ST. XAVIER'S COLLEGE (AUTONOMOUS)
Palayamkottai - 627 002
Recognized as "College with Potential for Excellence" by UGC
Accredited by NAAC at A⁺⁺ Grade with a CGPA of 3.66 out of 4 in IV Cycle

SYLLABUS

B.Sc. COMPUTER SCIENCE
(w.e.f June 2023)

Programme Name: B.Sc Computer Science
Programme Code: UCS

PROGRAMME SPECIFIC OUTCOMES

At the completion of the B.Sc. programme in Computer Science the students will be able to

PSO 1:   Algorithmic thinking to solve Real life problems.

PSO2: Enable to apply their programming skills to solve real world problems in society.

PSO3:   Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.

PSO4:   Understand, formulate, develop programming model with logical approaches to a Address issues arising in social science, business and other contexts.

PSO5: Acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of Computer science and Industrial statistics.

PSO6: Provide students / learners sufficient knowledge and skills enabling them to undertake further studies in Computer Science or Applications or Information Technology.

PSO7: Equip with Computer science technical ability, problem solving skills, creative talent and power of communication necessary for various forms of employment.

PSO8: Develop a range of generic skills helpful in employment, internships & societal activities.

B.Sc Computer Science
(With Effect from June 2023)

Sem	Part	Status	Sub. Code	Title of the Paper	Hrs	Cdt
I	I	Lang	23UGTL11	General Tamil – I	6	3
			23UGHL11	Hindi – I		
			23UGFL11	French - I		
	II	Lang	23UGEL11	Communicative English - I	6	3
	III	Core	23UCSC11	Programming in C	5	5
	III	Core	23UCSC12	Practical: Programming in C	5	5
	III	EC	23UCSE11	Digital Logic Fundamentals	4	3
	IV	SEC1	23UCSN11	Office Automation (NME)	2	2
	IV	FC	23UHER11/ 23UHEE11	Religion: Catholic Doctrine Ethics	2	2
					30	23
II	I	Lang	23UGTL21	General Tamil – II	6	3
	I	Lang	23UGHL21	Hindi – II		
	I	Lang	23UGFL21	French – II		
	II	Lang	23UGEL21	Communicative English – II	6	3
	III	Core	23UCSC21	Data Structure and Algorithms	5	5
	III	Core	23UCSC22	Practical: Data Structure and Algorithms	5	5
	III	EC	23UCSE21	Discrete Mathematics	4	3
	IV	SEC2	23UCSN21	Advanced Excel (NME)	2	2
	IV	SEC3	23UHEI21	Integrated Personality Development	2	2
					30	23
III	I	Lang	23UGTL31	General Tamil – III	6	3
	I	Lang	23UGHL31	Hindi – III		
	I	Lang	23UGFL31	French - III		
	II	Lang	23UGEL31	Communicative English - III	6	3
	III	Core	23UCSC31	Java Programming	5	5
	III	Core	23UCSC32	Practical: Java Programming	5	5
	III	EC	23UCSE31	Artificial Intelligence and Machine Learning	4	3
	IV	SEC4	23UHEL31	Life Coping & Entrepreneurial Skills management	2	2
	IV	SEC5	23UCSN31	Cloud Applications and Security (NME)	2	2
					30	23
IV	I	Lang	23UGTL41	General Tamil – IV	6	3
	I	Lang	23UGHL41	Hindi – IV		
	I	Lang	23UGFL41	French - IV		
	II	Lang	23UGEL41	Communicative English - IV	6	3
	III	Core	23UCSC41	RDBMS with PL/SQL	4	4
	III	Core	23UCSC42	Practical: RDBMS with PL/SQL	4	4
	III	EC	23UCSE41	Software Engineering	4	4
	IV	SEC6	23UCSN41	Multimedia Systems (NME)	2	2
	IV	SEC7	23UCSS42	Introduction to Data Science	2	2
	IV	EVS	23UEVS41	Environmental Studies	2	2

