – C.N.SreekandanNair,DC Books

REFERENCE BOOKS:

1. MalayalaNatakaSahithyaCharithram. G Sankara Pillai (Kerala SahithyaAkademi, Trissur)
2. Malayala Nataka Sahithya Charithram, Vayala Vasudevan Pillai (Kerala Sahithya Akademi Thrissur).
3. Natakam- OruPatanam (C.J. SmarakaPrasanga Samithi, Koothattukulam) Natakaroopacharcha, Kattumadam Narayanan (NBS, Kottayam)
4. Chalachithrasameeksha–Vijayakrishanan.
5. Cinemayude Paadangal-VisakalanavumVeekshanavum – Jose-K.Manual.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	3	3	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester IV

24LUS401 **LANGUAGE IV: SANSKRIT IV** **4H - 3C**

(Lyrics, Grammar and Translation)

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not required

COURSE OBJECTIVES(CO):

- The fundamental objective of the curriculum is to impart effective science education at the undergraduate level, exposing them to recent trends and developments in the subject.
- Creating scientific temper is another major objective of this curriculum.
- Another major thrust given here is to develop an environmental concern in all activities ofthe students. 'Go green', the motto of the syllabus emphasizes the urgent need to conserve nature without destruction of natural resources.

COURSE OUTCOMES(COs) :

- **Critical Thinking**: Take informed actions after identifying the assumptions that frame students' thinking and actions.
- **Problem Solving**: Understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired.
- **Effective Communication**: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
- **Effective Citizenship**: Demonstrate empathetic social concern and equity centered national development.
- **Environment and Sustainability**: Understand the issues of environmental contexts and sustainable development.

UNIT I **9 HOURS**

Introduction to Sanskrit Lyrics and erotic literature.

UNIT II **9 HOURS**

Devotional Literature, Important works

UNIT III **10 HOURS**

Krishnakarnamrita of Leelasuka (Second Section only)

UNIT IV **10 HOURS**

Grammar – Past tense, Declension of personal pronouns

UNIT V **10 HOURS**

Simple sentences from Sanskrit Self Teacher

TOTAL: 48 HOURS

TEXT BOOK:

1. Krishnakarnamrita of Leelasuka Sri Ramakrishna Mud Mylapore, Chennai.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**2.6**	**2.4**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester IV

24LUF401 **LANGUAGE IV: FRENCH IV** **4H-3C**

(Comprehension, Tradusion, Reduction, Une Act)

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required

COURSE OBJECTIVES (CO):

- To provide the students with an ability to build and enrich their communication skills.
- To help them think and write imaginatively and critically.
- To strengthen their professional skills.

COURSE OUTCOMES (COS):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Make the students proficient communicators in French.	Apply
CO2	Develop learners' ability to understand French.	Understand
CO3	Understand the nuances of listening, speaking and reading French.	Understand
CO4	Prepare the learners to face situations with confidence and to seek employment in the modern globalized world.	Apply
CO5	Build the students' ability to listen and to speak French better.	Apply

Unite – I **9 HOURS**

a) Leçon - On fait le ménage !
b) Communication - Protester et réagir
c) Grammaire - Le présent progressif, Les pronoms possessifs
La phrase négative (3)
d) Lexique -• Le logement,La maison,Les pièces
e) Culture - Paris et ses symboles

Unite – II **9 HOURS**

a) Leçon - À propos de logement
b) Communication - Exprimer l'intérêt et l'indifférence
c) Grammaire - Quelques adjectifs et pronoms indéfinis
Les verbes lire, rompre et se plaindre
d) Lexique - Meubles et équipement,Les tâches ménagères
e) Culture - Les fêtes et les traditions en France

Unite – III **10 HOURS**

a) Leçon - Tous en forme ! Accidents et catastrophes
b) Communication - Raconter au passé
c) Grammaire - Le passé composé et l'imparfait
Le passé récent, L'expression de la durée,
d) Lexique - Le corps humain : l'extérieur,Le corps humain :
l'intérieur Les maladies et les remèdes
e) Culture - La longue histoire de la Francophonie

Unite – IV **10 HOURS**

a) Leçon - Faire ses études à l'étranger
b) Communication -• Exprimer la peur et rassurer
c) Grammaire - Les adjectifs et les pronoms ,indéfi nis : rien, personne, aucun Les verbes dire, courir et mourir
d) Lexique - Les accidents,Les catastrophes naturelles
e) Culture - Les jeux de la Francophonie .

Unite – V **10 HOURS**

a) Leçon - Bon voyage !La méte
b) Communication - Exprimer son opinion, Parler de la météo
c) Grammaire -• Les pronoms démonstratifs neutres
Le futur simple, Situer dans le temps
d) Lexique - Le système scolaire,Les formalités pour partir à l'étranger
• La météo
e) Culture - Le français hors de France

TOTAL: 48 HOURS

TEXT BOOKS:

1. Cocton Marie –Noëlle , Duplex Dorothée, Heu Elodie , Kasazian Emilie, Ripaud Delphine, 2015, **Saison 1- Méthode de francais**, Didier, paris.
2. Cocton Marie – Noëlle, Dupleix, Heu Elodie, Kasazian Emilie ,Ripaud Deldphin, 2015**, Saison 1 – Cahier d'activites ,** Dider ,Paris.

REFERENCE BOOKS:

1. Anne Akyüz,Bernadette Bazelle- Shahmael,JoëlleBonenfant, Marie- Françoise Gliemenn, 2005, Les **exercices de grammaire,Hachette FLE,** Paris.
2. Christian Beaulieu,2015, **Je pratique**, **Exercises de grammaire A**1, Dider,Paris.
3. Nathalie BIE, philippe SANTINAN,2005, Gra**mmaire pour adolescents-250 exercises,** CLE International , Paris.

WEBSITES :

1. http:// enseigner.tv5 monde.com/
2. bonjourdumonde.com /exercises/contenu/le – francais-du- tourisme.html
3. http://www.bonjurdefrance.com/
4. https://www.lepointdufle.net/

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**3**	**3**	-	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

24ENU401 **ENGLISH IV** **3H-3C**

Instruction Hours / Week: L: 3 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not required

COURSE OBJECTIVES(CO):

- To provide the students with an ability to build and enrich their communication skills.
- To help them think and write imaginatively and critically.
- To strengthen their professional skills.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Make the students proficient communicators in English.	Apply
CO2	Develop learners' ability to understand English.	Understand
CO3	Understand the nuances of listening, speaking and readingEnglish.	Understand
CO4	Prepare the learners to face situations with confidence and to seek employment in the modern globalized world.	Apply
CO5	Build the students' ability to listen and to speak English better.	Apply

UNIT-I **8 HOURS**

Concept of Communication- Barriers to Communication- Body Language-PersonalityDevelopment-Etiquette and Manners-Soft Skills

UNIT- II **7 HOURS**

Listening Comprehension-Reading Comprehension-Paragraph Writing-Precis Writing-Collocation

UNIT-III **7 HOURS**

Writing-Writing Resume and Covering Letter- Types of Letter Writing-Writing MoU- Dicto Composition--Term Paper-Book Reviews

UNIT- IV **7 HOURS**

Speaking-Interview Skills-Preparing Welcome address and Vote of Thanks-Compering -

UNIT-V **7 HOURS**

Punctuation Marks- Figures of Speech

TOTAL: 36 HOURS

TEXT BOOK:

1. Board of Editors (2024). Proficiency in Communication II, Karpagam Academy of Higher Education

REFERENCE BOOKS:

1.Martin's, St (2013). Oxford Handbook of Writing: Handbook of Writing. Cambridge University Press.

2. Wren & Martin, (2008). High School English Grammar & Composition, S.Chand & Company Ltd, Board of Editors,
3. Krashen, Stephen D (1982). Principles and Practice in Second Language Acquisition. New York:Pergamon Press.

WEBSITES:

1. https://www.skillsbuilder.org/blog/top-5-speaking-skills-for-success-in-interviews
2. https://www.coursera.org/articles/interviewing-skills

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	**3**	**3**	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester IV

24CGU401 PROGRAMMING IN JAVA 3H-3C

Instruction Hours / Week: L: 3 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Programming Environment

COURSE OBJECTIVES (CO):

- To understand the fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- To use the Java SDK environment to create, debug and run simple Java programs and use Java in various technologies in different platforms and understand the fundamental of Packages and access modifiers and interface in java.

COURSE OUTCOMES (COs):

Upon completion of this course the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Demonstrate the structure and model of the Java programming language	Understand
CO2	Apply the class variables and methods.	Apply
CO3	Apply the inheritance usage.	Apply
CO4	Explain the database connectivity.	Understand
CO5	Apply the GUI programming and swing	Apply

UNIT I INTRODUCTION TO JAVA 8 HOURS

Java Architecture and Features, Understanding the semantic and syntax differences between C++ and Java, Compiling and Executing a Java Program, Variables, Constants, Keywords Data Types, Operators (Arithmetic, Logical and Bitwise) and Expressions, Comments, Doing Basic Program Output, Decision Making Constructs (conditional statements and loops) and Nesting.

UNIT II ARRAYS, STRINGS AND I/O 7 HOURS

Object-Oriented Programming Overview Principles of Object-Oriented Programming, Defining& Using Classes, Controlling Access to Class Members, Class Constructors, Method Overloading, Class Variables & Methods, Objects as parameters, final classes, Object class, Garbage Collection-Creating & Using Arrays (One Dimension and Multi-dimensional), Referencing Arrays Dynamically, Java Strings: The Java String class, Creating & Using String Objects, Manipulating Strings, String Immutability & Equality, Passing Strings To & From Methods, String Buffer Classes.Simple I/O using System.out and the Scanner class, Byte and Character streams, Reading/Writing from console and files.

UNIT III INHERITANCE 7 HOURS

Inheritance: (Single Level and Multilevel, Method Overriding, Dynamic Method Dispatch, Abstract Classes), Interfaces and Packages, Extending interfaces and packages, Package and Class Visibility, Using Standard Java Packages (util, lang, io, net), Wrapper Classes.

UNIT IV EXCEPTION HANDLING AND DATABASE CONNECTIVITY 7 HOURS

Exception types, uncaught exceptions, throw, built-in exceptions, creating your own exceptions; Multi-threading: The Thread class and Runnable interface, creating single and multiple threads, Thread prioritization, synchronization and communication, suspending/resuming threads. Accessing and manipulating databases using JDBC.

UNIT V JAVA GUI PROGRAMMING USING SWING 7 HOURS

Working with Graphics, Incorporating Images & Sounds. Event Handling Mechanisms, Listener Interfaces, Adapter and Inner Classes. The design and Implementation of GUIs using Swing components of Java Foundation Classes such as labels, buttons, text fields, layout managers, menus, events and listeners; Graphic objects for drawing figures such as lines, rectangles, ovals, using different fonts.

TOTAL: 36 HOURS

TEXT BOOKS:

1. Herbert Schildt. (2017). Java the Complete Reference, 8th Edition, Mc Graw Hill , Oracle Press.
2. James Gosling, Bill Joy, Guy L Steele Jr, Gilad Bracha, Alex Buckley. (2015). The JavaLanguage Specification, Java SE 8th Edition (Java Series), Addison Wesley Publishers.
3. Cay S. Horstmann, Gary Cornell. (2018). Core Java 2 Volume 1 ,11th Edition, Prentice Hall.
4. Cay S. Horstmann, Gary Cornell. (2019). Core Java 2 Volume 2 - Advanced Features, 9th Edition, Pearson.

REFERENCE BOOKS:

1. E. Balaguruswamy. (2019). Programming with Java, 6th Edition, McGraw Hill.
2. Paul Deitel, Harvey Deitel. (2018). Java: How to Program (Early Objects), 11th Edition, Prentice Hall.
3. David J. Eck, 2015, Introduction to Programming Using Java 8th Edition, Published by CreateSpace Independent Publishing Platform.
4. Ben Evans and David Flanagan, 2019, Java in a Nutshell, Seventh Edition. O'Reilly Media, Inc.

WEBSITES:

1. https://docs.oracle.com/java
2. https://www.tutorialspoint.com/java/index.htm
3. https://www.w3schools.com/java/
4. https://www.javatpoint.com/java-tutorial
5. https://docs.oracle.com/javase/tutorial/java/index.html
6. https://www.geeksforgeeks.org/java-tutorials/
7. https://nptel.ac.in/courses/106105191/
8. http://172.16.25.76/course/view.php?id=1827

CO, PO, PSO Mapping:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
CO2	3	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	3	2	-	-	-	-	-	-	-	-	-	-	2	-
CO4	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
CO5	3	-	-	3	-	-	-	3	-	-	-	-	-	-	-	-	2
Average	3	-	1	3	2	-	-	3	-	-	-	-	-	-	-	2	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester IV

24CGU402 DATABASE MANAGEMENT SYSTEM 3H-2C

Instruction Hours / Week: L: 3 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To understand the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation.
- To provide a strong formal foundation in database concepts, technology and Structured Query Language and give systematic database approaches covering DML, Function & Groupings and Joins&views.
- Be familiar with the basic issues of transaction processing and concurrency control and learn and understand various Cursors, Exceptions and Types of Exceptions.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Summarize to understand and design data modelling using Entity-Relationship model.	Understand
CO2	Inference SQL to a broad range of query and data update problems.	Understand
CO3	Make use of the DML, DDL, DCL To work with Tables.	Apply
CO4	Explain transaction Management in relational database System.	Understand
CO5	Apply different database architecture like Cursors and Exceptions to analyses the use of appropriate architecture inreal time environment.	Apply

UNIT I DATABASE CONCEPTS-A **RELATIONAL APPROACH** **7 HOURS**

Database - Relationships - DBMS - Relational data model - Integrity rules - Theoretical relational languages. **Database Design**: Data modeling- Dependency - Database design - Normal forms - Dependency diagrams - Denormalization

UNIT II STRUCTURED QUERY LANGUAE (SQL) **7 HOURS**

Introduction – DDL - Naming rules and conventions - Data types- Constraints- Creating a table- Displaying t able information - Altering an existing table – Dropping, renaming, and truncatingtable - Table types

UNIT III WORKING WITH TABLES **8 HOURS**

DML - Adding a new Row/Record - Customized prompts - Updating and deleting an existing rows/records - Retrieving data from table - Arithmetic operations - Restricting data with WHERE clause - Sorting - Substitution variables - DEFINE command - CASE structure. **Functions and Grouping**: Built-in functions - Grouping data. **Joins and Views**: Join - join types-**Views:** Views - Creating a view - Removing a view - Altering a view

UNIT IV PL/SQL **7 HOURS**

Fundamentals - Block structure - comments - Data types – Other data types - Variable declaration - Assignment operation - Bind variables - Substitution variables - Printing. **ControlStructures and Embedded SQL**: Control structures - Nested blocks - SQL in PL/SQL - Data manipulation - Transaction control statements

UNIT V PL/SQL CURSORS AND EXCEPTIONS **7 HOURS**

Cursors - Implicit & explicit cursors and attributes - cursor FOR loops - SELECT…FOR UPDATE - WHERE CURRENT OF Clause - cursor with parameters - Cursor variables - Exceptions - Types of exceptions - Records - Tables -Procedures -Functions-Triggers

TOTAL: 36 HOURS

TEXT BOOKS:

1. ElmasriRamez and Navathe Shaman. (2019). Fundamentals of Database System', Pearson Education , Sixth Edition.
2. Abraham Silberschatz, Henry F.Korth and S.Sudarshan. (2018). Database System Concepts', Tata Mc Graw Hill,Sixth Edition.

REFERENCE BOOKS:

1. Ivan Bayross. (2018). SQL, PL/SQL the Programming Language of Oracle Paperbak.BPB Publication, Fifth Edition.
2. Nilesh Shah, "Database Systems Using ORACLE", PHI, 2nd Edition, 2011

WEBSITES:

1. https://www.datanamic.com/support/lt-dez005-introduction-db-modeling.html
2. https://docs.oracle.com/cd/B12037_01/server.101/b10759/statements_1001.htm
3. https://www.geeksforgeeks.org/sql-ddl-dml-dcl-tcl-commands/
4. https://www.javatpoint.com/oracle-create-table
5. https://www.tutorialspoint.com/plsql/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	3-
CO2	3	-	1	2	2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
CO4	3	-	-	-	-	3	-	-	-	1	-	-	-	-	-	-	3
CO5	3	-	-	-	-	3	-	2	-	1	-	-	-	-	-	-	-
Average	3	-	1	2	2	3	-	2	-	1	-	-	-	-	-	-	3

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester IV

24CGU403 CYBER SECURITY 2H-1C

Instruction Hours / Week: L: 2 T: 0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To state the basic concepts in Cyberspace, Cybersecurity issues and challenges and provide an exposure to the classification of Cybercrimes and, Remedial and mitigation.
- To understand principles of Social Media Overview and Security and gain knowledge about E-Commerce and Digital Payments.
- To understand key terms and concepts Digital Device Security tools.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Explain the basic Mathematical tools for cryptography concepts	Understand
CO2	Apply the concept of AES, Blowfish algorithm and its applications	Apply
CO3	Apply the concept of public key cryptosystems.	Understand
CO4	Explain the concept of Digital Signature Algorithms	Understand
CO5	Apply the concept of and Firewall and its applications	Apply

UNIT I

INTRODUCTION TO CYBER SECURITY AND SDG9 5 HOURS

Cyber Security Fundamentals: Basic principles of cyber security - Importance of cyber security in sustainable infrastructure. Threats and Vulnerabilities in Modern Infrastructure: Common cyber threats to traffic, transport, and financial system- Vulnerabilities in smart transportation and stock market systems. Cyber Security Strategies for Sustainable Systems- Protecting critical infrastructure- Secure data management and privacy considerations. Regulatory and Compliance Requirements: Cyber security regulations for sustainable development-Ensuring compliance with international standards- Advanced Technologies in Cyber Security-Role of AI, machine learning, and blockchain in enhancing cyber security- Emerging technologies and their implications for sustainable infrastructure.