						30	24
V	III	Core	23UCSC51	Dot Net Core Programming	5	5
	III	Core-T6	23UCSC52	Mobile Application Development	5	5
	III	Core-P5	23UCSC53	Core Practical : Dot Net Core Programming	5	3
	III	Core-P6	23UCSC54	Core Practical : Mobile Application Development	5	3
	III	EC-T5	23UCSE51	PHP Programming	4	3
	III	EC-P5	23UCSE52	Practical : PHP Programming	4	3
	IV	VE	23UVEH51	Human Rights & Social Analysis	2	2
	IV	Internship	23UCSI51	Internship	-	2
					30	26
VI	III	Core-T7	23UCSC61	Python Programming	5	4
	III	Core-T8	23UCSC62	Data Analytics using R	5	4
	III	Core-P7	23UCSC63	Practical: Python Programming	4	2
	III	Core-P8	23UCSC64	Practical: Data Analytics using R	4	2
	III	Core	23UCSC65	Data Communications and Computer Network	4	3
	III	Project	23UCSE61	Project with Viva Voce	6	3
	IV	SEC8	23UCSS61	Professional Competency Skill	2	2
	V	Extension Activitiés		STAND (Student Training and Action for Neighbourhood Development)	-	1
					30	21
				Additional Compulsory Courses		
I UG		Add on Course **(Any one)**	23UCSAO1/ 23UCSAO2/ 23UCSAO3	Desktop Publishing / Document Editor/ Data Management and Auditing		2
II UG		Value added **(Any one)**	23UCSVA1/ 23UCSVA2 /23UCSVA3	PC Assembling and Trouble Shooting / Robotics and Its Applications / Cloud Computing		2
III UG		**ECC (Any one)**	23UCSEC1	Fundamentals of Computer		2
			23UCSEC2	Internet Concepts		
			23UCSEC3	Web Design with Style Sheets		
			23UCSEC4	Visual Basic Dot Net		
			23UCSEC5	Wireless Technology		
			23UCSEC6	Internet of Things		
				TOTAL	**180**	**146**

Sub. Code : 23UGTL11

பருவம்: **1**	தாள்: மொழிப்பாடம்	**Hrs: 6**	**Credits: 3**

LEARNING OBJECTIVES: கற்றலின் நோக்கங்கள்

1. முதலாமாண்டு பட்ட வகுப்பு மாணவர்களுக்குத் தமிழ்மொழி இலக்கியங்களை அறிமுகம் செய்தல்.

2. தற்கால இலக்கியப் போக்குகளையும் இலக்கணங்களையும் மாணவர் அறியுமாறு செய்து அவர்களின் படைப்பாற்றலைத் தூண்டுதல்.

3. தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

4. மொழித்திறன்களை மாணவர்கள் அறிந்துகொள்ள தூண்டுதல்.

5. நவின இலக்கிய வகைமைகளை அறிமுகம் செய்தல்.

6. சமூகச்சிந்தனைகளை உருவாக்க இலக்கியப்பாடுபொருள் காரணமாய் உள்ளது என்பதை அறியச் செய்தல்.

அலகு1: மரபுக்கவிதை

1.	பெ. சுந்தரனார்	-	தமிழ்த் தெய்வவணக்கம்
2.	பாரதிதாசன்	-	சிறுத்தையே வெளியே வா
3.	கவிமணி	-	புத்தரும் சிறுவனும்
4.	முடியரசன்	-	மொழி உணர்ச்சி
5.	கண்ணதாசன்	-	ஆட்டனத்தி ஆதிமந்தி (ஆதிமந்தி புலம்பல்)
6.	சுரதா	-	துறைமுகம் (வினாத்தாள்)
7.	தமிழ் ஒளி	-	கடல்

அலகு2: புதுக்கவிதை

1.	அப்துல் ரகுமான்	-	வீட்டுக்கொரு மரம் வளர்ப்போம்
2.	ஈரோடு தமிழன்பன்	-	சென்றியூ கவிதைகள் (ஏதேனும் ஐந்து கவிதைகள்)
3.	வைரமுத்து	-	பிற்சேர்க்கை
4.	மு.மேத்தா	-	வாழைமரத்தின் சபதம்
5.	அறிவுமதி	-	வள்ளுவம் பத்து
6.	நா. முத்துக்குமார்	-	ஆனந்த யாழை மீட்டுகிறாய்
7.	சுகிர்தராணி	-	சபிக்கப்பட்ட முத்தம்
8.	இளம்பிறை	-	நீ எழுத மறுக்கும் எனது அழகு

அலகு3: சிறுகதைகள்

1.	வாய்ச்சொற்கள்	-	ஜெயகாந்தன் (மாலை மயக்கம் தொகுப்பு)
2.	கடிதம்	-	புதுமைப்பித்தன்
3.	கரு	-	உமா மகேஸ்வரி
4.	முள்முடி	-	தி. ஜானகிராமன்
5.	சிதறல்கள்	-	விழி. பா. இதயவேந்தன்
6.	காகிதஉறவு	-	சு. சமுத்திரம்
7.	வீட்டின் மூலையில் சமையலறை- அம்பை
8.	(மொழிப்பெயர்ப்புக் கதை) நாய்க்காரச் சீமாட்டி – ஒரு குறும்புக்காரச் சிறுவன்

அலகு4: பாடம் சார்ந்த இலக்கிய வரலாறு

அலகு5 : மொழித்திறன் போட்டித் தேர்வு

1. பொருள் பொதிந்த சொற்றொடர் அமைத்தல்
2. ஓர் எழுத்து ஒரு மொழி
3. வேற்றுமை உருபுகள்
4. திணை, பால், எண், இடம்
5. கலைச்சொல்லாக்கம், மொழிபெயர்ப்பு

COURSE OUTCOMES: பயன்கள்

இப்பாடங்களைக் கற்பதால் மாணவர் பின்வரும் பயன்களைப் பெறுவர்.

CO1– பாரதியார் காலந்தொட்டு தற்காலப் புதுக்கவிதைகள் வரை கவிதையிலக்கியம் அறிமுகப்படுத்தப்படுவதால் படைப்பாற்றல் திறன் பெறுதல். (K1,K2)

CO2– புதுக்கவிதை வரலாற்றினைஅறிந்துகொள்வர். (K2)

CO3- இக்கால இலக்கிய வகையினைக் கற்பதன் மூலம் படைப்பாக்கத் திறனைப் பெறுதல். (K4)

CO4– மொழி அறிவோடு சிந்தனைத் திறன் அதிகரித்தல். (K3)

CO5– தமிழ்மொழியைப் பிழையின்றி எழுதவும், புதிய கலைச் சொற்களை

உருவாக்கவும் அறிந்துகொள்வர். (K4)

CO6– காலந்தோறும் சமூகச் சிந்தனைகள் மாறுவதை இலக்கிய வரலாற்றின்

மூலம் அறிந்து கொள்ளுதல். (K6)

TEXT BOOKS (பாடநூல்கள்)

1. தமிழ்த்துறை வெளியீடு - தூய சவேரியார் தன்னாட்சிக் கல்லூரி, பாளையங்கோட்டை.
2. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு– எ.ஃப். பாக்கியமேரி

REFERENCE BOOKS (பார்வை நூல்கள்)

- தமிழ் இலக்கிய வரலாறு - சிற்பி. பாலசுப்பிரமணியன்
- புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு – தமிழண்ணல்
- தமிழ் இலக்கிய வரலாறு – சேதுராமன்

WEB SOURCES (இணையதளங்கள்)
- Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org>
- Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
- Project Madurai - www.projectmadurai.org.
- Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
- Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
- Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
- Tamil Books on line- books.tamil cube.com
- Catalogue of the Tamil books in the Library of British Congress archive.org
- Tamil novels on line - books.tamilcube.com

Sub. Code : 23UGTL21

பருவம்: 2	தாள்:மொழிப்பாடம்	Hrs: 6	Credits: 3

LEARNING OBJECTIVES: கற்றலின் நோக்கங்கள்

1. சமய இலக்கியங்களையும் சிற்றிலக்கியங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்.

2. மொழித்திறனையும் சிறுகதை இலக்கிய வடிவத்தையும் மாணவர்களுக்கு உணர்த்துதல்.

3. தமிழ் இலக்கிய வரிசையில் சமய இலக்கியங்களின் முக்கியத்துவத்தை உணர்த்துதல்.

4. தமிழ் இலக்கிய வரிசையில் சிற்றிலக்கியங்களின் முக்கியத்துவத்தை அறிமுகம் செய்தல்.

5. தமிழ் இலக்கிய வளமைக்குப் பல்சமயங்கள் ஆற்றிய பங்கினை உணரச் செய்தல்.