UNIT II

CYBERCRIME AND CYBER LAW 5 HOURS

Classification of cybercrimes, Common cybercrimes- cybercrime targeting computers and mobiles- cybercrime against women and children- financial frauds- social engineering attacks,malware and ransomware attacks, zero day and zero click attacks- Cybercriminals modus- operandi Reporting of cybercrimes- Remedial and mitigation measures-Legal perspective of cybercrime- IT Act 2000 and its amendments-Cybercrime and offences ,Organizations dealingwith Cybercrime and Cyber security in India-Case studies.

UNIT III

SOCIAL MEDIA OVERVIEW AND SECURITY **5 HOURS**

Introduction to Social networks- Types of Social Media-Social Media Platforms-Social media monitoring, Hashtag, Viral content, Social media Marketing-Social media privacy, Challenges, opportunities and pitfalls in online social Network-Security issues related to social media- Flagging and reporting of inappropriate Content-Laws regarding posting of inappropriatecontent, Best practices for the use of Social media- Case studies.

UNIT IV

E-COMMERCE AND DIGITAL PAYMENTS **5 HOURS**

Definition of E- Commerce-Main components of E-Commerce- Elements of E-Commerce security- E-Commerce threats-E-Commerce security best practices-Introduction to digital payments- Components of digital payment and stake holders-Modes of digital payments-Banking Cards, Unified Payment Interface (UPI), e-Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled payments, Digital payments related common frauds andpreventive measures- RBI guidelines on digital payments and customer protection in unauthorized banking transactions- Relevant provisions of Payment Settlement Act,2007.

UNIT V

Digital Devices Security, Tools and Technologies for Cyber Security **4 HOURS**

End Point device and Mobile phone security- Password policy- Security patch management- Data Backup-Downloading and management of third party software- Device security policy- Cyber Security best practices- Significance of host firewall and Ant-virus- Management of hostfirewall and Anti-Virus-Wi-Fi security- Configuration of basic security policy and permissions.

TOTAL: 24 HOURS

TEXT BOOKS:

1. Nina Godbole & SUNIT Belapure. (2013). CYBER SECURITY. Wiley India Pvt. Ltd. New Delhi
2. Godbole, N. (2009). Information Systems Security: Metrics Frameworks and Best Practices. Wiley India. New Delhi
3. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
4. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011).

REFERENCE BOOKS:

1. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson, 13th November, 2001).
2. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
3. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
4. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
5. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

WEBSITES:

1. www.Cybercrime.gov.in
2. https://gac.gov.in/
3. https://www.india.gov.in/password-policy-ministry-electronics-and-information-technology?page=3
4. https://mahe.gov.in/mobile-app-policy/
5. https://www.dsci.in/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	3	3	-	-	-	-	2	-	-	-	-	-	3	-
CO2	-	-	3	3	-	-	-	3	-	-	2	-	-	-	-	-	2
CO3	-	-	-	-	3	-	-	-	2	-	-	2	-	-	-	3	2
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	3	-
CO5	-	-	-	-	3	-	-	3	2	-	-	2	-	-	-	-	-
Average	3	-	3	3	3	-	-	3	2	2	2	2	-	-	-	3	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester IV

24CGU404 PROCESS MANAGEMENT 2H-2C

Instruction Hours / Week: L: 2 T: 0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Operating Systems

COURSE OBJECTIVES (CO):

- To understand software engineering and software process models and acquire Knowledge on Agile Process Model, Scrum and Sprint.
- To recognize the need of DevOps Tools and gain knowledge on Lean UX and Agile Anti patterns.
- To design and develop a quality software product.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Demonstrate to understand software engineering and softwareprocess models.	Understand
CO2	Inference Knowledge on Agile Process Model, Scrum and Sprint.	Understand
CO3	Experiment with the need of DevOps Tools	Apply
CO4	Infer knowledge on Lean UX and Agile Anti patterns	Understand
CO5	Develop and design a quality software product	Apply

UNIT I SOFTWARE AND SOFTWARE ENGINEERING 5 HOURS

The Nature of Software, The Unique Nature of WebApps, Software Engineering- Software Process, Software Engineering Practice-Software Myths. Software Process Model: A Generic Process Model, Process Assessment and Improvement, Perspective Process Models, Specialized Process Model, The Unified Process. Software Engineering Code of Ethics.

UNIT II AGILE 5 HOURS

What Is Agile, Understanding Agile Value, Agile Manifesto, Principles of Agile, Agile Methodologies, Advantages and Disadvantages of Agile - Agile anti-patterns, Scaled Agile Framework, Why Lean UX, The Three Foundations of Lean UX, Principles of Lean UX.

UNIT III SCRUM 5 HOURS

Definition of Scrum, Uses of Scrum, Scrum Theory, Scrum Values, The Scrum Team, Scrum Events, Scrum Artifacts, Artifact Transparency.

UNIT IV DEVOPS 5 HOURS

Introduction to DevOps, methodologies, principles, strategies, Automation, Performance Measurement through KPIS and Metrics, Agile and DevOps, Agile Infrastructure, Velocity, Lean Startup UPS.

UNIT V DESIGN THINKING 4 HOURS

Introduction to Design Thinking – Lean thinking, Actionable Strategy, The Problem with Complexity, Vision and Strategy, Defining Actionable Strategy Act to Learn, Leading Teams to Win.

TOTAL: 24 HOURS

TEXT BOOKS:

1. Jonny Schneider. (2017). Understanding Design Thinking, Lean, and Agile. O'Reilly Media.
2. Jeff Gothelf . (2017). Lean vs. Agile vs. Design Thinking. Sense and Respond Press
3. Jeff Gothelf, Josh Seiden.(2016). Lean UX. 2nd Edition.

REFERENCE BOOKS:

1. Stephen Haunts. (2012). Essential of Scrum. Addison-Wesley Professional. 1st Edition.
2. Roger S Pressman. (2010). Software Engineering A Practioners Approach. 7th Edition.
3. Kallori Vikraman. (2016). Introduction to Devops. 1st Edition.

WEBSITES:

1. https://www.tutorialspoint.com/sdlc/sdlc_overview.htm
2. https://existek.com/blog/sdlc-models/
3. https://www.agilealliance.org/agile101/
4. https://devops.com/
5. http://theleanstartup.com/principles

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	2
CO2	-	-	3	3	-	-	-	3	-	-	-	-	-	-	-	-	-
CO3	-	-	3	3	-	-	-	3	-	-	1	-	-	-	-	1	-
CO4	-	-	-	3	-	2	-	3	-	-	-	-	-	-	-	-	2
CO5	-	-	3	3	-	-	-	3	-	-	-	-	-	-	-	1	-
Average	3	-	3	3	-	2	-	3	-	-	1	-	-	-	-	1	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

24CGU405 **CAMPUS TO CORPORATE** **2H-2C**

Instruction Hours / Week: L: 2 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To understand the Fundamental Concepts of Corporates and Industry and recall about the change management and about the culture.
- To Understand the need of corporate etiquettes and the skills.
- To Apply the basic level of English communication skills and understand the reading, writing, listening comprehension.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Summarize to learn the concepts of industry relations.	Understand
CO2	Explain the differences between the campus and corporate	Understand
CO3	Experiment with the need of skills required for an industry.	Apply
CO4	Make use of phonetics and the communication skills.	Apply
CO5	Explain the writing of short stories and the interview skills	Understand

UNIT I OVERVIEW OF CORPORATE & BPS INDUSTRY **5 HOURS**

Overview of Corporate: Ice-breaker Session, What is Corporate, History of Corporate. Overview ofBPS Industry: What is BPS, History of BPS, Benefits of BPS, BPS Industry in World, BPS Industryin India, TCS BPS

UNIT II DIFFERENCE BETWEEN CAMPUS AND CORPORATE **5 HOURS**

Change Management (Understand the difference between campus and corporate life and prepare themselves for the same). Learn the Culture, Impact of your attitude and behavior, Consider the language, Establish and maintain relationship, Respect others, Be Confident, Keep on learning & Consider the body language

UNIT III GROOMING FOR CORPORATES **5 HOURS**

Corporate Etiquettes: Dressing and Grooming Skills, Workplace Etiquette, Business Etiquette, Email Etiquette, Telephone Etiquette, Meeting Etiquette & Presentation Skills . ProfessionalCompetencies: Analytical Thinking, Listening Skills, Time Management, Team Skills, Assertiveness, Stress Management, Participating in Group Discussion, Interview Facing,Ownership and Attention to detail

UNIT IV **5 HOURS**

ELEMENTARY AND INTERMEDIATE LEVEL ENGLISHCOMMUNICATION

Grammar, Phonetics, One on One basic conversation skill practice. Reading Comprehension, Listening Comprehension, Improving Vocabulary, Improving Writing Skills and Comprehension while interacting face to face

UNIT V ADVANCED LEVEL ENGLISH COMMUNICATION **4 HOURS**

Recitation of short stories, Interview Skills, Group Discussion, Social Conversation Skills, Presentation & One Act Plays.

TOTAL: 24 HOURS

TEXT BOOKS:

1. TCS study material

WEBSITES:

1. NPTEL : https://youtu.be/bl9YSiH4ujQ
2. NPTEL :https://youtu.be/JIKU_WT0Bls
3. NPTEL :https://youtu.be/QSLIttMmaLk
4. NPTEL :https://youtu.be/R6wZsNLOORI
5. NPTEL :https://youtu.be/45uNWLmAZR8

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	-	-	-	-	3	-	-	-	3	3	-	2	1	-	-
CO2	-	-	-	-	-	-	3	-	1	-	3	-	2	2	1	2	3
CO3	-	3	-	-	-	-		-	1	2	3	-	2	2	1	-	3
CO4	-	3	-	-	-	-	3	-	-	-	-	-	-	2	1	2	3
CO5	-	3	-	-	-	-	-	-	1	-	3	3	-	-	1	-	-
Average	-	3	-	-	-	-	3	-	1	2	3	3	2	2	1	2	3

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester IV

24CGUA401 OPERATIONS RESEARCH 4H-4C

Instruction Hours / Week: L: 4 T: 0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Basic understanding of algebra and mathematical modeling.

COURSE OBJECTIVES (CO):

- To learn the basic concepts and applications of linear programming and to impart knowledge in concepts and tools of Operations Research.
- To make the student capable of formulating the various real-life decision-making problems as Mathematical programming problems.
- To enable the practical application of operations research methods for decision-making in real-world scenarios.

COURSE OUTCOMES (COs):

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

COs	Course Outcomes	Blooms Level
CO1	Understand the basic concepts and formulate real-world problems as a linear programming model.	Understand
CO2	Apply methods to find initial basic feasible solutions and optimal solutions for transportation problems.	Apply
CO3	Apply different queuing models and assignment problem to solve real-life problems.	Apply
CO4	List and understand the costs involved in inventory management.	Understand
CO5	Construct project networks and perform time calculations using CPM and PERT methods.	Apply

UNIT I LINEAR PROGRAMMING 9 HOURS

Mathematical Model assumption of linear Programming – Graphical method - Principles of Simplex method- Big-M Method- Duality in LPP.

UNIT II TRANSPORTATION MODEL 9 HOURS

Introduction – Mathematical Formulation – Finding Initial Basic Feasible Solutions – Optimum Solution for Non degeneracy and Degeneracy Model - Unbalanced Transportation Problems and Maximization case in Transportation Problem.

UNIT III ASSIGNMENT PROBLEM AND QUEUEING THEORY 10 HOURS

Mathematical Formulation of the Problem – Hungarian Method – Unbalanced Assignment Problem- Maximization Case in Assignment Problem - Travelling Salesman Problem.

Introduction - Characteristics of Queueing System. Problems in (M/M/1):(∞/FIFO) and (M/M/1):(N/FIFO) models .

UNIT IV INVENTORY CONTROL **10 HOURS**

Introduction – Costs involved in Inventory – Deterministic EOQ Models – Purchasing Model without and with Shortage, Manufacturing Model without and with Shortage - Price Break.

UNIT V PERT AND CPM **10 HOURS**

Introduction - Network scheduling by PERT / CPM – Network and basic components – Rules of Network construction – Time calculation in Networks – CPM. PERT – PERT calculations.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Kandiswarup, P. K. Gupta and Man Mohan. (2011). Operations Research, 12th Revised edition, S. Chand & Sons Education Publications, New Delhi.
2. Sharma S.D. (2017). Operations Research Theory, Methods & Applications, Kedar Nath Ram Nath Publications, India.

REFERENCE BOOKS:

1. Hamdy A. Taha., (2017). Operations Research-An Introduction, Tenth Edition, published by Dorling Kindersley (India) Pvt. Ltd., licensees of Pearson Education in South Asia.
2. Prem Kumar Gupta and Hira D.S., (2014). Operations Research, S. Chand & Company Ltd, Ram Nagar, New Delhi.
3. Srinivasan G., (2017). Operations Research: Principles and Applications, PHI, New Delhi

WEBSITES:

1. https://youtu.be/vUMGvpsb8dc
2. https://youtu.be/ItOuvM2KmD4

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	1	3	-	2	-	-	-	-	-	-	-	-	-	-	-
Average	**-**	**-**	**1**	**3**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

24CGU411 **PROGRAMMING IN JAVA - PRACTICAL** **3H-1C**

Instruction Hours / Week: L: 0 T: 0 P: 3 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Object-Oriented Programming (OOP)

COURSE OBJECTIVES (CO):

- To understand the fundamentals of programming such as variables, conditional and iterativeexecution, methods, etc.
- To understand fundamentals of object-oriented programming in Java, including definingclasses, invoking methods, using class libraries, etc.
- To use the Java SDK environment to create, debug and run simple Java programs and use Java in various technologies in different platforms, understand the fundamental of Packages and access modifiers and interface in java.

COURSE OUTCOMES (COs):

Upon completion of this course the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Demonstrate the structure and model of the Java programming language	Understand
CO2	Apply the class variables and methods.	Apply
CO3	Apply the inheritance usage.	Apply
CO4	Explain the database connectivity.	Understand
CO5	Apply the GUI programming and swing	Apply

List of Programs

1. To convert a decimal to binary number.
2. Write a program to find the sum of series $1+x+x^2+x^3+$……..
3. To find the sum of any number of integers entered as command line arguments.
4. To learn use of single dimensional array by defining the array dynamically.
5. Write a program to find maximum and sum of an array.
6. Write a Program to generate Fibonacci Series and Factorial for a number.
7. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions (from lower to higher data type).
8. Write a program to an exception out of bounds, if mark is greater than 100 throw anexception.
9. Write a program ―DivideByZero‖ that takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a message when the denominator is zero.
10. Write a program to generate multiplication table by multithreading.
11. Write a program to demonstrate priorities among multiple threads.
12. Write a program to perform string operations.

TEXT BOOKS:

1. Herbert Schildt. (2017). Java the Complete Reference, 8th Edition, Mc Graw Hill , Oracle Press.
2. James Gosling, Bill Joy, Guy L Steele Jr, Gilad Bracha, Alex Buckley. (2015). The Java Language Specification, Java SE 8th Edition (Java Series), Addison Wesley Publishers.
3. Cay S. Horstmann, Gary Cornell. (2018). Core Java 2 Volume 1 ,11th Edition, Prentice Hall.
4. Cay S. Horstmann, Gary Cornell. (2019). Core Java 2 Volume 2 - Advanced Features, 9th Edition,Pearson.

REFERENCE BOOKS:

1. E. Balaguruswamy. (2019). Programming with Java, 6th Edition, McGraw Hill.
2. Paul Deitel, Harvey Deitel. (2018). Java: How to Program (Early Objects), 11th Edition, PrenticeHall.
3. David J. Eck. (2015). Introduction to Programming Using Java 8th Edition, Published by CreateSpaceIndependent Publishing Platform.
4. Ben Evans and David Flanagan. (2019). Java in a Nutshell, Seventh Edition. O'Reilly Media, Inc.

WEBSITES:

1. www.java.sun.com
2. www.knking.com
3. www.webdeveloper.com
4. www.forums.sun.com
5. www.netbeans.com
6. java.sun.com/docs/books/tutorial/
7. www.java.net/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
CO2	3	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	3
CO3	-	3	-	-	2	1	-	1	-	-	-	-	-	-	-	-	-
CO4	3	3	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
CO5	3	3	-	2	-	1	-	1	-	-	-	-	-	-	-	-	3
Average	3	3	-	2	2	1	-	1	-	-	-	-	-	-	-	2	3

1 - Low, 2 - Medium, 3 - Strong, '-' – No Correlation

Semester IV

24CGU412 DATABASE MANAGEMENT SYSTEM – PRACTICAL 2H-1C

Instruction Hours / Week: L: 0 T: 0 P:2 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To understand the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation.
- To provide a strong formal foundation in database concepts, technology and StructuredQuery Language and give systematic database approaches covering DML, Function & Groupings and Joins & views.
- To be familiar with the basic issues of transaction processing and concurrency control and learn and understand various Cursors, Exceptions and Types of Exceptions.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Summarize to understand and design data modelling using Entity-Relationship model.	Understand
CO2	Inference SQL to a broad range of query and data update problems.	Understand
CO3	Make use of the DML, DDL, DCL To work with Tables.	Apply
CO4	Explain transaction Management in relational database System.	Understand
CO5	Apply different database architecture like Cursors and Exceptions to analyses the use of appropriate architecture inreal time environment.	Apply

List of Programs

1. Using Differentoperators
2. Using ControlStructures
3. Implement Built-infunctions
4. Implement update and Altertable
5. Implementing PL/SQLBlock
6. Implement PL/SQL table and record
7. Using Functions
8. Using Cursors
9. Using Triggers

TEXT BOOKS:

1. ElmasriRamez and Navathe Shaman. (2019). Fundamentals of Database System', Pearson Education, Sixth Edition.
2. Abraham Silberschatz, Henry F.Korth and S.Sudarshan. (2018). Database System Concepts', TataMc Graw Hill, Sixth Edition.

REFERENCE BOOKS:

1. Ivan Bayross. (2018). SQL, PL/SQL the Programming Language of Oracle Paperback. BPB Publication, Fifth Edition.
2. Nilesh Shah, "Database Systems Using ORACLE", PHI, 2nd Edition, 2011

WEBSITES:

1. https://www.datanamic.com/support/lt-dez005-introduction-db-modeling.html
2. https://docs.oracle.com/cd/B12037_01/server.101/b10759/statements_1001.htm
3. https://www.geeksforgeeks.org/sql-ddl-dml-dcl-tcl-commands/
4. https://www.javatpoint.com/oracle-create-table
5. https://www.tutorialspoint.com/plsql/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	3	-	-	-	-	-	-	-	-	-	2	1
CO2	3	-	1	2	2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1
CO4	3	-	-	-	-	3	-	-	-	1	-	-	-	-	-	2	-
CO5	3	-	-	-	-	3	-	2	-	1	-	-	-	-	-	-	1
Average	3	-	1	2	2	3	-	2	-	1	-	-	-	-	-	2	1

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester IV

24VAC401 UNIVERSAL HUMAN VALUES 2H-1C

Instruction Hours / Week: L: 2 T: 0 P:0 **Marks:** Internal**:100** External**:-** Total**:100**

End Semester Exam: - Hours

PREREQUISITE:

- Not Required

COURSE OBJECTIVES (CO):

- To develop the holistic perspective based on self-exploration about themselves, family, society and nature/existence.
- To understand harmony in themselves, family, society and nature/existence.
- To strengthen the self-reflection.
- To develop the commitment and courage to act.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Become more aware of themselves and their surroundings (family, society, nature).	Understand
CO2	Be more responsible in life.	Apply
CO3	Deal with problems with sustainable solutions, while keeping human relationship and human nature in mind.	Analyze
CO4	Develop consciousness of themselves through the control of mind.	Evaluate
CO5	Nurture human to live with mutual happiness and prosperity with rest of nature	Analyze

UNIT I INTRODUCTION 5 HOURS

Purpose and motivation for the course, recapitulation from universal human values I. Self-exploration-what is it? – its content and process; 'Natural Acceptance' and Experiential Validation- as a process for self-exploration. Continuous Happiness and prosperity. A look at basic human Aspiration. Right understanding, Relationship and physical Facilities-the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and prosperity correctly- A critical appraisal of the current scenario. Method of fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT II UNDERSTANDING HARMONY IN THE HUMAN BEING – HARMONY IN MYSELF 5 HOURS

Understanding human being as a co-existence of the sentiment 'I' and the material 'Body'. Understanding the needs of self ('I') and 'Body' – sukh and Suvidha. Understanding the body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and helth; correct appraisal of physical needs, meaning of prosperity in detail. Programs to ensure Sanyam and health.

UNIT III UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY-HARMONY IN HUMANHUMAN RELATIONSHIP 5 HOURS

Understanding values in human-human relationship; meaning of justice (nine universal values in relationship) and program for its fulfillment to ensure mutual happiness; Trust and respect as the foundational values of relation, Understanding the meaning of trust; Difference between intention and competence understanding the meaning of respect, Difference between respect and differentiation; the other salient values in relationship. understanding harmony in the family and society (society being an extension of family): Resolution, prosperity, fearlessness and coexistence as comprehensive human goals. Visualizing a universal harmonious order in society- undivided society, universal order- from family to world family.

UNIT IV UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE- WHOLE EXISTENCE AS CO- EXISTENCE 4 HOURS

Understanding harmony in the nature, Interconnectedness and mutual fulfillment among the four orders of nature recyclability and self-regulation in nature. Understanding existence as co-existence of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT V IMPLICATION OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS 5 HOURS

Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics: a) Ability to utilize the professional competence for augmenting universal human order b) Ability to identify the scope and characteristics of people-friendly and ecofriendly production systems, c) Ability to identify and develop appropriate technologies and management patters for above production systems. Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers b) At the level of society: as mutually enriching institutions and organizations.

TOTAL: 24 HOURS

TEXT BOOKS:

1. Gaur,R.R, Sangal,R and Bagaria,G.P,(2010). A foundation course in Human Values and professional Ethics, Excel books, New Delhi.
2. Schumacher. E.F, Small is Beautiful: Economics as If People Mattered,Perennial Library.
3. Cecile Andrews, (2006). Slow is Beautiful, New Society Publishers.

REFERENCE BOOKS:

1. Joseph Cornelius Kumaruppa,(Digitized 30 Oct 2019). The Economy of Permanence.
2. Mahatma Gandhi, (1983). The Story of My Experiments with Truth.
3. Maulana Abul Kalam Azad, (2017). India Wins Freedom, Create Space Independent Publishing Platform.
4. Romain Rolland, (1952). The Life of Vivekananda and the Universal Gospel, Advaita ashrama.

WEBSITES:

1. http://www.arvindguptatoys.com/arvindgupta/gandhiexperiments.pdf
2. http://www.sanipanhwar.com/India%20Wins%20Freedom%20%20Maulana%20Abul%20Kalam%20Azad
3. https://estudantedavedanta.net/The-Life-Of-Vivekananda-And-The-Universal-Gospel.pdf

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	2	1	-	-	-	-	-	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
CO3	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	3	-	-	-	-	-	-	-	-	-	-	3	2	-
Average	**-**	**-**	**2**	**2**	**2**		**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.5**	**-**

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester V

24CGU501 CLIENT RELATIONSHIP MANAGEMENT 4H-3C

Instruction Hours/Week: L: 4 T: 0P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To acquire Knowledge about the ITSM, ITIL, ServiceNow basics, scripting, UI policies and business rules.
- To Understand basic and system administration using ServiceNow and apply ServiceNow APIs for problem, incident, change and service requestmanagement.
- To Analyze SLAs and business rules to streamline and automate routine work tasks using ServiceNow and use various script types used throughout the platform.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Infer Knowledge about the ITSM, ITIL, ServiceNow basics, scripting, UI policies and business rules.	Understand
CO2	Summarize the basic system administration using ServiceNow.	Understand
CO3	Apply ServiceNow APIs for problem, incident, change and service request management.	Apply
CO4	Make use of SLAs and business rules to streamline and automate routine work tasks using ServiceNow.	Apply
CO5	Make use of various script types used throughout the platform.	Apply

UNIT I SERVICE NOW INTERMEDIATE LEVEL 10 HOURS

Administrator-ServiceNow Introduction-ServiceNow Platform UI ServiceNow ITSM overview-Managing Users, Groups and Roles, departments, companies and Assignment Rules-Tables, Columns, Attributes, Dictionary Entries, Schema Map-Managing Forms, Layouts and Lists- Dictionary Overrides and Simple Reference Qualifiers.

UNIT II SYSTEM PROPERTIES 09 HOURS

Incident management - Problem management- - Change management- Overview of other ITSM Modules - Overview of other ITSM Modules- SLA Basics-Introduction to Client and Server-Side Scripting-server-side scripting - Server Side Glide API -server-side scripting - Server Side Glide API -Server Side script Debugging-Server Side Scripting Best Practices-Business Rules-Client SideAPIs-UI Policies and Data Policies-Client Scripts -Client Side script Debugging.

UNIT III CLIENT SCRIPTS & CLIENT GLIDE APIS-BEST PRACTICES 10 HOURS

Client-side scripting & policies (UI and Data)-Modularize programming using UI Actions (both Server and Client Side)-Script Include-Glide AJAX-UI Pages and UI Macros-Managing Update Sets-Custom Applications Automated Test Framework –Events-Inbound/Out Bound Notifications-Mail Templates and Scripts.

UNIT IV MANAGE WORKFLOWS **09 HOURS**

Managing Stage Sets -Manage Workflows -Manage Workflows -Flow Designer (Overview)- Service Catalogs, Categories, Items and variables-Manage Execution Plans and workflows-Cart Layouts-Client scripts and UI policies-Record Producers-Order Guides & Scriptable Order Guides-Scheduled Jobs. VTB Agent Intelligence (Overview)-Restrict access to applications and application modules-Automatically create application Access Controls -Manually create, test, and debug Access Controls-Managing ServiceNow imports and exports-Managing Import Sets and Transform Map-Configure and run Reports and Dashboards Security Controls-Database Views.

UNIT V SERVICENOW SERVICE PORTALS OVERVIEW **10 HOURS**

ServiceNow Service portals core components -Scripting in Service Portal-ITSM Virtual Agent – Overview-Performance Analytics Overview-Servicenow on Mobile-Servicenow Integration Overview.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Tim Woodruff. (2018). Learning ServiceNow: Administration and development on the Nowplatform, for powerful IT automation", 2nd Edition, Packt Publishing Ltd..
2. Andrew Kindred. (2018). Mastering ServiceNow Scripting" Packt Publishing.

REFERENCE BOOKS:

1. AshishRudraSrivastava. (2017). ServiceNow Cook Book" Packt Publishing Ltd.

WEBSITES:

1. https://www.servicenow.com/products/it-service-management.html
2. https://www.servicenow.com/content/dam/servicenow-assets/public/en- us/doc-type/resource-center/data-sheet/ds-itsm.pdf
3. https://www.guru99.com/servicenow-tutorial.html

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
CO2	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	3	3	2	-	-	-	1	-	-	-	-	-	2	-
CO4	-	-	1	3	3	-	-	3	-	-	-	-	-	-	-	-	-
CO5	-	-	-	3	-	-	-	3	-	1	-	-	-	-	-	2	1
Average	3	-	1	3	3	2	-	3	-	1	-	-	-	-	-	2	1

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester V

24CGU502 INTRODUCTION TO DIGITAL TECHNOLOGY 3H-2C

Instruction Hours / Week: L: 3 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To understand the Fundamental Concepts of Digital Technologies in Marketing and AI Concepts and recall robotic process automation basics, tools, UiPath basic constructs in bot development.
- To Understand the need of automation, UiPath sequence, activities and applications.
- To Apply various robotic process automation workflows for bot development analyze the need of robotic process automation and automate real world business processes.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Demonstrate the fundamental concepts of DigitalTechnology in Marketing and AI Concepts.	Understand
CO2	Outline robotic process automation basics, tools, UiPath basic constructs in bot development.	Understand
CO3	Identify the need of automation, UiPath sequence, activities and applications.	Apply
CO4	Make use of robotic process automation and automate real world business processes.	Apply
CO5	Identify various robotic process automation workflows for bot development.	Apply

UNIT I DIGITAL PRIMER 8 HOURS

Why is Digital Different?- Digital Metaphors On Cloud 9-A Small Intro to Big Data-Social Media& Digital Marketing-Artificial Intelligence- Unchain the Block chain-Internet of Everything- Immersive Technology.

UNIT II DIGITAL FOR INDUSTRIES 7 HOURS

Manufacturing and Hi-tech-Banking and Financial Services-Insurance and Healthcare-Retail- Travel & Hospitality-Communications, Media & Information Services-Government.

UNIT III AUTOMATIX 7 HOURS

Art of RPA-Introduction - Setting the Context-RPA Prelude-RPA Demystified-RPA vs BPM RPA Implementations-RPA in Industries-RPA Tools

UNIT IV AUTOMATION ANYWHERE 7 HOURS

Getting Started with AA Enterprise-Exploring AA Enterprise-AA Enterprise – Architecture.

UNIT V KNOWING THE BOTS 7 HOURS

More About TaskBots-AA Enterprise - All About Recorders-Designers-MetaBots-Cognitive RPA.

TOTAL: 36 HOURS

TEXT BOOKS:

1. Richard Murdoch. (2018). Robotic Process Automation: Guide To Building SoftwareRobots, Automate Repetitive Tasks & Become an RPA Consultant. Kindle Edition
2. Kelly Wibbenmeyer. (2018). The Simple Implementation Guide to Robotic Process Automation (RPA): How to Best Implement RPA in an Organization

WEBSITES:

1. https://en.wikipedia.org/wiki/Robotic_process_automation
2. https://en.wikipedia.org/wiki/Automatix_(software)
3. https://www.automationanywhereuniversity.com/
4. https://www.automationanywhere.com/in/products/iq-bot

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	3	-	-	-	-	-	-	-	2	-
CO2	3	-	-	-	-	1	-	3	-	1	-	-	-	-	-	-	-
CO3	3	-	-	3	2	-	-	3	-	-	-	-	-	-	-	2	2
CO4	3	-	1	-	-	1	-	3	-	-	-	-	-	-	-	2	-
CO5	3	-	1	3	2	1	-	3	-	-	-	-	-	-	-	-	2
Average	3	-	1	3	2	1	-	3	-	1	-	-	-	-	-	2	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

24CGU503 **SOFTWARE TESTING** **3H-2C**

Instruction Hours / Week: L: 3 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To learn about different type of applications and testing, along with the purpose of automation testing.
- To gain insight into the evolution of Selenium and get an overview of Selenium and its components and compare commonly used automation tool with Selenium automation tools.
- Explore the features and use of Selenium-WebDriver and learn data driven testing using TestNG.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Illustrate Selenium Architecture and its components.	Understand
CO2	Outline the concepts of basics of JAVA	Understand
CO3	Identify the WebDriver advanced features.	Apply
CO4	Make use of Data driven, Keyword driven and Hybrid test framework.	Apply
CO5	Experiment with Selenium IDE and build the Test cases using TestNG	Apply

UNIT I INTRODUCTION TO AUTOMATION **8 HOURS**

Planning before Automation - Introduction to Selenium - Installing Selenium Components.

UNIT II USING SELENIUM IDE **7 HOURS**

Managing User Interface Controls - Basics of Java- Creating First Selenium Web Driver Script.

UNIT III SELENIUM METHODS **7 HOURS**

Common Selenium Web Driver Methods - Verification Point in Selenium - Exploring the Featuresof Web Driver.

UNIT IV HANDLING POP-UP DIALOGS AND MULTIPLE WINDOWS **7 HOURS**

Working with Dynamic UI Objects- Data driven testing using TestNG - Selenium Functions, Common Questions and Tips.

UNIT V REPORTING IN SELENIUM **7 HOURS**

Batch Execution- Automation Frameworks - Understanding Selenium Grid.

TOTAL: 36 HOURS

TEXT BOOKS:

1. Rex Allen Jones II. (2016). Selenium Web Driver for Functional Automation Testing, Test4 Success, LLC
2. Adithya Garg, Ashish Mishra. (2015). A Practitioner's Guide to Test Automation Using Selenium", Tata McGraw Hill Education.

REFERENCE BOOKS:

1. Navneesh Garg, (2014). Test Automation Using Selenium WebDriver with Java", Adact In Group Pvt Ltd..
2. Satya Avasarala, (2014). Selenium Web Driver - PRACTICAL Guide, Packt Publishing.
3. David Burns. (2010). Selenium 1.0 Testing Tools, Packt Publishing.

WEBSITES:

1. https://www.seleniumhq.org/docs/
2. https://www.javatpoint.com/selenium-tutorial
3. https://www.softwaretestingmaterial.com/selenium-tutorial/

CO, PO, PSO Mapping:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	1
CO2	-	-	3	-	-	3	-	-	2	-	1	-	-	-	-	-	2
CO3	-	-	-	3	-	-	-	3	-	-	-	-	-	-	-	1	-
CO4	-	-	-	3	-	-	-	3	-	-	-	-	-	-	-	1	2
CO5	-	-	3	3	-	3	-	3	-	-	-	-	-	-	-	-	-
Average	1	-	3	3	-	3	-	3	2	-	1	-	-	-	-	1	1.6

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester V

24CGUA501 BASICS OF ACCOUNTING 6H-6C

Instruction Hours / Week: L: 6 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To understand basic concepts on accounting.
- To prepare various subsidiary books and prepare financial statements.
- To carry out depreciation on fixed assets and prepare accounts for nonprofit organizations.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Understand basic concepts on Accounting	Understand
CO2	Prepare various subsidiary books	Understand
CO3	Prepare financial statements	Apply
CO4	Carry out depreciation on fixed assets	Apply
CO5	Prepare accounts for nonprofit organizations	Apply

UNIT I **15 HOURS**

Accounting – Definition- Fundamentals of Book Keeping – Branches of Accounting – Nature of Accounts - Accounting Concepts and Conventions – Journal – Ledger.

UNIT II **15 HOURS**

Subsidiary books – Introduction – Types of subsidiary books - purchases book - sales book- returns book - cash book - single column cash book – Two column cash book - Three column Cash book - petty cash book

UNIT III **12 HOURS**

Trial balance - Errors and their rectification - Final accounts of a sole trader with adjustments - Trading and Profit and Loss Account - Balance Sheet – Difference between Profit and Loss Accountand Balance Sheet.

UNIT IV **15 HOURS**

Depreciation- Definition- Methods of depreciation- straight line method- written down value method- annuity value method- sinking fund method- provisions and reserves

UNIT V **15 HOURS**

Accounts for Non Profit organization- Receipts and Payments and income and expenditure accountand Balance sheet – Difference between Receipts and Payments and income and expenditure account and Balance sheet

TOTAL: 72 HOURS

Note: Distribution of Marks between problems and theory shall be 75% and 25%.

TEXT BOOKS:

1. N.Vinayakam, P.L.Maniam and K.L.Nagarajan , (2012)Principles of Accountancy NewDelhi .S.Chand & Company Ltd
2. S. P. Jain & K. L. Narang, 2010, Advanced Accountancy, Sultan Chand & Sons. New Delhi
3. T.S.Grewal,(2011)Introduction to Accountancy, New Delhi S.Chand & Company Ltd.