6. சமய, சிற்றிலக்கியங்களின் இடத்தைத் தமிழ் இலக்கிய வரலாற்றின் வழி அறியச் செய்தல்.

அலகு 1:

- திருநாவுக்கரசர் - தேவாரம் - நாமார்க்கும் குடியல்லோம் எனத் தொடங்கும் பதிகம் (10 பாடல்கள்)
- ஆண்டாள் - திருப்பாவை (முதல் 20 பாசுரம்)

அலகு 2 :

- வள்ளலார் - அருள் விளக்கமாலை (முதல் 10 பாடல்கள்)
- எச்.ஏ.கிருட்டிணப்பிள்ளை - இரட்சணியமனோகரம் - பால்ய பிராத்தனை
- குணங்குடி மஸ்தான் சாகிபு – பராபரக்கண்ணி (முதல் 10 கண்ணி)

அலகு 3:

- தமிழ் விடுதூது (முதல் 20 கண்ணி)
- திருக்குற்றாலக் குறவஞ்சி – குறத்தி மலைவளம் கூறுதல்
- முக்கூடற்பள்ளு – நாட்டு வளம்

அலகு 4: பாடம் தழுவிய இலக்கிய வரலாறு

(பல்லவர் காலம், நாயக்கர் காலம்)

அலகு 5 : மொழித்திறன் - போட்டித் தேர்வுத்திறன்

1. தொடர் வகைகள்
2. மரபுத்தொடர், பழமொழிகள்
3. பிறமொழிச் சொற்களைக் களைதல்
4. வழுச்சொற்கள் நீக்குதல்
5. இலக்கணக் குறிப்பு அறிதல்.

COURSE OUTCOMES - பயன்கள்

CO1– பக்தி இலக்கியங்களைக் கற்பதன் மூலம் பக்தி நெறியினையும், சமய நல்லிணக்கத்தையும் தெரிந்து பின்பற்றுவர். (K1,K2)

CO2– சிற்றிலக்கியங்களின் வழி இலக்கியச் சுவையினையும் பண்பாட்டு அறிவினையும் பெறுவர். (K2)

CO3– பட்டப்படிப்பினைப் படிக்கும்போதே பெரும்பான்மையான தமிழ் இலக்கியங்கள் குறித்த அறிவினைப் பெறுவர். (K4)

CO4– தமிழ்ச் சமூகப் பண்பாட்டு வரலாற்றினை இலக்கியங்கள் வாயிலாக அறிவர். (K3)

CO5– போட்டித் தேர்வுகளில் வெற்றிப் பெறுவதற்குத் தமிழ்ப்பாடத்தினை பயன் கொள்ளும் வகையில் ஏற்ற பயிற்சி பெறுவர். (K4)

CO6– பல்சமய இலக்கியங்களை அறிவதன் மூலம் பல்சமய உரையாடல்களின் முக்கியத்துவத்தை அறிவர். (K3)

TEXT BOOKS (பாட நூல்கள்)

1. தமிழ்த்துறை வெளியீடு, தூய சவேரியார் தன்னாட்சிக் கல்லூரி, பாளையங்கோட்டை.
2. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு– எ.்.ப். பாக்கியமேரி

REFERENCE BOOKS (பார்வை நூல்கள்)

- தமிழ் இலக்கிய வரலாறு - சிற்பி. பாலசுப்பிரமணியன்
- புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு – தமிழண்ணல்
- தமிழ் இலக்கிய வரலாறு – சி.சேதுராமன்

WEB SOURCES (இணையதளங்கள்)
- Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org>
- Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
- Project Madurai - www.projectmadurai.org.
- Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
- Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
- Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
- Tamil Books on line- books.tamil cube.com
- Catalogue of the Tamil books in the Library of British Congress archive.org
- Tamil novels on line - books.tamilcube.com

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பொதுத் தமிழ் - 3

Sub Code: 23UGTL31

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பருவம்: 3	தாள்: மொழிப்பாடம்	Hrs: 6	Credits: 3

Learning objectives: கற்றலின் நோக்கங்கள்

1. காலந்தோறும் எழுந்த காப்பியங்களின் போக்கையும், புதினத்தின் இலக்கிய வடிவத்தையும் மாணவர்கள் உணருமாறு செய்தல்

2. காப்பியம், புதினம், ஆகிய படைப்பியல் வகைகளைப் பற்றிய பரந்து பட்டபுலமையைப் பெருக்குதல்.