REFERENCE BOOKS:

1. R.L.Gupta, V.K.Gupta and M.C.Shukla,2010, New Delhi Financial Accounting,Sultan Chand
2. T.S.Grewal, S.C.Gupta and S.P.Jain, 2010, New Delhi Advanced Accountancy, Sultan Chand
3. K.L.Narang and S.N.Maheswari ,2010, New Delhi Advanced Accountancy-Kalyani Publishers.

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
CO2	-	-	3	2	-	-	3	-	-	-	3	-	-	-	-	-	-
CO3	-	-	3	-	-	-	3	-	2	-	3	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	2	-	3	-	-	-	-	-	1
CO5	-	-	3	2	-	-	3	2	-	-	3	-	-	-	-	-	-
Average	1	-	3	2	-	-	3	2	2	-	3	-	-	-	-	-	1

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester V

24CGU511 CLIENT RELATIONSHIP MANAGEMENT – PRACTICAL 4H-2C

Instruction Hours / Week: L: 0 T: 0 P: 4 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To acquire Knowledge about the ITSM, ITIL, ServiceNow basics, scripting, UI policies and business rules.
- To Understand basic and system administration using ServiceNow and apply ServiceNow APIs for problem, incident, change and service requestmanagement.
- To Analyze SLAs and business rules to streamline and automate routine work tasks usingServiceNow and use various script types used throughout the platform.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Infer Knowledge about the ITSM, ITIL, ServiceNow basics, scripting, UI policies and business rules.	Understand
CO2	Summarize the basic system administration using ServiceNow.	Understand
CO3	Apply ServiceNow APIs for problem, incident, change and service request management.	Apply
CO4	Make use of SLAs and business rules to streamline and automate routine work tasks using ServiceNow.	Apply
CO5	Make use of various script types used throughout the platform.	Apply

List of Programs

1. Creating tickets for servicing requests from clients
2. Creating reports of status of client services

TEXT BOOKS:

1. Tim Woodruff. (2018). Learning ServiceNow: Administration and development on the Now platform, for powerful IT automation", 2nd Edition, Packt Publishing Ltd..
2. Andrew Kindred. (2018). Mastering ServiceNow Scripting" Packt Publishing.

REFERENCE BOOK:

1. Ashish Rudra Srivastava. (2017). ServiceNow Cook Book" Packt Publishing Ltd.

WEBSITES:

1. https://www.servicenow.com/products/it-service-management.html
2. https://www.servicenow.com/content/dam/servicenow-assets/public/en-us/doc-type/resource-center/data-sheet/ds-itsm.pdf
3. https://www.guru99.com/servicenow-tutorial.html

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	1	3	-	-	-	-	-	-	-	3	-
CO2	3	-	-	-	2	-	-	3	-	-	-	-	-	-	-	-	-
CO3	3	-	2	-	2	-	-	3	-	-	-	2	-	-	-	2	2
CO4	3	-	2	1	-	-	1	3	-	-	-	-	-	-	-	2	2
CO5	3	-	2	-	-	-	-	3	-	-	-	-	-	-	-	-	-
Average	3	-	2	1	2	-	1	3	-	-	-	2	-	-	-	2.3	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester V

24CGU512 INTRODUCTION TO DIGITAL TECHNOLOGY - PRACTICAL 5H-2C

Instruction Hours / Week: L: 0 T: 0 P: 5 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To understand the Fundamental Concepts of Digital Technologies in Marketing and AI Concepts.
- To Recall robotic process automation basics, tools, UiPath basic constructs in bot development and understand the need of automation, UiPath sequence, activities and applications.
- To Apply various robotic process automation workflows for bot development and analyze the need of robotic process automation and automate real world business processes.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Demonstrate the fundamental concepts of Digital Technology in Marketing and AI Concepts.	Understand
CO2	Outline robotic process automation basics, tools, UiPath basicconstructs in bot development.	Understand
CO3	Identify the need of automation, UiPath sequence, activities andapplications.	Apply
CO4	Make use of robotic process automation and automate real world business processes.	Apply
CO5	Identify various robotic process automation workflows for bot development.	Apply

List of Programs

1. Creating bots for automatic software installation
2. Creating bots for automatic software patch installation
3. Creating bots for file transfer
4. Creating bots for automatic file backup

TEXT BOOKS:

1. Richard Murdoch. (2018). Robotic Process Automation: Guide To Building Software Robots, Automate Repetitive Tasks & Become an RPA Consultant. Kindle Edition
2. Kelly Wibbenmeyer. (2018). The Simple Implementation Guide to Robotic Process Automation (RPA): How to Best Implement RPA in an Organization

WEBSITES:

1. https://en.wikipedia.org/wiki/Robotic_process_automation
2. https://en.wikipedia.org/wiki/Automatix_(software)
3. https://www.automationanywhereuniversity.com/
4. https://www.automationanywhere.com/in/products/iq-bot

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	3	-	-	-	-	-	-	-	1	2
CO2	3	-	-	-	-	1	-	3	-	1	-	-	-	-	-	1	2
CO3	3	-	-	3	2	-	-	3	-	-	-	-	-	-	-	-	-
CO4	3	-	1	-	-	1	-	3	-	-	-	-	-	-	-	1	2
CO5	3	-	1	3	2	1	-	3	-	-	-	-	-	-	-	-	-
Average	3	-	1	3	2	1	-	3	-	1	-	-	-	-	-	1	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester V

24CGU513 SOFTWARE TESTING – PRACTICAL 5H-2C

Instruction Hours / Week: L: 0 T: 0 P: 5 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To learn about different type of applications and testing, along with the purpose of automation testing.
- To gain insight into the evolution of Selenium and get an overview of Selenium and its components and compare commonly used automation tool with Selenium automation tools.
- Explore the features and use of Selenium-WebDriver and learn data driven testing using TestNG.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Illustrate Selenium Architecture and its components.	Understand
CO2	Outline the concepts of basics of JAVA	Understand
CO3	Identify the WebDriver advanced features.	Apply
CO4	Make use of Data driven, Keyword driven and Hybrid test framework.	Apply
CO5	Experiment with Selenium IDE and build the Test cases using TestNG	Apply

List of Programs

1. Write a test case based on controls.
2. Test data in a flat file.
3. Manual test case to verify student grade
4. Write and test a program to select the number of students who have scored more than 60 inany one subject(or all Subjects)
5. Write and test a program to login a specific web page.
6. Write and test a program to get the number of list items in a list / combo box.
7. Test a HTML file.
8. Test a program in MS Excel for Data Driven Wizard.ss
9. Test the addition of two values in C++ Program.

TEXT BOOKS:

1. Rex Allen Jones II. (2016). Selenium Web Driver for Functional Automation Testing, Test 4 Success, LLC
2. Adithya Garg, Ashish Mishra. (2015). A Practitioner's Guide to Test Automation Using Selenium", Tata McGraw Hill Education.
3. Navneesh Garg, (2014). Test Automation Using Selenium WebDriver with Java", Adact In Group Pvt Ltd.

REFERENCE BOOKS:

1. Satya Avasarala, (2014). Selenium Web Driver - PRACTICAL Guide, Packt Publishing.
2. David Burns. (2010). Selenium 1.0 Testing Tools, Packt Publishing.

WEBSITES:

1. https://www.seleniumhq.org/docs/
2. https://www.javatpoint.com/selenium-tutorial
3. https://www.softwaretestingmaterial.com/selenium-tutorial/

CO, PO, PSO Mapping:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	3
CO2	-	-	3	3	-	-	-	3	-	-	-	-	-	-	-	-	-
CO3	-	-	3	3	-	-	-	3	-	-	1	-	-	-	-	2	3
CO4	-	-	-	3	-	2	-	3	-	-	-	-	-	-	-	2	-
CO5	-	-	3	3	-	-	-	3	-	-	-	-	-	-	-	2	-
Average	1	-	3	3	-	2	-	3	-	-	1	-	-	-	-	2	3

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

Semester V

24CGU591	**INTERNSHIP***	**0H-2C**

Instruction Hours / Week: L: 0 T: 0 P: 0 **Marks:** Internal**:100** External**:-** **T**otal**:100**

End Semester Exam: - Hours

24CGU601A **IT COGNITION** **6H-4C**

Instruction Hours / Week: L: 6 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To understand critical thought and its interaction with knowledge and understand problem solving and how it uses critical thought to develop solutions to problems.
- To explore project-based learning as a specific method of problem solving.
- To examine design thinking as a sub-set of project-based learning and its scaffold processfor learning and define argumentation and how it employs a critical though process.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Demonstrate the basic knowledge of cognitive psychology.	Understand
CO2	Summarize the cognition works from attention, sensation, perception, action, language processes.	Understand
CO3	Identify problem-Solving methods.	Apply
CO4	Make use of decision making to solve the problems	Apply
CO5	Identify the ability of critical thinking.	Apply

UNIT I INTRODUCTION TO COGNITION **14 HOURS**

Meaning cognitive processes, Development of cognitive psychology: Structuralism, Functionalism, Behaviorism, Memory Research, Gestalt Psychology, Emergence of cognitive psychology, Information Processing, Connectionism, Alternate approaches to cognitive psychology, Research Methods in Cognitive Psychology.

UNIT II PERCEPTUAL PROCESSES **14 HOURS**

Object Recognition- theories of object recognition, Bottom-Up and Top-Down Processing, Face Perception, Change Blindness. Attention: Divided attention, Selective Attentkon, Visual attention and Auditory attention. Consciousness: Varieties, Subliminal Perception. Perception Perceptual Organizational Processes, Multisensory interaction and Integration – Synesthesia, Comparing the senses, Perception and Action.

UNIT III MEMORY **15 HOURS**

Working Memory: Research on Working Memory, Factors affecting the capacity of working Memory, Baddeley's Working Memory Approach. Long Term Memory: Encoding and Retrieval inLong Term Memory, Autobiographical Memory. Memory Strategies: Practice, Mnemonics using Imagery, Mnemonics using organization, The Multimodal Approach, Improving Prospective Memory. Meta scognition: Metamemory, TOT, Meta comprehension.

UNIT IV PROBLEM SOLVING, REASONING AND DECISION MAKING **15 HOURS**

VUCA World Problem Solving – Types of problem, Understanding the problem, Problem-Solving Approaches, Factors that influence Problem Solving. creativity. Reasoning – Inductive and Deductive Reasoning Decision Making – Heuristics in decision making – representativeness, availability and anchoring and adjustment. The framing effect, Overconfidence in decisions, The Hindsight Bias.

UNIT V FUTURE SKILLS **14 HOURS**

Critical thinking, Adaptive thinking, Cognitive Load Management, Design thinking, Virtual Collaboration and Cultural Sensitivity.

TOTAL: 72 HOURS

TEXT BOOKS:

1. Matlin M.W. (2019) 'Cognition' 10th Edition, Wiley Publication.
2. Riegler, B.R., Reigler, G.L. (2008), Cognitive Psychology – Applying the Science of Mind.2nd Edition, Pearson Education.

REFERENCE BOOKS:

1. Benjafield J G (2007). 'Cognition' 3rd Edition. Oxford University Press.
2. Goldstein B.E.(2008) 'Cognitive Psychology' 2nd Edition, Wadsworth.

WEBSITES:

1. https://nptel.ac.in/courses/109103134/23
2. https://lockwoodresource.com/problem-solving-in-a-vuca-world-what-kind-of-problem- are-you-solving-by-lisa-solomon/
3. https://www.instructionaldesign.org/theories/cognitive-load/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
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CO2	3	-	-	-	2	-	2	-	-	-	-	2		1	-	-	-
CO3	3	-	3	3	3	-	-	-	-	-	-	-	-	-	-	-	3
CO4	3	-	3	3	3	-	-	-	-	-	-	-	-	-	-	2	3
CO5	3	-	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-
Average	3	-	3	3	2.7	-	2	-	-	-	1	2	-	1	1	2	3

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

24CGU601B **SOFT COMPUTING** **6H -4C**

Instruction Hours/Week: L: 6 T: 0 P: 0 **Marks:** Internal**:40** External**:60 T**otal**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Knowledge of mathematics, algorithms, and programming

COURSE OBJECTIVES (CO):

The Objectives of the course are to

- To understand the various applications of Fuzzy sets.
- To impart the knowledge on Artificial Neural Networks.
- To analyze the concepts of Neuro Fuzzy Technology.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Explain about the need and importance of Soft Computing	Understand
CO2	Analyze the various applications of Fuzzy sets.	Analyze
CO3	To infer the knowledge of basic of Artificial Neural Networks	Understand
CO4	Understand the Genetic Algorithms.	Understand
CO5	Understand the concepts of Neuro Fuzzy Technology	Understand

UNIT I INTRODUCTION TO SOFT COMPUTING: 14 HOURS

Aims of Soft Computing-Foundations of Fuzzy Sets Theory-Basic Concepts and Properties of Fuzzy Sets- Elements of Fuzzy Mathematics-Fuzzy Relations-Fuzzy Logic

UNIT II APPLICATIONS OF FUZZY SETS: 14 HOURS

Applications of Fuzzy Sets-Fuzzy Modeling – Fuzzy Decision Making-Pattern Analysis and Classification-Fuzzy Control Systems-Fuzzy Information Processing- Fuzzy Robotics.

UNIT III ARTIFICIAL NEURAL NETWORKS: 15 HOURS

Artificial Neural Networks-Models of Neuron-Architecture of Feed Forward Neural Networks, Recurrent Neural Networks-Learning methods-supervised and unsupervised learning-Time Delay Neural Networks-Radial Basis Function Neural Networks- Adaptive Resonance Theory (ART) Neural Networks- Associative Neural Memory Models-Application of ANN.

UNIT IV GENETIC ALGORITHMS: 15 HOURS

Main Operators- Genetic Algorithm Based Optimization-Principle of Genetic Algorithm- Genetic Algorithm with Directed Mutation- Comparison of Conventional and Genetic Search Algorithms Issues of GA in practical implementation. Introduction to Particle swarm optimization-PSO operators-GA and PSO in engineering applications.

UNIT V NEURO-FUZZY TECHNOLOGY: 14 HOURS

Fuzzy Neural Networks and their learning-Architecture of Neuro- Fuzzy Systems- Generation of Fuzzy Rules and membership functions - Fuzzification and Defuzzyfication in Neuro - Fuzzy Systems – Neuro - Fuzzy Identification - Neuro Fuzzy Control- Combination of Genetic Algorithm with Neural Networks- Combination of Genetic Algorithms and Fuzzy Logic

TOTAL : 72 HOURS

TEXT BOOKS:

1. Sivanandam.S.N, Deepa.S.N, "Principles of soft computing",2nd Edition,Wiley India Pvt Limited, 2011.
2. Juh Shing Roger Jang, Cheun Tsai Sun, Eiji Mizutani, "Neuro fuzzy andsoft computing", Prentice Hall, 1997.

REFERENCE BOOKS:

1. Juh Shing Roger Jang,Cheun Tsai Sun,Eiji Mizutani, "Neuro fuzzy and soft computing", Prentice Hall, 1997.
2. Ronald R.Yager, Lofti Zadeh, "An Introduction to fuzzy logic applications in intelligent Systems", Kluwer Academic, 1992.

WEBSITES:

1. https://archive.nptel.ac.in/courses/106/105/106105173/
2. https://www.cet.edu.in/noticefiles/274_soft%20computing%20LECTURE%20NOTES
3. https://lastmomenttuitions.com/course/soft-computing/

CO,PO,PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	3	3	3	-	-	-	-	-	-	-	-	-	-	-	3
CO2	3	-	3	3	3	-	-	-	-	-	2	-	-	-	3	-	-
CO3	3	-	3	3	3	-	-	-	-	-	2	-	-	-	3	-	3
CO4	3	-	3	3	3	-	-	-	-	-	2	-	-	-	3	-	-
CO5	3	-	3	3	3	-	-	-	-	-	2	-	-	-	3	-	3
Average	3	-	3	3	3	-	-	-	-	-	2	-	-	-	3	-	3

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Semester V

24CGU601C **J2EE** **6H -4C**

Instruction Hours/Week: L: 6 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Java programming, object-oriented concepts, and web technologies

COURSE OBJECTIVES(CO):

- To understand in-depth concepts of J2EE, including the lifecycle of servlets and JSP.
- To learn communication techniques in Java, such as JDBC, and handle errors and exceptions in web applications.
- To use NetBeans IDE for creating J2EE applications.

COURSE OUTCOMES (COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	To understand the In-depth concepts of JEE	Understand
CO2	To understand the in-depth Life cycle of servlets and JSP.	Understand
CO3	To understand how to communicate with databases using Java.	Understand
CO4	Make use of NetBeans IDE for creating J2EE Applications.	Apply
CO5	To understand J2EE as an architecture and platform for building and deploying web-based, n-tier, transactional, component-based enterprise applications.	Understand

UNIT I- J2EE OVERVIEW **14 HOURS**

Beginning of Java – Java Byte code – Advantages of Java –J2EE and J2SE. J2EE Multi Tier Architecture – Distributive Systems – The Tier – Multi Tier Architecture – Client Tier Web Tier Enterprise Java Beans Tier Enterprise Information Systems Tier Implementation.

UNIT II - J2EE DATABASE CONCEPTS **14 HOURS**

Data – Database – Database Schema. Introduction- Jdbc Architecture- Types of Drivers. Statement-ResultSet- Read Only ResultSet -Updatable ResultSet--Forward Only ResultSet - Scrollable ResultSet - PreparedStatement—Metadata- Connection Modes-SavePoint- Batch Updations-CallableStatement-BLOB & CLOB.

UNIT III - JAVA SERVLETS **15 HOURS**

Benefits – Anatomy – HTML Forms- HTTP: Request-response, headers, GET, POST -Servlet Lifecycle: init(), service(), destroy()- Requests and responses- Core Servlet API: GenericServlet, ServletRequest, and ServletResponse-HTTP Servlets: HttpServletRequest, HttpServletResponse and HttpServlet- Accessing Parameters.