3. தமிழ் இலக்கியங்களின் உள்ளடக்கம், வெளியீட்டுநெறி, படைப்பியல் கொள்கை ஆகியவற்றை அறியச் செய்தல்.

4. இலக்கியக் கொள்கைகளின் அடிப்படையில் இலக்கியங்களைத் திறனாய்வுச் செய்யப் பயிற்சி அளித்தல்.

5. படைப்புத் துறையிலும் ஊடகத் துறையிலும் கல்விப் புலத்திலும் அயல்நாடுகளிலும் வேலைவாய்ப்பினைப் பெறுதற்குத் துணைசெய்தல்.

6. மதிப்புரை, திறனாய்வு அறிமுகப்படுத்துவதன் மூலம் சிறந்த திறனாய்வுகளை அடையாளம் காணுதல்

அலகு: 1

சிலப்பதிகாரம ் - வழக்குரைகாதை, மணிமேகலை – ஆதிரை பிச்சையிட்ட காதை, சீவகசிந்தாமணி - பூமகள் இலம்பகம், வளையாபதி

அலகு: 2

பெரியபுராணம் - பூசலார் புராணம், கம்பராமாயணம் - மந்தரை சூழ்ச்சிப் படலம், வில்லிபாரதம் - மற்போர் சருக்கம், சீறாப்புராணம் - புலி வசனித்த படலம்.

அலகு: 3

வஞ்சிமாநகரம் வரலாற்றுப் புதினம் - நா.பார்த்தசாரதி

அலகு: 4

பாடம் தழுவிய இலக்கிய வரலாறு

அலகு: 5

மொழித்திறன்
1. நூல் மதிப்புரை
2. திறனாய்வுசெய்தல்
3. கடிதம் வரைதல்
4. விண்ணப்பம் எழுதுதல்

Course outcomes: பயன்கள்

CO1 – காப்பியங்களின் வழி வாழ்வியல் சிந்தனையைப் பெறுதல். (K1,K2)

CO2 – காப்பியங்கள் அறிமுகப் படுத்தப்படுவதால் தமிழ் மொழியின் உயர்வையும், சிறப்பையும் உணர்தல். (K2)

CO3 – தமிழ் புதினங்கள் வழி சமகாலப் படைப்புகளின் வாழ்வியல் சிந்தனைகளைஅறிதல் (K4)

CO4 – நாவல் இலக்கியம் அறிமுகப்படுத்தப்படுவதால் சிந்தனை ஆற்றல், படைப்பாற்றல், கற்பனைத் திறன் வளர்தல் (K3)

CO5 – தமிழ் இலக்கியம் சார்ந்தபோட்டித் தேர்வுகளை எதிர்கொள்ளும் ஆற்றல் பெறுதல் (K4)

CO6 - கடிதம், விண்ணப்பம் எழுதும் முறைகளைஅறிதல் (K6)

பாடநூல்கள் :

தமிழ்த்துறை வெளியீடு

பார்வை நூல்கள்
1. தமிழ் இலக்கியவரலாறு- சிற்பிபாலசுப்பிரமணியன்

இணையதளம்

1. Tamil Heritage Foundation – www.tamilheritage.org<http://www.tamilheritage. Org>.
2. Tamil Virtual University Library – www.tamilvw.org/libraryhttp://www. virtualvu.org/library
3. Project Madurai – www.projectmadurai.org
4. Chennai Library – www.chennailibrary.com<http://www.chennailibrary.com
5. Tamil Universal Library- www.ulib.prg<http://www.ulib.pig7
6. Tamil E-books downloads – tamilbooksdownloads.blogspot.com
7. Tamil Books online – books.tamilcube.com
8. Catalogue of the Tamil Books in the library of British congress archive.org
9. Tamil novels.online – books.tamil.cube.com