UNIT IV - ENTERPRISE JAVA BEANS **14 HOURS**

Entity Java Bean - Session Java Bean – Home and Remote Interfaces-Stateless bean- Stateful bean-EJB Exceptions- EJB deployment process Message Driven Bean.

UNIT V – JSP **15 HOURS**

Introduction-. Advantages of JSP over Servlet-JSP Architecture- JSP Lifecycle -Integration of JSP & Servlet API-JSP implicit objects-Use of JSP Tags, Actions and Directives- JSP Scripting Elements: declaratives-scriptlets-expressions-JSP Actions: Standard Actions-Custom Actions-JSTL & Tag Library-Error Handling in JSP-Using Java Beans in JSP-Defining Custom Tags.

TOTAL: 72 HOURS

TEXT BOOKS:

1. Jim Keogh. (2018). The Complete Reference J2EE 1st edtion New Delhi: Tata McGraw Hill.
2. Duane, K. Fields., & Mark, A. Kolb. (2017). Web Development with Java Server Pages (1st ed.). Pune: Manning Publications.
3. Rod Johnson. (2017). J2EE Development without EJB 1st edition. New Delhi:Wiley Dream Tech.

REFERENCE BOOKS:

1. Rod Johnson., & Rod Johnson, P.H. (2016). Expert One-On-One J2EE Design and Development. New Delhi: John Wiley & Sons.
2. Paul, J. Perrone., Venkata, S. R. Chaganti., Venkata S. R. Krishna., & Tom Schwenk. (2016). J2EE Developer's Handbook. New Delhi: Sams Publications.
3. Joseph, J. Bambara et al. (2016). J2EE Unleashed (1st ed.). New Delhi:Tech Media.

WEBSITES:

1. https://www.oracle.com/technetwork/java/javaee/appmodel-135059.html
2. https://www.geeksforgeeks.org/introduction-java-servlets/
3. http://media.datadirect.com/download/docs/jdbc/alljdbc/jdbcconnect/j2ee.html
4. https://www.javatpoint.com/ejb-tutorial
5. https://www.javatpoint.com/jsp-tutorial
6. https://nptel.ac.in/courses/106105191/

CO,PO,SO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
CO2	2	-	1	3	-	-	-	3	-	-	2	-	-	-	-	2	-
CO3	-	-	-	3	3	2	-	-	-	-	2	-	-	-	-	-	-
CO4	-	-	-	3	3	-	-	3	-	-	-	-	-	-	-	2	-
CO5	-	-	-	3	-	-	-	3	-	-	2	-	-	-	-	2	-
Average	2	-	1	3	3	2	-	3	-	-	2	-	-	-	-	2	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation.

24CGU601D **INTERNET OF THINGS** **6H-4C**

Instruction Hours/week: L:6 T: 0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

PREREQUISITE:

- Computer networks, programming, and sensors

COURSE OBJECTIVES(CO):

- The objective of this course is to provide the student with the fundamental knowledge and skills to understand smart objects and IoT Architecture.
- The student will learn various tools of IoT related Protocols.
- To build simple IoT systems using open hardware such as Arduino and Raspberry Pi.
- To understand Data analytics concepts using IoT.
- The student will be reinforcing the concepts of IoT to design an IoT based smart system using open hardware platforms and open cloud offerings.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand the different real world IoT applications and its functions.	Understand
CO2	Apply of IoT Protocols in Security and Optimizing Networks.	Apply
CO3	Understand how to use Routing and Lossy Network Protocol and Service Protocols.	Understand
CO4	Understand how to manage structured and unstructured data in data analytics framework.	Understand
CO5	Apply the concepts of IoT in various smart systems.	Apply

UNIT I – FUNDAMENTALS OF IOT **15 HOURS**

Evolution of Internet of Things – Enabling Technologies – IoT Architectures: oneM2M, IoT World Forum (IoTWF) and Alternative IoT Models – Simplified IoT Architecture and Core IoT Functional Stack – Fog, Edge and Cloud in IoT – Functional Blocks of an IoT Ecosystem – Sensors, Actuators, and Smart Objects – Open Hardware Platforms for IoT

UNIT II – IOT PROTOCOLS - I **14 HOURS**

IoT Access Technologies: Physical and MAC Layers, Topology and Security of IEEE 802.15.4, 1901.2a, 802.11ah and LoRaWAN – Network Layer: Constrained Nodes and Constrained Networks – Optimizing IP for IoT: From 6LoWPAN to 6Lo.

UNIT III – IOT PROTOCOLS – II **14 HOURS**

Routing over Low Power and Lossy Networks (RPL) – Application Transport Methods: Application Layer Not Present, Supervisory Control and Data Acquisition (SCADA) – Application Layer Protocols: CoAP and MQTT – Service discovery – mDNS.

UNIT IV- CLOUD, FOG, DATA ANALYTICS FRAMEWORK **15 HOURS**

Cloud and Fog Topologies – Cloud Services Model – Fog Computing – Structured versus Unstructured Data and Data in Motion Vs Data in Rest – Role of Machine Learning – No SQL Databases – Hadoop Ecosystem – Apache Kafka, Apache Spark – Edge Streaming Analytics and Network Analytics – Security in IoT – CISCO IoT System – IBM Watson IoT Platform.

UNIT V- IOT APPLICATIONS **14 HOURS**

Smart and Connected Cities: Street Layer, City Layer, Data Center Layer and Services Layer, Street Lighting, Smart Parking Architecture and Smart Traffic Control – Smart Transportation – Connected Cars.

TOTAL: 72 HOURS

TEXT BOOKS:

1 David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton, Jerome Henry, “IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things”, CISCO Press, 2017.

2 Perry Lea, “Internet of things for architects”, Packt, 2018.

3 Jan Ho¨ller, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Savesand, David Boyle, “From Machine-to-Machine to the Internet of Things – Introduction to a New Age of Intelligence”, Elsevier, 2014.

REFERENCE BOOKS:

1 Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key Applications and Protocols”, Wiley, 2012.

2 Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), “Architecting the Internet of Things”, Springer, 2011.

3 Arshdeep Bahga, Vijay Madisetti, “Internet of Things – A hands-on Approach”, Universities Press, 2015.

WEBSITES:

1. https://www.arduino.cc/
2. https://www.ibm.com/smarterplanet/us/en/?ca=v_smarterplanet

CO,PO,PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-	1	-
CO2	-	-	-	3	3	-	-	2	-	-	-	-	-	-	-	1	-
CO3	1	-	-	3	3	-	-	2	-	-	-	-	-	-	-	1	-
CO4	-	-	1	3	3	1	-	-	-	-	-	-	-	-	-	1	-
CO5	-	-	-	3	3	1	-	-	-	-	-	-	-	-	-	1	-
Average	1	-	1	3	3	1	-	2	-	-	-	-	-	-	-	1	-

1 - Low, 2 - Medium, 3 - High, ’-‘ - No Correlation.

24CGU601E **GENERATIVE AI** **6H-4C**

Instruction Hours/week: L:6 T: 0 P: 0 **Marks:** Internal**:40** External**:60 T**otal**:100**
End Semester Exam:3 Hours

PREREQUISITE:

- Machine learning, neural networks, and programming (Python)

COURSE OBJECTIVES(CO):

- Understand the basic concepts of Generative AI models and applications, including language models and LLM architecture.
- Gain knowledge about GPT (Generative Pre-trained Transformer) and its practical applications.
- Develop a working knowledge of use cases for Generative AI.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand the basics of Generative AI Models and Applications.	Understand
CO2	Apply basic principles of AI in solutions that require problem solving.	Apply
CO3	Understand the various concepts of GPT for Artificial Intelligence.	Understand
CO4	Experiment with Future application and emerging Trends	Apply
CO5	Utilize the Use case of Generative AI	Apply

UNIT I: INTRODUCTION TO GENERATIVE AI **14 HOURS**

Definition and scope of Generative AI - Overview of generative models and their applications- Importance of Generative AI in various domains - Brief discussion on ethical considerations and challenges- Machine learning paradigms – Natural Language Processing.

UNIT – II: LANGUAGE MODELS AND LLM ARCHITECTURES **15 HOURS**

Introduction to language models and their role in AI Traditional approaches to language modelling - Characteristics of Large Language Models (LLMs) -Deep learning-based language models and their advantages Overview of popular LLM architectures: RNNs, LSTMs, and Transformers – Pre-processing Techniques for LLMs.

UNIT – III UNDERSTANDING GPT (GENERATIVE PRE-TRAINED TRANSFORMER)
14 HOURS

Introduction to GPT and its significance – Open AI GPT Models - Pre-training and fine-tuning processes in GPT - Overview of GPT variants and their use cases – Applications of GPT – Training strategies of GPT.

UNIT IV Chat GPT: A Practical Application of GPT **14 HOURS**

Introduction to Chat GPT and its purpose – Text generation and completion - Training data and techniques for Chat GPT - Handling user queries and generating responses - Tips for improving Chat GPT's performance – Machine Learning and Deep Learning.

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UNIT – V USE CASES OF GENERATIVE AI **15 HOURS**

Overview of various domains and industries benefiting from Generative AI - Use cases in natural language processing, content generation, and creative applications - Case studies highlighting successful implementations Potential future applications and emerging trends.

TOTAL: 72 HOURS

TEXT BOOKS:

1. Kevin Knight and Elaine Rich, Nair B(2021)., "Artificial Intelligence
2. (SIE)", Mc Graw .
3. Dan W. Patterson, "Introduction to AI and ES", Pearson Education,
4. Ivan Brako,PROLOG: Programming for Artificial Intelligence,3rd edition Pearson,

REFERENCE BOOKS:

1. Flasiński, Mariusz. (2018). Introduction to Artificial Intelligence. Tata Mcgraw Hill, Delhi.
2. Chandra .S.S.V. (2017). Artificial Intelligence and Machine Learning. Kindle Edition.
3. Elain Rich and Kevin Knight. (2021). Artificial Intelligence. McGraw Hill.

WEBSITES:

1. https://www.tutorialspoint.com/
2. https://www.geeksforgeeks.org/
3. https://www.slideshare.net/slideshow/
4. https://www.quora.com/
5. https://www.ibm.com/blog/
6. https://www.analyticsvidhya.com/blog/2023/03/
7. https://www.techtarget.com/

CO,PO,SO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO2	2	-	-	2	-	-	-	3	-	-	-	-	-	-	-	-	2
CO3	2	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	2
CO4	-	-	1	2	-	1	-	3	-	-	-	-	-	-	-	-	2
CO5	-	-	-	2	-	-	-	3	-	-	-	-	-	-	-	-	2
Average	2	-	1	2	-	1	-	3	-	-	-	-	-	-	-	-	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation.

.

Semester VI

24CGU602A MACHINE LEARNING 6H-4C

Instruction Hours / Week: L: 6 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Data Structures and Algorithms

COURSE OBJECTIVES (CO):

- To introduce students to the basic concepts and techniques of Machine Learning and develop skills of using recent machine learning software for solving practical problems.
- To gain experience of doing independent study and research and recognize the characteristics of machine learning that make it useful to real-worldproblems.
- To characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Outline theory of machine learning components and models	Understand
CO2	Utilize the algorithms of machine learning to learn linear and non-linear models	Apply
CO3	Relate data clustering algorithms for machine learning process	Understand
CO4	Construct machine learning algorithms to learn tree and rule-based models	Apply
CO5	Apply reinforcement machine learning techniques for robotics	Apply

UNIT I FOUNDATIONS OF LEARNING 14 HOURS

Components of learning – learning models – geometric models – probabilistic models – logic models – grouping and grading – learning versus design – types of learning – supervised – unsupervised – reinforcement – theory of learning – feasibility of learning – error and noise –training versus testing – theory of generalization – generalization bound –bias and variance – learning curve

UNIT II LINEAR MODELS 14 HOURS

Linear classification – univariate linear regression – multivariate linear regression – regularized regression – Logistic regression – perceptrons – multilayer neural networks – learning neural networks structures – support vector machines – soft margin SVM – generalization and over fitting– regularization – validation

UNIT III DISTANCE-BASED MODELS 15 HOURS

Nearest neighbor models – K-means – clustering around medoids – silhouttes– hierarchical clustering – k- d trees – locality sensitive hashing – non - parametric regression – ensemble learning– bagging and random forests – boosting – meta silhouttes – hierarchical clustering – k- d trees – locality sensitive hashing – non - parametric regression – ensemble learning – bagging and randomforests – boosting – meta learning

.

UNIT IV TREE AND RULE MODELS **14 HOURS**

Decision trees – learning decision trees – ranking and probability estimation trees –Regression trees– clustering trees – learning ordered rule lists – learning unordered rule lists – descriptive rule learning – association rule mining – first -order rule learning

UNIT V REINFORCEMENT LEARNING **15 HOURS**

Passive reinforcement learning – direct utility estimation – adaptive dynamic programming – temporal - difference learning – active reinforcement learning – genetic algorithm for Reinforcement Learning - exploration – learning an action utility function – Generalization in reinforcement learning – policy search – applications in game playing – applications in robot control

TOTAL: 72 HOURS

TEXT BOOKS:

1. Tom. M.Mitchell (2019), Machine Learning, Tata McGraw Hill Publications
2. Y. S. Abu - Mostafa, M. Magdon-Ismail, and H.-T. Lin. (2018). Learning from Data,AML Book Publishers.
3. P. Flach. (2017). "Machine Learning: The art and science of algorithms that make sense of data", Cambridge University Press.
4. K. P. Murphy. (2017). Machine Learning: A probabilistic perspective, MIT Press,
5. D. Barber. (2015). Bayesian Reasoning and Machine Learning, Cambridge University Press.

WEBSITES:

1. https://machinelearningmastery.com/linear-regression-for-machine-learning/
2. https://www.cambridge.org/core/books/machine-learning/distancebased-models/
3. https://dzone.com/articles/machine-learning-with-decision-trees
4. http://reinforcementlearning.ai-depot.com/
5. https://nptel.ac.in/courses/106106139/
6. https://swayam.gov.in/nd1_noc19_cs81/preview

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	3
CO2	2	-	1	2		-	-	1	-	-	-	-	-	-	-	2	3
CO3	-	-	2	3	3	2	-	2	-	-	-	-	-	-	-	2	-
CO4	-	-	2	3	3	3	-	3	-	-	-	-	-	-	-	-	3
CO5	-	-	2	3	3	2	-	3	-	-	-	-	-	-	-	2	-
Average	2.5	-	1.4	2.7	3	2.3	-	2.4	-	-	-	-	-	-	-	2	3

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

.

Semester VI

24CGU602B NATURAL LANGUAGE PROCESSING 6H-4C

Instruction Hours / Week: L: 6 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Language and Linguistics

COURSE OBJECTIVES (CO):

- To introduce the fundamental concepts and techniques of natural language processing (NLP) and understanding of the models and algorithms in the field of NLP.
- To demonstrate the computational properties of natural languages and develop the commonly used algorithms for processing linguistic information.
- To understanding Lexical and syntactic levels of languages for processing and understanding semantics and pragmatics of languages for processing.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Demonstrate the fundamental concepts and techniques of natural language processing (NLP)	Understand
CO2	Explain the computational properties of natural languages**.**	Understand
CO3	Develop the commonly used algorithms for processing linguistic information.	Apply
CO4	Make use of Lexical and syntactic levels of languages for processing	Apply
CO5	Identify the semantics and pragmatics of languages for processing.	Apply

UNIT I INTRODUCTION TO NLP 14 HOURS

Introduction – Models -and Algorithms - The Turing Test -Regular Expressions Basic Regular Expression Patterns -Finite State Automata - Regular Languages and FSAs – Morphology - Inflectional Morphology - Derivational Morphology – Finite – State Morphological Parsing - Combining an FST Lexicon and Rules - Porter Stemmer

UNIT II N-GRAMS MODELS 14 HOURS

N-grams Models of Syntax - Counting Words - Unsmoothed N-grams – Smoothing-Backoff - Deleted Interpolation – Entropy - English Word Classes – Tag sets for English -Part of Speech Tagging -Rule-Based Part of Speech Tagging - Stochastic Part of Speech Tagging – Transformation-Based Tagging

UNIT III CONTEXT FREE GRAMMARS 14 HOURS

Context Free Grammars for English Syntax- Context-Free Rules and Trees – Sentence-Level Constructions –Agreement – Sub Categorization – Parsing – Top-down – Earley Parsing -Feature Structures-Probabilistic Context-Free Grammars

UNIT IV REPRESENTING MEANING 15 HOURS

Representing Meaning - Meaning Structure of Language - First Order Predicate Calculus- Representing Linguistically Relevant Concepts -Syntax-Driven Semantic Analysis -Semantic Attachments - Syntax-Driven Analyzer - Robust Analysis - Lexemes and Their Senses - Internal Structure -Word Sense Disambiguation -Information Retrieval

.

UNIT V DISCOURSE **15 HOURS**

Discourse -Reference Resolution - Text Coherence -Discourse Structure - Dialog and Conversational Agents - Dialog Acts – Interpretation – Coherence –Conversational Agents - Language Generation – Architecture -Surface Realizations – Discourse Planning – Machine Translation -Transfer Metaphor – Interlingua – Statistical Approaches.

TOTAL:72 HOURS

TEXT BOOKS:

1. D. Jurafsky and J. Martin. (2020). Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition.
2. Steven Bird, Ewan Klein, and Edward Loper. (2019). Natural Language Processing with Python, O'Reilly Publishers.

REFERENCE BOOKS:

1. Ian H Written and Elbef, Mark A. Hall. (2013). Data mining: Practical Machine Learning Tools and Techniques, Morgan Kaufmann Publishers.