Sub Code: 23UGTL41

பருவம்: 4	தாள்: மொழிப்பாடம்	Hrs: 6	Credits: 3

Learning objectives: கற்றலின் நோக்கங்கள்

1. இலக்கியங்களின் சிறப்பினை உணர்த்துதல்
2. சங்க இலக்கியத்தின் மூம் வாழ்வயல நெறிகள உணர்தல்
3. தமிழ் இலக்கியங்களின் உள்ளடக்கம், வெளியீட்டுநெறி, படைப்பியல் கொள்கை ஆகியவற்றை அறியச் செய்தல்.
4. அகத்திணை, புறத்திணை இலக்கணங்களை மாணவர்கள் அறியச் செய்தல்
5. மொழிபெயர்ப்புத் திறனை வளர்த்தல்
6. நாடக இலக்கியங்களின் அமைப்பு முறையை அறிதல்

அலகு: 1

நற்றிணை 10, 14, 16, குறுந்தொகை - 16, 17, 19, 20, 25, 29, 38, 44, கலித்தொகை - 38, 51, அகநானூறு - 15, 33, 55, புறநானூறு - 37, 86, 112, பரிபாடல் - 55

அலகு: 2

நெடுநல்வாடை- நக்கீரர்

அலகு: 3

சபாபதிநாடகம் - பம்மல் சம்பந்த முதலியார்

அலகு: 4

பாடம் தழுவிய இலக்கியவரலாறு

அலகு: 5

மொழித்திறன்
1. மொழிபெயர்ப்புகலைச்சொற்கள்
2. கொடுக்கப்பட்டுள்ள ஆங்கிலப் பகுதியைத் தமிழில் மொழிபெயர்த்தல்
3. அலுவலகக் கடிதம்- தமிழில் மொழிபெயர்த்தல்

Course outcomes: பயன்கள்

CO1 – சங்க இலக்கியங்களில் காணப்படும் வாழ்வியல் சிந்தனைகளை அறிதல் (K1,K2)
CO2 – தமிழின் தொன்மையையும் செம்மொழித் தன்மையையும் உணர்தல் (K2)
CO3 – நாடக இலக்கியம் மூலம் நடிப்பாற்றலையும் கலைத்தன்மையையும் வளர்த்தல (K4)
CO4 – நாடக இலக்கியம் அறிமுகப்படுத்தப்படுவதால் சிந்தனை ஆற்றல், படைப்பாற்றல், கற்பனைத் திறன் வளர்தல் (K4)
CO5 – தமிழிலிருந்து அலுவலகக் கடிதங்களை மொழிபெயர்க்கும் அறிவைபெறுதல் (K3)
CO6 - மோழி அறிவோடு வேலைவாய்ப்பினையும் பெறுதல். (K4)

பாடநூல்கள் :
தமிழ்த்துறை வெளியீடு

பார்வை நூல்கள்
2. தமிழ் இலக்கிய வரலாறு- சிற்பிபாலசுப்பிரமணியன்

இணையதளம்:
1. Tamil Heritage Foundation – www.tamilheritage.org<http://www.tamilheritage. Org>.
2. Tamil Virtual University Library – www.tamilvw.org/libraryhttp://www. virtualvu.org/library
3. Project Madurai – www.projectmadurai.org
4. Chennai Library – www.chennailibrary.com<http://www.chennailibrary.com
5. Tamil Universal Library- www.ulib.prg<http://www.ulib.pig7
6. Tamil E-books downloads – tamilbooksdownloads.blogspot.com
7. Tamil Books online – books.tamilcube.com
8. Catalogue of the Tamil Books in the library of British congress archive.org
9. Tamil novels.online – books.tamil.cube.com

DEPARTMENT OF ENGLISH

UG – PART II - GENERAL ENGLISH

**(The Seven-Tier Pattern recommended by UGC Curriculum Development Centre
and Identified as Best Practice by NAAC)**

	Stream A (For learners of high entry level proficiency)	Stream B (For learners of average entry level proficiency)	Stream C (For learners of low entry level proficiency)
Courses in Semester I	IV 23UGEL14	III 23UGEL13	I 23UGEL11
Courses in Semester II	V 23UGEL25	IV 23UGEL24	II 23UGEL22
Courses in Semester III	VI 23UGEL36	V 23UGEL35	III 23UGEL33
Courses in Semester IV	VII 23UGEL47	VI 23UGEL46	IV 23UGEL44

GENERAL COURSE OUTCOMES

CO1   Acquire the four language skills (Listening, Speaking, Reading and Writing)

CO2   Develop the skill of independent reading and interpreting of graded texts

CO3   Expand and consolidate active and passive vocabulary

CO4   Acquire the skills needed to participate in a conversation that builds knowledge collaboratively

CO5   Acquire a clear understanding of English Grammar to facilitate accuracy of communication

CO6   Develop the skills of formal written communication to be used in academic and career related contexts

TEXTS

Course I   -   *Spotlight I*
Course II   -   *Spotlight II*
Course III   -   *Spotlight III*
Course IV   -   *Spotlight IV*
Course V   -   *Spotlight V*
Course VI   -   *Spotlight VI*
Course VII   -   William Shakespeare's *Julius Caesar* &
                             Charles Dickens' *Oliver Twist*
All Courses   -   *Active English Grammar and Composition* by the Board of Editors

EXTERNAL EXAMINATION

❖ External Examination has two components.
   1) Written Examination and 2) Viva Voce

❖ A three-hour written examination will be conducted for 100 marks for all General English papers and the scores will be converted to 40 marks, with a pass minimum of 16 marks

❖ At the end of every semester, **Spoken English Viva Voce** will be conducted for all the students for 100 marks (four components) and the scores will be converted to 10 marks, with a required pass minimum of 4 marks

❖ To pass in any General English paper, a student must secure the pass minimum of 40 out of 100

Distribution of marks: **Written Exam** (100 marks)   Converted to 40 marks

                           Viva voce   (100 marks)   Converted to 10 marks

                           TOTAL   **(40+10)**   **50 marks**

INTERNAL ASSESSMENT

❖ Two Internal Examinations shall be conducted for 50 marks each along with the Continuous Internal Assessments for the Core and Allied courses.

❖ The internal assessment for the courses may include assignments, seminars, projects, tests, viva (any oral presentation), communication activities etc., focusing on skill development or / and the course content

GENERAL ENGLISH
COURSE – I

Hours: 6	Course Code: 23UGEL11	Credits: 3

LEARNING OUTCOMES

LO1 To provide an ambience to acquire the basic language skills, listening, speaking, reading and writing

LO2 To make the learners learn the basic elements of grammar

LO3 To enable them to involve in basic communicative activities

LO4 To develop basic vocabulary

LO5 To help the learners comprehend and respond in English

LO6 To build confidence in using English to communicate

UNIT	TOPICS	
I	**POETRY** Maya Angelou Hilaire Belloc	"Poor Girl" "The Justice of Peace"
II	**PROSE** A. P. J. Abdul Kalam Madhavan Kutty	"My Early Days" "I Won't Let Him Go!"
III	**SHORT STORIES** Oscar Wilde Mulk Raj Anand	"The Selfish Giant" "The Lost Child"
IV	**LANGUAGE COMPETENCY** 1. Use of Verbs: Verb Grid (Positive, Negative & Question), Regular Verbs, Irregular Verbs & Modals 2. Tenses: Active Voice Tenses & Passive Voice Tenses 3. Use of Nouns: Forms of Personal Pronouns, Use of Nouns as Subject, Object, Complement and Object of the Preposition 4. Sentence Patterns: SV, SVO, SVC, SVA, SVOA, SVIODO 5. Punctuation and Capitalisation 6. Reading Comprehension (5 Anecdotes and 5 Wisdom Stories)	
V	**SPOKEN ENGLISH** 1. Reading Aloud (From the text) 2. Introducing oneself 3. Describing a place (With hints) 4. Describing a picture(With hints)	

COURSE OUTCOMES

CO1 Use grammatical structures in meaningful constructions

CO2 Use oral communication for day-to-day activities

CO3 Use simple sentences for oral and written communication

CO4 Use punctuation and capitalisation accurately

CO5 Comprehend what they listen to, and respond to it at the primary level

CO6 Read and appreciate simple stories and anecdotes

TEXTBOOKS

1. Board of Editors. *Spotlight I.* India: Ponnsai Publishers & Distributors, 2015.

2. *Oxford Elementary Learner's Dictionary.* Ed. Angela Crawley. Phonetics Ed. Michael Ashby. United Kingdom: Oxford University Press, 2021.

3. Board of Editors. *Active English Grammar and Composition.* India: Trinity Press, 2022.

REFERENCE

- Bhatnagar, R. P. ,*English for Competitive Examinations,* India: Trinity Press, 2017.
- Joseph K. V. , *A Textbook of English Grammar & Usage,* India: McGraw Hill Education 2015.
- Sinha, R. P. *Current English Grammar and Usage with Composition.* India: Oxford University Press, 2018.