WEBSITES:

1. https://onlinecourses.swayam2.ac.in/aic20_sp06/preview
2. https://onlinecourses.swayam2.ac.in/arp19_ap79/preview
3. https://www.tutorialspoint.com/natural_language_processing/index.html
4. https://www.tutorialspoint.com/natural_language_processing/index.html

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-		-	-	-	-	-	-	-	-	-	-	-	-	2	1
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1
CO3	3	-	-	3	3	3	-	2	-	-	-	-	-	-	-	2	-
CO4	3	-	-	3		3	-	2	-	-	-	-	-	-	-	-	2
CO5	3	-	-	3	-	-	-	2	-	-	-	-	-	-	-	-	-
Average	3	-	-	3	3	2	-	2	-	-	-	-	-	-	-	2	1.3

1 – Low, 2 – Medium, 3 – High, '-' – No Correlation

.

Semester VI

24CGUA601 ENTREPRENEURSHIP 6H - 4C

Instruction Hours/week: L:6 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To explain concepts of Entrepreneurship and build an understanding about business situationsin which entrepreneurs act.
- To qualify students to analyse the various aspects, scope and challenges under anentrepreneurial venture.
- To understand the objectives of entrepreneurs and discuss the steps in venture development and new trends in entrepreneurship and correctly collect and analyze Entrepreneurship Development and Government Role.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Identify the foundation of Entrepreneurship Development andits theories.	Apply
CO2	Apply entrepreneurial skills and managementfunction of a company with special reference to SME sector	Understand
CO3	Identify the type of entrepreneur and the steps involved in an entrepreneurial venture.	Apply
CO4	Apply the new trends in entrepreneurship& starting a venture and to explore marketing methods	Apply
CO5	Interpret the Entrepreneurship Development and Government	Understand

UNIT I INTRODUCTION TO ENTREPRENEURSHIP 14 HOURS

Introduction – Entrepreneur – meaning- importance-Qualities, nature, types, traits, culture, similarities and economic and differences between Entrepreneur and Intrapreneur. Entrepreneurshipdevelopment-its importance- Role of Entrepreneurship -Entrepreneurial environment

UNIT II EVOLUTION OF ENTREPRENEURS 14 HOURS

Entrepreneurial promotion. Training and developing motivation: factors – mobility of Entrepreneurs Entrepreneurial change – occupational mobility-factors in mobility – Role of consultancy organizations in promoting Entrepreneurs-Forms of business for Entrepreneurs.

UNIT III CORPORATE ENTREPRENEURSHIP 15 HOURS

Creating and starting the venture – Steps for starting a small industry – selection of types of organization – International entrepreneurship opportunities. Need for corporate entrepreneurship, domain of corporate entrepreneurship, conditions favorable for Corporate entrepreneurship, benefitsof Corporate entrepreneurship.

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UNIT IV FAMILY AND NON-FAMILY ENTREPRENEUR & WOMEN ENTREPRENEURS

15 HOURS

Managing, growing and ending the new venture – Family and Non Family Entrepreneur & Women entrepreneurs: Role of Professionals, Professionalism vs family entrepreneurs, Role of Woman entrepreneur, , Factors influencing women entrepreneur, Challenges for women entrepreneurs, Growth and development of women entrepreneurs in India

UNIT V ENTREPRENEURSHIP DEVELOPMENT AND GOVERNMENT ROLE

14 HOURS

Entrepreneurship Development and Government: Role of Central Government and State Government in promoting Entrepreneurship – Introduction to various incentives, subsidies and grants – Export Oriented Units – Fiscal and Tax concessions available. Women Entrepreneurs Reasons for low / no women Entrepreneurs their Role, Problems and Prospects.

TOTAL:72 HOURS

TEXT BOOKS:

1. Vasanth Desai ,2009, Dynamics of Entrepreneurial Development and Management, HimalayaPublishing House.
2. N.P.Srinivasan & G.P.Gupta, 2020, Entrepreneurial Development , Sultanchand &Sons.

REFERENCE BOOKS:

1. Paul Burns, Bloomsbury Academic,2020, Corporate Entrepreneurship And Innovation.
2. UNNI,2021, Women Entrepreneurship In Indian Mid Class, Orient Blackswan Pvt. Ltd.
3. S Anil Kumar , S C Poornima , M K Abraham , K Jayshree ,2021, Entrepreneurship Development, New Age Publishers; First edition , NEW AGE International Pvt Ltd.

WEBSITES:

1. https://www.udemy.com/topic/cyber-security/
2. https://www.coursera.org/courses?query=cybersecurity
3. https://www.simplilearn.com/cyber-security
4. https://onlinecourses.swayam2.ac.in/cec21_ge10/preview
5. https://onlinecourses.swayam2.ac.in/cec20_lb06/preview

CO, PO, PSO Mapping:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	1	-	-	-	-	3	-	-	3	3	2	2	3	3	3	2
CO2	3	-	-	-	-	-	3	-	-	3	3	-	-	-	-	3	-
CO3	3	-	-	-	-	-	3	-	-	-	3	2	-	-	3	-	3
CO4	3	-	-	-	-	-	3	-	-	3	-	2	-	-	3	3	2
CO5	3	-	-	-	-	-	2	-	-	3	-	2	-	-	3	-	-
Average	3	1	-	-	-	-	2.8	-	-	3	3	2	2	-	3	3	2.3

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

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Semester VI

24CGU611A MACHINE LEARNING - PRACTICAL 4H-2C

Instruction Hours/Week: L:0 T:0 P:4 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Programming Languages

COURSE OBJECTIVES (CO):

- To introduce students to the basic concepts and techniques of Machine Learning and develop skills of using recent machine learning software for solving practical problems.
- To gain experience of doing independent study and research and recognize the characteristics of machine learning that make it useful to real-worldproblems.
- To characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Outline theory of machine learning components and models	Understand
CO2	Utilize the algorithms of machine learning to learn linear and non-linear models	Apply
CO3	Relate data clustering algorithms for machine learningprocess	Understand
CO4	Construct machine learning algorithms to learn tree and rule-based models	Apply
CO5	Apply reinforcement machine learning techniques for robotics	Apply

List of Programs

1. Perform elementary mathematical operations in Octave/MATLAB like addition,multiplication, division and exponentiation.
2. Perform elementary logical operations in Octave/MATLAB (like OR, AND, Checking for Equality, NOT, XOR).
3. Create, initialize and display simple variables and simple strings and use simple formatting for variable.
4. Create/Define single dimension / multi-dimension arrays, and arrays with specific values like array of all ones, all zeros, array with random values within a range, or a diagonal matrix.
5. Use command to compute the size of a matrix, size/length of a particular row/column, load data from a text file, store matrix data to a text file, finding out variables and their features in the current co.
6. Perform basic operations on matrices (like addition, subtraction, multiplication) and display specific rows or columns of the matrix.
7. Perform other matrix operations like converting matrix data to absolute values, taking the negative of matrix values, adding/removing rows/columns from a matrix, finding the maximum or minimum values in a matrix or in a row/column, and finding the sum of some/all elements in a matrix.

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8. Create various type of plots/charts like histograms, plot based on sine/cosine function based on data from a matrix. Further label different axes in a plot and data in a plot.
9. Generate different subplots from a given plot and color plot data.
10. Use conditional statements and different type of loops based on simple example/s.
11. Perform vectorized implementation of simple matrix operation like finding the transpose of a matrix, adding, subtracting or multiplying two matrices.
12. Implement Linear Regression problem. For example, based on a dataset comprising of existing set of prices and area/size of the houses, predict the estimated price of a given house.
13. Based on multiple features/variables perform Linear Regression. For example, based on a number of additional features like number of bedrooms, servant room, number of balconies, number of houses of years a house has been built – predict the price of a house.
14. Implement a classification/ logistic regression problem. For example based on different features of students data, classify, whether a student is suitable for a particular activity. Based on the available dataset, a student can also implement another classification problem like checking whether an email is spam or not.
15. Use some function for regularization of dataset based on problem 14.
16. Use some function for neural networks, like Stochastic Gradient Descent or back propagation - algorithm to predict the value of a variable based on the dataset of problem.

TEXT BOOKS:

1. Tom.M.Mitchell (2019), Machine Learning, Tata McGraw Hill Publications
2. Y. S. Abu - Mostafa, M. Magdon-Ismail, and H.-T. Lin. (2018). Learning from Data, AML Book Publishers.

REFERENCE BOOKS:

1. P. Flach. (2017). Machine Learning: The art and science of algorithms that make sense of data,Cambridge University Press.
2. K. P. Murphy. (2017). Machine Learning: A probabilistic perspective, MIT Press,
3. D. Barber. (2015). Bayesian Reasoning and Machine Learning, Cambridge University Press.

WEBSITES:

1. https://machinelearningmastery.com/linear-regression-for-machine-learning/
2. https://www.cambridge.org/core/books/machine-learning/distancebased-models/
3. https://dzone.com/articles/machine-learning-with-decision-trees
4. http://reinforcementlearning.ai-depot.com/
5. https://nptel.ac.in/courses/106106139/
6. https://swayam.gov.in/nd1_noc19_cs81/preview

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	-	-	-	-	-	-	3	-	-	-	-	-	-	-	3	3
CO2	2	-	2	3	-	-	-	3	-	-	-	-	-	-	-	-	-
CO3	-	-	2	3	3	2	-	3	-	-	-	-	-	-	-	-	2
CO4	-	-	2	3	3	2	-	3	-	-	-	-	-	-	-	3	2
CO5	-	-	2	3	3	2	-	3	-	-	-	-	-	-	-	-	-
Average	2	-	2	3	3	2	-	3	-	-	-	-	-	-	-	3	2.3

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

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24CGU611B NATURAL LANGUAGE PROCESSING - PRACTICAL 4H-2C

Instruction Hours/Week: L:0 T:0 P:4 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Machine Learning Models

COURSE OBJECTIVES (CO):

- To introduce the fundamental concepts and techniques of natural language processing (NLP) and understanding of the models and algorithms in the field of NLP.
- To demonstrate the computational properties of natural languages and develop the commonly used algorithms for processing linguistic information.
- To understanding Lexical and syntactic levels of languages for processing and understanding semantics and pragmatics of languages for processing

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Demonstrate the fundamental concepts and techniques of naturallanguage processing (NLP)	Understand
CO2	Explain the computational properties of natural languages**.**	Understand
CO3	Develop the commonly used algorithms for processing linguistic information.	Apply
CO4	Make use of Lexical and syntactic levels of languages for processing	Apply
CO5	Identify the semantics and pragmatics of languages for processing.	Apply

List of Programs

1. Implementing word similarity
2. Implementing simple problems related to word disambiguation
3. Simple demonstration of part of speech tagging
4. Lexical Analyzer
5. Semantic Analyzer
6. Sentiment Analysis

TEXT BOOKS:

1. D. Jurafsky and J. Martin. (2020). Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition.
2. Steven Bird, Ewan Klein, and Edward Loper. (2019). Natural Language Processing with Python,O'Reilly Publishers.

REFERENCE BOOKS:

1. Ian H Written and Elbef, MarkA. Hall. (2013). Data mining: Practical Machine Learning Tools andTechniques, Morgan Kaufmann Publishers.

WEBSITES:

1. https://onlinecourses.swayam2.ac.in/aic20_sp06/preview
2. https://onlinecourses.swayam2.ac.in/arp19_ap79/preview
3. https://www.tutorialspoint.com/natural_language_processing/index.html

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CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
CO3	3	-	-	3	3	3	-	1	-	-	-	-	-	-	-	2	-
CO4	3	-	-	3		2		3	-	-	-	-	-	-	-	-	1
CO5	3	-	-	3	-	-	-	3	-	-	-	-	-	-	-	2	-
Average	3	-	-	3	3	2.5	-	2.3	-	-	-	-	-	-	-	2	1

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

.

Semester VI

24CGU691	**PROJECT**	**8H-4C**

Instruction Hours/Week: L:0 T:0 P:8 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

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Semester VII

24CGU701 DEEP LEARNING 6H-5C

Instruction Hours/Week: L: 6 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Machine Learning Fundamentals

COURSE OBJECTIVES (CO):

- To Understanding the basics concepts of deep learning and emphasizing knowledge on various deep learning algorithms.
- To Provide Understanding of CNN and RNN to model for real world applications and provide Understanding in the various challenges involved in designing deep learningalgorithms for varied application using Image Classification Filters.
- To solve real world applications using Deep learning.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Outline the basic ideas and principles of Neural Networks	Understand
CO2	Apply feed forward neural networks for real world problems.	Apply
CO3	Analyze different deep learning models in Image related projects.	Analyze
CO4	Build and implement deep learning applications using RNN.	Apply
CO5	Relate the role of deep learning in machine learning applications and get familiar with the use of TensorFlow/Keras in deep learning applications.	Apply

UNIT I INTRODUCTION TO NEURAL NETWORKS 15 HOURS

Basic concept of Neurons – Perceptron Algorithm – Feed Forward and Back Propagation Networks.

UNIT II FEED FORWARD NEURAL NETWORKS 14 HOURS

Feed Forward Neural Networks – Gradient Descent – Back Propagation Algorithm – Vanishing Gradient problem – Mitigation – RelU Heuristics for Avoiding Bad Local Minima – Heuristics for Faster Training.

UNIT III CONVOLUTION NEURAL NETWORKS 15 HOURS

Nestors Accelerated Gradient Descent – Regularization – Dropout. CNN Architectures – Convolution – Pooling Layers – Transfer Learning – Image Classification using Transfer Learning

UNIT IV RECURRENT NEURAL NETWORKS 14 HOURS

RNN, LSTM, GRU, Encoder/Decoder Architectures – Autoencoders – Standard- Sparse – Denoising – Contractive- Variational Autoencoders – Adversarial Generative Networks – Autoencoder and DBM-Image Segmentation – Object Detection – Automatic Image Captioning– Image generation with Generative Adversarial Networks – Video to Text with LSTM Models

UNIT V CASE STUDIES USING CNN & RNN 14 HOURS

Attention Models for Computer Vision – Case Study: Named Entity Recognition – Opinion Mining using Recurrent Neural Networks – Parsing and Sentiment Analysis using Recursive Neural Networks – Sentence Classification using Convolutional Neural Networks – Dialogue Generation with LSTMs.

TOTAL:72 HOURS

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TEXT BOOKS:

1. Francois Chollet. (2018). Deep Learning with Python, Manning Publications, 1st Edition.
2. Ragav Venkatesan, Baoxin Li. (2018). Convolutional Neural Networks in Visual Computing, CRC Press, 1st Edition.

REFERENCE BOOKS:

1. Phil Kim. (2017). Matlab Deep Learning: With Machine Learning, Neural Networks and Artificial Intelligence, APress, 3rd Edition.
2. Navin Kumar Manaswi. (2018). Deep Learning with Applications Using Python, Apress, 1st Edition.
3. Ian Good Fellow, Yoshua Bengio and Aaron Courville. (2017). Deep Learning, MIT Press, 1st Edition.
4. Joshua F. Wiley. (2016). R Deep Learning Essentials, Packt Publications, 1st Edition.

WEBSITES:

1. www.nptel.ac.in/courses/106/106/106106184/
2. www.nptel.ac.in/courses/106/106/106106201/
3. www.nptel.ac.in/courses/106/105/106105215/
4. www.ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-s191-introduction- to-deep-learning-january-iap-2020/
5. www.kaggle.com/learn/intro-to-deep-learning

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
CO2	2	-	1	3	-	-	-	3	-	-	2	-	-	-	-	-	1
CO3	-	-	-	3	3	2	-	-	-	-	2	-	-	-	-	2	1
CO4	-	-	-	3	3	-	-	3	-	-	-	-	-	-	-	2	-
CO5	-	-	-	3	-	-	-	3	-	-	-	-	-	-	-	-	1
Average	2	1	1	3	3	2	-	3	-	-	2	-	-	-	-	2	1

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

.

Semester VII

24CGU702 FULL STACK DEVELOPMENT 6H-5C

Instruction Hours/Week: L: 6 T: 0P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Programming Languages, Database Management, Web Development Basics.

COURSE OBJECTIVES (CO):

- To understand the various components of full stack development and learn Node.js features and applications
- To develop applications with MongoDB and understand the role of Angular and Express in web applications
- To develop simple web applications with React.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Demonstrate the various stacks available for web applicationdevelopment.	Understand
CO2	Make use of Node.js for application development	Apply
CO3	Develop applications with MongoDB	Apply
CO4	Relate the features of Angular and Express	Understand
CO5	Develop React applications	Apply

UNIT I BASICS OF FULL STACK 14 HOURS

Understanding the Basic Web Development Framework - User - Browser – Webserver - Backend Services – MVC Architecture - Understanding the different stacks –The role of Express – Angular Node – Mongo DB – React

UNIT II NODE JS 14 HOURS

Basics of Node JS – Installation – Working with Node packages – Using Node package manager – Creating a simple Node.js application – Using Events – Listeners –Timers - Callbacks – Handling Data I/O – Implementing HTTP services in Node.js

UNIT III MONGO DB 15 HOURS

Understanding NoSQL and MongoDB – Building MongoDB Environment – User accounts – Access control – Administering databases – Managing collections – Connecting to MongoDB fromNode.js – simple applications

UNIT IV EXPRESS AND ANGULAR 15 HOURS

Implementing Express in Node.js - Configuring routes - Using Request and Response objects - Angular - Typescript - Angular Components - Expressions - Data binding - Built-in directives

UNIT V REACT 14 HOURS

MERN STACK – Basic React applications – React Components – React State – Express REST APIs - Modularization and Webpack - Routing with React Router – Server-side rendering

TOTAL:72 HOURS

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TEXT BOOKS:

1. Brad Dayley, Brendan Dayley, Caleb Dayley,2018,'Node.js, MongoDB and Angular Web Development', Addison-Wesley, Second Edition.
2. Vasan Subramanian,2019, 'Pro MERN Stack, Full Stack Web App Development with Mongo,Express, React, and Node', Second Edition, Apress.

REFERENCE BOOKS:

1. Chris Northwood, 2018, 'The Full Stack Developer: Your Essential Guide to the Everyday SkillsExpected of a Modern Full Stack Web Developer', Apress; 1st edition.
2. Kirupa Chinnathambi, 2018, 'Learning React: A Hands-On Guide to Building Web ApplicationsUsing React and Redux', Addison-Wesley Professional, 2nd edition.

WEBSITES:

1. https://www.tutorialspoint.com/the_full_stack_web_development/index.asp
2. https://www.coursera.org/specializations/full-stack-react
3. https://www.udemy.com/course/the-full-stack-webdevelopment

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	2	-	-	-	-	3	3
CO2	-	-	1	-	-	3	-		-	-	-	-	-	-	-	3	-
CO3	-	-		3	-	3	-	3	-	-	-	-	-	-	-	-	3
CO4	-	-	1	3	-	3	-	3	-	-	-	-	-	-	-	3	3
CO5	-	-		3	-	3	-	3	-	-	2	-	-	-	-	-	-
Average	1	-	1	3	-	3	-	3	-	-	2	-	-	-	-	3	3

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

.

Semester VII

24CGUA701 STATISTICAL COMPUTING 6H-4C

Instruction Hours/Week: L:6 T:0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Statistical Modeling and Inference

COURSE OBJECTIVES (CO):

- To develop the statistical skills in the areas of sampling and test of hypothesis.
- To understand statistical techniques as powerful tool in scientific computing.
- To enable the students to gain knowledge about test for randomness and run test.
- To make the students to understand the concept of sign test and Wilcoxon Signed rank test.
- To learn chi-square test for independence as well as to understand the concept of quality, process and product control using control chart techniques and sampling inspection plan.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Extend the principles of census and sample surveys andto become competent for conducting sample surveys.	Understand
CO2	Identify the information about the population based on a random sample taken from that population and to choose an appropriate test procedure under the test of significance	Apply
CO3	Identify the difference between parametric and non-parametrictests**.**	Apply
CO4	Compare and understand the difference between one way andtwo-way ANOVA.	Analyze
CO5	Summarize the basic of Statistical Quality Control and itstools	Understand

UNIT I **15 HOURS**

Sample Survey Basic Concept of Sample Survey - Census and Sample Survey - Population and Sample – Parameter and Statistic – Preparation of Questionnaire and Schedules – Principle steps inSample Survey – Pilot survey – Sampling Distribution - Standard Error - Sampling and Non- sampling Errors – Advantages over Complete Enumeration – Limitations of Sampling.

UNIT II **15 HOURS**

Test of Significance Sampling Distribution - Standard Error – Test of Hypothesis: Simple Hypothesis, Null Hypothesis and Alternative Hypothesis – Test of Significance: Large Sample Testbased on Mean, Differences of Means, Proportion and Difference of Proportions - Small Sample Test based on Mean, Difference of Means, Paired ‘t’ Test.

UNIT III **14 HOURS**

Analysis of Variance F-test – Analysis of Variance (ANOVA) – Test procedure for One way and Two-way classifications – Simple Problems.

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UNIT IV **14 HOURS**

Introduction of Non-parametric Test – Difference between Non-parametric and Parametric Test – Advantage and Limitations of Non-parametric Tests – Comparison of One and Two Populations Test for Randomness – Run Test – Test for Rank Correlation Coefficient – Sign Test. Comparisonof Two Populations Median Test – Mann Whitney U Test.

UNIT V **14 HOURS**

Meaning and Concepts of Quality – Quality of Design – Standardization for Quality – Quality Movement – Quality Management – Quality of Conformance – Need for Statistical Quality Control Techniques in Industry – Causes of Quality Variations – Process Control and Product Control – Statistical basis for Control Charts – Uses of Shewart's Control Charts - R Charts - Charts for Defectives p and np Charts.

TOTAL:72 HOURS

TEXT BOOKS

1. Gupta S. P., (2001), Statistical Methods, Sultan Chand & Sons, New Delhi.
2. Gupta S. C., (1974), Statistical Quality Control, Khanna Publishing Co, New Delhi.
3. Mahajan M., (2009), Statistical Quality Control, Dhanpat Rai & Co. (P) Ltd., Educational & Technical Publishers, New Delhi.

REFERENCE BOOKS:

1. Pillai R.S.N., and Bagavathi V., (2002). Statistics, S. Chand & Company Ltd, New Delhi
2. Gupta S. C and Kapoor V. K., (2007), Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi.
3. Montgomery D., (2011), Statistical Quality Control, Wiley India Pvt. Ltd, New Delhi.
4. Leavenworth G., (2015), Statistical Quality Control, Mc - Graw Hill Education Pvt. Ltd., New Delhi.

WEBSITES:

1. http://www.ing.unipi.it/lanzetta/stat/Chapter20.pdf
2. https://www.statisticshowto.com/parametric-and-non-parametric-data/
3. http://onlinestatbook.com/2/introduction/inferential.html

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	1
CO2	3	-	3	-	-	2				1	-	-	-	-	-	-	-
CO3	3	-	3	2	-	-	-	1	-	-	-	-	-	-	-	2	-
CO4	3	-	3	2	-	-	-	1	-	-	-	-	-	-	-	2	1
CO5	3	-	3	2	1	2	-	-	-	-	-	-	-	-	-	-	1
Average	3	-	3	2	1	2	-	1	-	1	-	-	-	-	-	2	1

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

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Semester VII

24CGU711 DEEP LEARNING – PRACTICAL 6H-3C

Instruction Hours/Week: L:0 T:0 P: 6 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Neural Network Basics, Convolutional Neural Networks (CNNs)

COURSE OBJECTIVES (CO):

- To Understanding the basics concepts of deep learning and emphasizing knowledge on various deep learning algorithms.
- To Provide Understanding of CNN and RNN to model for real world applications and provide Understanding in the various challenges involved in designing deep learning algorithms for varied application using Image Classification Filters.
- To solve real world applications using Deep learning

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Outline the basic ideas and principles of Neural Networks	Understand
CO2	Apply feed forward neural networks for real world problems.	Apply
CO3	Analyze different deep learning models in Image related projects.	Analyze
CO4	Build and implement deep learning applications using RNN.	Apply
CO5	Relate the role of deep learning in machine learning applications and get familiar with the use of TensorFlow/Keras in deep learning applications.	Apply

List of Programs

1. Implement Simple Programs like vector addition in TensorFlow.
2. Implement a simple problem like regression model in Keras.
3. Implement a perceptron in TensorFlow/Keras Environment.
4. Implement a Feed-Forward Network in TensorFlow/Keras.
5. Implement an Image Classifier using CNN in TensorFlow/Keras.
6. Implement a Transfer Learning concept in Image Classification.
7. Implement an Autoencoder in TensorFlow/Keras.
8. Implement a Simple LSTM using TensorFlow/Keras.
9. Implement an Opinion Mining in Recurrent Neural network.
10. Implement an Object Detection using CNN.

TEXT BOOKS:

1. Francois Chollet. (2018). Deep Learning with Python, Manning Publications, 1st Edition.
2. Ragav Venkatesan, Baoxin Li. (2018). Convolutional Neural Networks in Visual Computing, CRC Press, 1st Edition
3. Phil Kim. (2017). Matlab Deep Learning: With Machine Learning, Neural Networks and Artificial Intelligence, APress, 3rd Edition.

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REFERENCE BOOKS:

1. Navin Kumar Manaswi. (2018). Deep Learning with Applications Using Python, Apress,1st Edition.
2. Ian Good Fellow, Yoshua Bengio and Aaron Courville. (2017). Deep Learning, MIT Press,1st Edition.
3. Joshua F. Wiley. (2016). R Deep Learning Essentials, Packt Publications, 1st Edition.

WEBSITES:

1. www.nptel.ac.in/courses/106/106/106106184/
2. www.nptel.ac.in/courses/106/106/106106201/
3. www.nptel.ac.in/courses/106/105/106105215/
4. www.ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-s191- introduction-to-deep-learning-january-iap-2020/
5. www.kaggle.com/learn/intro-to-deep-learning

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1
CO2	2	-	1	2	-	-	-	1	-	-	2	-	-	-	-	-	3
CO3	-	-	-	3	3	2			-	-	2	-	-	-	-	2	1
CO4	-	-	-	3	3	-	-	3	-	-	-	-	-	-	-	-	-
CO5	-	-	-	3		-	-	3	-	-	-	-	-	-	-	2	-
Average	2.5	-	1	2.5	3	2	-	2.5	-	-	2	-	-	-	-	2	1.6

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

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Semester VII

24CGU712 FULL STACK DEVELOPMENT - PRACTICAL 6H-3C

Instruction Hours/Week: L:0 T:0 P:6 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- HTML/CSS, JavaScript, Database Integration, Cloud Platforms

COURSE OBJECTIVES (CO):

- To understand the various components of full stack development and learn Node.js features and applications.
- To develop applications with MongoDB and understand the role of Angular and Express in web applications
- To develop simple web applications with React.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Demonstrate the various stacks available for web application development.	Understand
CO2	Make use of Node.js for application development	Apply
CO3	Develop applications with MongoDB	Apply
CO4	Relate the features of Angular and Express	Understand
CO5	Develop React applications	Apply

List of Programs

1. Develop a portfolio website for yourself which gives details about yourself for a potential recruiter.
2. Create a web application to manage the TO-DO list of users, where users can login and manage their to-do items
3. Create a simple micro blogging application (like twitter) that allows people to post their content which can be viewed by people who follow them.
4. Create a food delivery website where users can order food from a particular restaurant listed in the website.
5. Develop a classifieds web application to buy and sell used products.
6. Develop a leave management system for an organization where users can apply different types of leaves such as casual leave and medical leave. They also can view the available number of days.
7. Develop a simple dashboard for project management where the statuses of various tasks are available. New tasks can be added, and the status of existing tasks can be changed among Pending, InProgress or Completed.
8. Develop an online survey application where a collection of questions is available, and users are asked to answer any random 5 questions

TEXT BOOKS:

1. Brad Dayley, Brendan Dayley, Caleb Dayley, ‘Node.js, MongoDB and Angular Web Development’, Addison-Wesley, Second Edition, 2018
2. Vasan Subramanian, ‘Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node’, Second Edition, Apress, 2019.

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REFERENCE BOOKS:

1. Chris Northwood, 'The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer', Apress; 1st edition, 2018
2. Kirupa Chinnathambi, 'Learning React: A Hands-On Guide to Building Web Applications Using React and Redux', Addison-Wesley Professional, 2nd edition, 2018

WEBSITES:

1. https://www.tutorialspoint.com/the_full_stack_web_development/index.asp
2. https://www.coursera.org/specializations/full-stack-react
3. https://www.udemy.com/course/the-full-stack-webdevelopment

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	3
CO2	-	-	3	3	-	2	-	3	-	-	-	-	-	-	-	1	3
CO3	-	-	3	3	-	-	-	3	-	-	-	-	-	-	-	2	-
CO4	-	-	-	3	-	2	-	3	-	-	-	-	-	-	-	2	-
CO5	-	-	3	3	-	-	-	3	-	-	-	-	-	-	-	-	1
Average	1	-	3	3	-	2	-	3	-	-	1	-	-	-	-	1.5	2.3

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

.

Semester VIII - A

24CGU801 DATA SCIENCE 6H - 5C

Instruction Hours/Week: L: 6 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Data Handling and Manipulation

COURSE OBJECTIVES (CO):

- To study the basic concepts of Data Science and data lifecycle and understand the theoretical and mathematical aspects of Data Science models.
- To learn common random variables and their uses, and with the use of empiricaldistributions.
- To obtain the knowledge in data management tools and explore the major techniques for data science.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Illustrate the key concepts in data science, including toolsand approaches	Understand
CO2	Identify and apply the concepts in data collection, samplingand probabilistic models.	Apply
CO3	Outline various techniques in data science.	Understand
CO4	Apply the mathematical formulation of machine learning and statistical models to visualize the data invarious methods.	Apply
CO5	Apply a suitable data science technique to solve an information analytics problem.	Apply

UNIT I INTRODUCTION **15 HOURS**

The Big Picture: What is Data Science? –The data life cycle: pre-processing, analysis, post- processing Preprocessing: Data gathering, cleansing, visualization, and understanding (Mean, Variance, Standard Deviation. Percentiles)–Data Storage (Relational databases.e.g. MySQL)

UNIT II SAMPLING **15 HOURS**

Sampling – Probability Models for Statistical Methods: Discrete and continuous probability distributions, density functions. Random variables, expected values, variance, correlation.

UNIT III DATA NORMALIZATION **14 HOURS**

Data Normalization (z-values, transforms) –Random processes –Data Management: Tools for Data Analysis, Case Study: Data analysis using Python-Arrays, Visualization.

UNIT IV MAJOR TECHNIQUES IN DATA SCIENCE **14 HOURS**

Major Techniques in Data Science: Data mining, Data warehousing, Data mining vs Data warehouse– Machine Learning-Supervised Learning, Unsupervised Learning.

UNIT V BUSINESS INTELLIGENCE **14 HOURS**

Business Intelligence–Descriptive Analytics, Diagnostic Analytics, Predictive Analytics, Prescriptive Analytics–Cloud computing-definition, Cloud services, types of clouds, some ofcommercial and non-commercial cloud service providers. **TOTAL: 72 HOURS**

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TEXT BOOKS:

1. Glenn J. Myatt, Wayne P. Johnson. (2014). Making Sense of Data I: A Practical Guide to Exploratory Data Analysis and Data Mining, John Wiley&Son Publication, Second Edition.
2. SaltzJeffreyS. (2019). An Introduction to Data Science, Sage Publications Inc, Second Edition.
3. Murtaza Haider. (2015). Getting Started with Data Science: Making Sense ofData with Analytics, IBM Press, First Edition.
4. Peter Bruce & Andrew Bruce. (2017). Practical Statistics for DataScientists, O'Reilly Publication, First Edition.
5. Dawn Griffiths. (2008). Headfirst Statistics, O'Reilly Publication, First Edition.

WEBSITES:

1. https://www.inferentialthinking.com/chapters/intro
2. https://www.openintro.org/stat/
3. https://swayam.gov.in/nd1_noc20_cs36/preview
4. https://swayam.gov.in/nd1_noc19_cs60/preview
5. https://ocw.mit.edu/courses/electrical-engineering-and-computer science/6-

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1
CO2	3	-	-	2	-	-	-		-	-	-	-	-	-	-	-	1
CO3	3	-	-	2	-	-	-	2	-	-	-	-	-	-	-	2	-
CO4	3	-	2	2	-	2	-	2	-	-	-	-	-	-	-	2	-
CO5	3	-	2	2	-	2	-	2	-	-	-	-	-	-	-		1
Average	3	-	2	2	-	2	-	2	-	-	-	-	-	-	-	3	1

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

.

Semester VIII - A

24CGU802 BIG DATA ANALYTICS 6H-5C

Instruction Hours/Week: L:6 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Database Management and SQL

COURSE OBJECTIVES (CO):

- To know the fundamental concepts of big data and analytics and explore tools and practices for working with big data.
- To learn about stream computing and know about the research that requires the integration of large amounts of data.
- To perform analytics on data streams and learn NoSQL databases and management.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Summarize the fundamental concepts of big data and analytics	Understand
CO2	Experiment with big data tools and its analysis techniques	Apply
CO3	Analyze data by utilizing clustering and classification algorithms	Analyze
CO4	Identify and apply different mining algorithms and recommendation systems for large volumes of data	Apply
CO5	Model analytics on data streams	Apply

UNIT I INTRODUCTION TO BIG DATA 15 HOURS

Evolution of Big data - Best Practices for Big data Analytics - Big data characteristics Validating –The Promotion of the Value of Big Data - Big Data Use Cases- Characteristics of Big Data Applications - Perception and Quantification of Value -Understanding Big Data Storage - A GeneralOverview of High - Performance Architecture - HDFS - MapReduce and YARN - Map Reduce Programming Model

UNIT II CLUSTERING AND CLASSIFICATION 15 HOURS

Advanced Analytical Theory and Methods: Overview of Clustering - K-means - Use Cases - Overview of the Method - Determining the Number of Clusters - Diagnostics - Reasons to Chooseand Cautions. Classification: Decision Trees - Overview of a Decision Tree - The General Algorithm - Decision Tree Algorithms - Evaluating a Decision Tree - Decision Trees in R - Naïve Bayes - Bayes Theorem Naïve Bayes Classifier.

UNIT III ASSOCIATION AND RECOMMENDATION SYSTE 14 HOURS

Advanced Analytical Theory and Methods: Association Rules - Overview - Apriori Algorithm – Evaluation of Candidate Rules - Applications of Association Rules - Finding Association & finding similarity - Recommendation System: Collaborative Recommendation- Content Based Recommendation - Knowledge Based Recommendation- Hybrid Recommendation Approaches.

UNIT IV STREAM MEMORY 14 HOURS

Introduction to Streams Concepts – Stream Data Model and Architecture - Stream Computing, Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating moments – Counting oneness in a Window – Decaying Window – Real time Analytics Platform (RTAP) applications

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UNIT V NOSQL DATA MANAGEMENT FOR BIG DATA AND VISUALIZATION

14 HOURS

NoSQL Databases: Schema-less Models‖: Increasing Flexibility for Data Manipulation-Key Value Stores- Document Stores - Tabular Stores - Object Data Stores - Graph Databases Hive – Sharding –- Hbase – Analyzing big data with twitter - Big data for E-Commerce Big data for blogs - Reviewof Basic Data Analytic Methods using R.

TOTAL:72 HOURS

TEXT BOOKS:

1. David Loshin. (2019). Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph, Morgan Kaufmann/Elsevier Publishers.
2. EMC Education Services. (2018). Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data. Wiley publishers.
3. Bart Baesens . (2017). Analytics in a Big Data World: The Essential Guide to Data Science and its Applications, Wiley Publishers.

REFERENCE BOOKS:

1. Dietmar Jannach and Markus Zanker. (2017). Recommender Systems: An Introduction. Cambridge University Press.
2. Kim H. Pries and Robert Dunnigan. (2016). Big Data Analytics: A Practical Guide for Managers " CRC Press.
3. Jimmy Lin and Chris Dyer. (2015). Data-Intensive Text Processing with MapReduce", Synthesis Lectures on Human Language Technologies, Vol. 3, No. 1, Pages 1-177, Morgan Claypool publishers.

WEBSITES:

1. https://www.ibm.com/analytics/big-data-analytics
2. https://www.simplilearn.com/what-is-big-data-analytics-article

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	-	-	-	3	-	-	-	1	-	-	-	-	-	-	-	3	2
CO3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO4	-	-	-	3	-	-	-	-	-	-	-	-	-	1	-	-	-
CO5	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2	3	-
Average	2	-	-	3	-	-	-	1	-	2	-	-	-	1	2	3	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

.

Semester VIII - A

24CGUA801 ORGANIZATIONAL BEHAVIOUR 6H-4C

Instruction Hours/Week: L:6 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To understand the basic concepts of organizational behavior and analyze the individual behavior traits required for performing as an individual or group.
- To obtain the perceiving skills to judge the situation and communicate the thoughts and ideas.
- To understand how to perform in group and team and how to manage the power, politics and conflict and recognize the importance of organizational culture and organizational change.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Inspect organizational behavior issues in the contextof the organizational behavior theories and concepts.	Analyze
CO2	Identify the behavior of the individuals and groups in organization andmanage the stress.	Apply
CO3	Examine team, power, politics and conflict arising between the members.	Analyze
CO4	Relate how organizational change and culture affect theworking relationship within organizations	Understand
CO5	Infer and exhibit the communication skills to convey the thoughtsand ideas of case analysis to the individuals and group.	Understand

UNIT I ORGANIZATION BEHAVIOUR INTRODUCTION 15 HOURS

Organization Behavior: Meaning and definition - Fundamental concepts of OB -Contributing disciplines to the OB field – OB Model - Significance of OB in the organization success – Challenges and Opportunities for OB.

UNIT II BEHAVIOUR AND PERSONALITY 15 HOURS

Attitudes – Sources - Types - Functions of Attitudes. Values – Importance - Types of Values. Personality – Determinants of personality- Theories of Personality - psycho-analytical, social learning, job-fit, and trait theories.

UNIT III PERCEPTION 14 HOURS

Perception – factors influencing perception - Person Perception – Attribution Theory – Frequently Used Shortcuts in Judging Others- Perceptual Process- Perceptual Selectivity - Organization Errors of perception – Linkage between perception and Decision making.

UNIT IV GROUP AND STRESS MANAGEMENT 14 HOURS

Foundation of Group Behavior - Types of Groups - Stages of Group Development - Group Norms Group Cohesiveness – Stress – Causes of stress – Effects of Occupational Stress- Coping Strategiesfor Stress.

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UNIT V ORGANIZATION CULTURE AND CHANGE **14 HOURS**

Organizational culture- Characteristics of Culture- Types of Culture – Creating and Maintaining an Organizational Culture. Organizational change – Meaning - Forces for Change - Factors in Organizational Change - Resistance to change- Overcoming resistance to change.

TOTAL :72 HOURS

TEXT BOOKS:

1. Fred Luthans. (2017). Organizational Behavior: An Evidence – Based Approach,12th edition, McGraw Hill Education, New Delhi.
2. Steven McShane and Mary Ann VonGlinow (2017), Organizational Behavior, 6th edition, McGraw-Hill Education, New Delhi
3. Robbins, S. P., and Judge, T.A. (2016). Organizational Behavior. (16thedition). NewDelhi: Prentice Hall of India.

REFERENCE BOOKS:

1. Laurie J. Mullins (2016), Management and Organizational behavior, 10th edition,Pearson Education, New Delhi
2. Robbins, S. P., and Judge, T.A. (2016). Essentials of Organizational Behavior 13th edition, Pearson Education.

WEBSITE:

1. https://nptel.ac.in/courses/110/105/110105033/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	3	-	-	-	3	3	-	1	2	2	3
CO2	3	-	-	-	-	-	3	-	-	-	3	3	-	1	2	2	-
CO3	3	-	-	-	-	-	3	-	1	1	3	3	1	1	2	2	-
CO4	3	-	-	-	-	-	3	-	1	-	3	3	1	-	-	-	3
CO5	-	3	-	-	-	-	3	-	1	-	3	3	-	1	2	-	3
Average	3	3	-	-	-	-	3	-	1	1	3	3	1	1	2	2	3

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

.

Semester VIII - A

24CGU811 DATA SCIENCE - PRACTICAL 6H-3C

Instruction Hours/Week: L:0 T:0 P:6 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Machine Learning Algorithms

COURSE OBJECTIVES (CO):

- To study the basic concepts of Data Science and data lifecycle and understand the theoretical and mathematical aspects of Data Science models.
- To learn common random variables and their uses, and with the use of empirical distributions.
- To obtain the knowledge in data management tools and explore the major techniques for data science.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Illustrate the key concepts in data science, including tools and approaches	Understand
CO2	Identify and apply the concepts in data collection, sampling and probabilistic models.	Apply
CO3	Outline various techniques in data science.	Understand
CO4	Apply the mathematical formulation of machine learning and statistical models to visualize the data in various methods.	Apply
CO5	Apply a suitable data science technique to solve an information analytics problem.	Apply

List of Programs

1. Matrix manipulations.
2. Creating and manipulating a List and an Array.
3. Manipulation of vectors and matrix.
4. Operators on Factors in R.
5. Working with looping statements.
6. Find subset of dataset by using subset (), aggregate () functions on iris dataset.
7. Find the data distributions using box and scatter plot.
8. Find the correlation matrix and plot the correlation plot on dataset and visualize it.

TEXT BOOKS:

1. Glenn J. Myatt, Wayne P. Johnson. (2014). Making Sense of Data I: A Practical Guideto Exploratory Data Analysis and Data Mining, John Wiley & Son Publication, Second Edition.
2. Saltz Jeffrey S. (2019). An Introduction to Data Science, Sage Publications Inc, Second Edition.
3. Murtaza Haider. (2015). Getting Started with Data Science: Making Sense of Data withAnalytics, IBM Press, First Edition.

.

REFERENCE BOOKS:

1. Peter Bruce & Andrew Bruce. (2017). Practical Statistics for Data Scientists,O'Reilly Publication, First Edition.
2. Dawn Griffiths. (2008). Headfirst Statistics, O'Reilly Publication, First Edition.

WEBSITES:

1. https://www.inferentialthinking.com/chapters/intro
2. https://www.openintro.org/stat/
3. https://swayam.gov.in/nd1_noc20_cs36/preview
4. https://swayam.gov.in/nd1_noc19_cs60/preview
5. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-0002-introduction-to- computational-thinking-and-data-science-fall-2016/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	3	-	-	2	-	-	-	-	-	-	-	-	-	-	-	3	2
CO3	3	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	2
CO4	3	-	2	2	-	3		2	-	-	-	-	-	-	-	3	-
CO5	3	-	2	2	-	3		2	-	-	-	-	-	-	-	-	2
Average	3	-	2	2	-	3	-	2	-	-	-	-	-	-	-	3	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

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Semester VIII - A

24CGU812 BIG DATA ANALYTICS - PRACTICAL 6H-3C

Instruction Hours/Week: L:0 T:0 P:6 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Data Processing and Transformation

COURSE OBJECTIVES (CO):

- To know the fundamental concepts of big data and analytics and explore tools and practices for working with big data
- To learn about stream computing and know about the research that requires the integration of large amounts of data.
- To perform analytics on data streams and learn NoSQL databases and management.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Summarize the fundamental concepts of big data and analytics	Understand
CO2	Experiment with big data tools and its analysis techniques	Apply
CO3	Analyze data by utilizing clustering and classification algorithms	Analyze
CO4	Identify and apply different mining algorithms and recommendation systems for large volumes of data	Apply
CO5	Model analytics on data streams	Apply

List of Programs

1. Set up a pseudo-distributed, single-node Hadoop cluster backed by the Hadoop Distributed File System, running on Ubuntu Linux. After successful installation on one node, configuration of a multi-node Hadoop cluster (one master and multiple slaves).
2. MapReduce application for word counting on Hadoop cluster
3. Unstructured data into NoSQL data and do all operations such as NoSQL query with API.
4. K-means clustering using map reduce
5. Page Rank Computation
6. Mahout machine learning library to facilitate the knowledge build up in big data analysis.
7. Application of Recommendation Systems using Hadoop/mahout libraries

TEXT BOOKS:

1. David Loshin. (2019). Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools,Techniques, NoSQL, and Graph, Morgan Kaufmann/Elsevier Publishers.
2. EMC Education Services. (2018). Data Science and Big Data Analytics: Discovering, Analyzing,Visualizing and Presenting Data. Wiley publishers.
3. Bart Baesens . (2017). Analytics in a Big Data World: The Essential Guide to Data Science and itsApplications, Wiley Publishers.

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REFERENCE BOOKS:

1. Dietmar Jannach and Markus Zanker. (2017). Recommender Systems: An Introduction. CambridgeUniversity Press.
2. Kim H. Pries and Robert Dunnigan. (2016). Big Data Analytics: A Practical Guide for Managers " CRCPress.
3. Jimmy Lin and Chris Dyer. (2015). Data-Intensive Text Processing with MapReduce", SynthesisLectures on Human Language Technologies, Vol. 3, No. 1, Pages 1-177, Morgan Claypool publishers.

WEBSITES:

1. https://www.ibm.com/analytics/big-data-analytics
2. https://www.simplilearn.com/what-is-big-data-analytics-article

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2
CO2	-	-	-	3	-	-	-	1	-	-	-	-	-	-	-	-	2
CO3	2	-	-		-	-	-	-	-	-	-	-	-	-	-	3	2
CO4	-	-	-	3	-	-	-	-	-	-	-	-	-	1	-	-	-
CO5	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2	3	-
Average	2	-	-	3	-	-	-	1	-	2	-	-	-	1	2	3	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

.

Semester VIII - B

24CGU801B RESEARCH METHODOLOGY AND IPR 6H -4C

Instruction Hours/Week: L: 6 T: 0 P: 0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Not Required.

COURSE OBJECTIVES (CO):

- To impart knowledge and skills required for research methodology and know the Problem formulation, analysis and solutions.
- To acquire knowledge on analysis of the datasets and find the results.
- To know the basic understanding of the Intellectual Rights and explore the Patent drafting and filing patents.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Infer the fundamental concepts of research methodology	Understand
CO2	Build an ability to find the research problem and review on it.	Apply
CO3	Discover the various research designs and techniques.	Analyze
CO4	Construct an ability to understand the nature of intellectual property rightsand it apply it	Apply
CO5	Identify the ability to understand about IPR and filing patents in R & D	Apply

UNIT I RESEARCH METHODOLOGY 15 HOURS

Objectives and motivation of research - Types of research - Research approaches – Significance of research - Research methods verses methodology - Research and scientific method - Importance of research methodology - Research process - Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, necessary instrumentations- Criteria of good research. Defining the research problem: Definition of research problem - Problem formulation - Necessity of defining the problem - Technique involved in defining a problem.

UNIT II LITERATURE SURVEY AND DATA COLLECTION 15 HOURS

Importance of literature survey - Sources of information - Assessment of quality of journals and articles -Information through interne. Effective literature studies approach, analysis, plagiarism, and research ethics. Data - Preparing, Exploring, examining and displaying.

UNIT III RESEARCH DESIGN AND ANALYSIS 14 HOURS

Meaning of research design - Need of research design - Different research designs - Basic principlesof experimental design - Developing a research plan - Design of experimental set-up - Use of standards and codes. Overview of Multivariate analysis, Hypotheses testing and Measures of Association. Presenting Insights and findings using written reports and oral presentation.

UNIT IV INTELLECTUAL PROPERTY RIGHTS (IPR) 14 HOURS

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. Role of WIPO and WTOin IPR establishments, Right of Property, Common rules of IPR practices, Types and Features of IPR Agreement, Trademark, Functions of UNESCO in IPR maintenance.

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UNIT V PATENT RIGHTS (PR) **14 HOURS**

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications. New Developments in IPR: Administration of Patent System,IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs. Licenses, Licensing of related patents, patent agents, Registration of patent agents.

TOTAL: 72 HOURS

TEXT BOOKS:

1. Peter S. Menell , Mark A. Lemley, Robert P. Merges, (2021) "Intellectual Property in the NewTechnological "Vol. I Perspectives.
2. Laura R. Ford, (2021), "The Intellectual Property of Nations: Sociological and HistoricalPerspectives on a Modern Legal Institution Paperback.
3. R. Ganesan, (2011) "Research Methodology for Engineers", MJP Publishers, Chennai, 2011.
4. Ratan Khananab is and Suvasis Saha, (2015) "Research Methodology", Universities Press, Hyderabad.
5. Cooper Donald R, Schindler Pamela S and Sharma JK, (2012) "Business Research Methods", Tata McGraw-Hill Education,11Edition.

REFERENCE BOOKS:

1. Catherine J. Holland, (2007) "Intellectual property: Patents, Trademarks, Copyrights, TradeSecrets", Entrepreneur Press.
2. David Hunt, Long Nguyen, Matthew Rodgers, (2007) "Patent searching: tools & techniques", Wiley.
3. The Institute of Company Secretaries of India, Statutory body under an Act of parliament,2013,Professional Programme Intellectual Property Rights, Law and practice", September 2013.
4. Ranjit Kumar, (2010), 2nd Edition, "Research Methodology: A Step by Step Guide for beginners".

WEBSITES:

1. https://www.scribbr.com/dissertation/methodology/
2. https://www.educba.com/types-of-research-methodology/
3. https://www.wipo.int/about-ip/en/

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	-	-	-	3	-	-	-	-	-	-	-	-	-	1	2
CO2	-	-	2	3	1	3	-	2	-	-	-	-	-	-	-	-	-
CO3	-	-	2	3	-	3	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	2	3	-	3	-	2	-	-	-	-	1	-	-	1	2
CO5	-	-	-	3	-	3	-	2	-	-	-	-	-	-	-	-	-
Average	1	-	2	3	1	3	-	2	-	-	-	-	1	-	-	1	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

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Semester VIII - B

24CGUA811 STATISTICAL ANALYSIS USING R - PRACTICAL 6H-4C

Instruction Hours/Week: L:0 T:0 P:6 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam: 3 Hours

PREREQUISITE:

- Data Manipulation and Visualization

COURSE OBJECTIVES (CO):

- To acquire the computing tasks such as using conditional processing statements, loops, andwriting one's own functions.
- To perform advanced graphing of data and statistical modeling of data and use statistical distribution functions in R.
- To read Structured Data into R from various sources and understand split-apply-combine (group-wise operations) in R, perform basic statistical modeling of data using R.

COURSE OUTCOMES (COs):

Upon completion of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Interpret how to install and configure software necessary fora statistical programming environment	Understand
CO2	Experiment with generic programming language concepts.	Apply
CO3	Analyze how reading data into R, accessing R packages, writing R functions, debugging, and organizing and commenting R code is done	Analyze
CO4	Make use of external data into R for data processing and statisticalanalysis	Apply
CO5	Construct and develop R applications for data analytics	Apply

List of Programs

1. Write a program to demonstrate functions and operators.
2. **Vectors:** Grouping values into vectors, then doing arithmetic and graphs with them.
3. **Matrices:** Creating and graphing two-dimensional data sets.
4. **Summary Statistics:** Calculating and plotting some basic statistics: mean, median, andstandard deviation.
5. **Factors:** Creating and plotting categorized data.
6. **Data Frames:** Organizing values into data frames, loading frames from files and merging them.
7. Write a program to design R as a calculator.
8. Write a program to demonstrate Probability distributions.
9. Write a program to demonstrate Importing and exporting data.
10. Write a program to Establish a Regression.

TEXT BOOKS:

1. Garrett Grolemund and Hadley Wickham (2016). R for Data Science
2. Roger.D.Peng, (2015). R Programming for Data Science
3. Hadley Wickham, (2014). Advanced R Programming,1st Edition.

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REFERENCE BOOKS:

1. Daniel Navarro. (2013). Learning Statistics with R. University of Adelaide Publications.
2. JeffreyStanton. (2013). Introduction to Data Science, with Introduction to R, Version3.

WEBSITES:

1. https://www.r-project.org/
2. https://www.datamentor.io/r-programming/
3. https://www.datacamp.com/courses/free-introduction-to-r?utm_
4. https://www.coursera.org/learn/r-programming
5. https://172.16.25.76/Course/View.php?id = 2216
6. https://nptel.ac.in/courses/111104100/
7. https://nptel.ac.in/content/syllabus_pdf/111104100.pdf
8. https://www.edx.org/learn/r-programming

CO, PO, PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	3	-	-	-	-	2	-	-	-	-	-	3	2
CO2	-		2	2	-	-	-	2	-	-	-	-	-	-	-	-	2
CO3	-	-	-	-	3	1	-		1	-	-	-	-	-	-	3	-
CO4	3	-	-	-	3	-	-	2	-	-	-	-	-	-	-	3	2
CO5	-	-	2	2	-	-	-	-	-	2	-	-	-	-	-	-	-
Average	3	-	2	2	3	1	-	2	1	2	-	-	-	-	-	3	2

1 - Low, 2 - Medium, 3 - High, '-' – No Correlation

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Semester VIII - B

24CGU891	**RESEARCH PROJECT / PREPARATION OF RESEARCH PROJECT**	**18H -12C**

Instruction Hours/Week: L: 0 T: 0 P: 18 **Marks:** Internal**:120** External**:180** Total**:300**

End Semester Exam: 3 Hours

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