S. No.	QUESTION PATTERN	Marks
I	3 Short essays (200 words each) out of 6 from Units I, II & III (3X10)	30
II	5 Match the following from Units I, II & III	05
III	5 Stating True or False from Units I, II & III	05
IV	Verb Grid (Positive, Negative & Question)	20
V	Tense Grid (Active & Passive)	10
VI	Noun as subject, object, complement & object of the preposition	10
VII	Sentence pattern	10
VIII	Punctuation & Capitalization	05
IX	Reading comprehension	05
	Total	**100**

COURSE – II

Hours: 6	Course Code: 23UGEL22	Credits: 3

LEARNING OUTCOMES

LO1   To provide an ambience to acquire the basic language skills, listening, speaking, reading and writing
LO2   To make the learners frame questions and answers
LO3   To enable them to involve in basic communicative activities
LO4   To develop a comprehensible use of adjectives and adverbs
LO5   To help the learners comprehend and respond in English
LO6   To develop oral communication for day-to-day activities

UNIT	TOPICS	
I	**POETRY** Rabindranath Tagore Gieve Patel	"Leave this Chanting and Singing" " On Killing a Tree"
II	**PROSE** Leslie W. Leavitt Sister Nivedita	"Mahatma Gandhi" "The Judgement Seat of Vikramaditya"
III	**SHORT STORIES** O. Henry Stephen Leacock	"After Twenty Years" "With the Photographer"
IV	**LANGUAGE COMPETENCY** 1. Use of Adjectives 2. Use of Adverbs 3. Use of Conditional 'If' (Probable & Improbable Conditions) 4. Use of 'who', 'which', 'where' & 'that' in combining sentences 5. Framing questions – 'Wh -' & 'Yes' / 'No' Questions 6. Prefixes and Suffixes 7. Developing Hints into a Paragraph	
V	**SPOKEN ENGLISH** 1. Reading Aloud (from the Prescribed Text) 2. Introducing Others 3. Describing a Personality (from Hints) 4. Narrating a Story(from Hints)	

COURSE OUTCOMES

CO1   Use grammatical structures in meaningful contexts
CO2   Use oral communication for day-to-day activities
CO3   Use simple sentences for oral and written communication
CO4   Use enhanced vocabulary
CO5   Comprehend and respond to what they listen to at the secondary level
CO6   Read and appreciate simple pieces of fiction and non-fiction

TEXTBOOKS

1.   Board of Editors. *Spotlight II*.India: Ponnsai Publishers & Distributors, 2015.

2. *Oxford Elementary Learner's Dictionary.* Ed. Angela Crawley. Phonetics Ed. Michael Ashby. United Kingdom: Oxford University Press, 2021.

3. Board of Editors. *Active English Grammar and Composition.* India: Trinity Press, 2022.

REFERENCE

- Bhatnagar, R. P., *English for Competitive Examinations.* India: Trinity Press, 2017.

- Joseph K. V. *A Textbook of English Grammar & Usage,* India: McGraw Hill Education, 2015.

- Sinha, R. P. *Current English Grammar and Usage with Composition.* India: Oxford University Press, 2018.

S. No.	QUESTION PATTERN	Marks
I	3 Short Essays from Unit I, II and III	30
II	5 True or False (Units I, II and III)	05
III	5 Match the Following (Unit I, II and III)	05
IV	Adding appropriate adjectives	10
V	Adding appropriate adverbs	10
VI	Framing Probable & Improbable Conditional Sentences	10
VII	Combining Sentences with 'who', 'where', 'which' & 'that'	10
VIII	Framing 'Wh' & 'Yes/No' Qns.	10
IX	Prefixes & Suffixes	05
X	Developing Hints to a Paragraph (100 words)	05
	Total	**100**

GENERAL ENGLISH

COURSE - III

Hours: 6	Course Code: 23UGEL13, 23UGEL 33	Credits: 3

LEARNING OUTCOMES

LO1   To involve the learners in reading and interpreting English in poetry and prose (Fiction and Non-fiction)

LO2   To enable learners to write about prescribed literature

LO3   To help learners develop vocabulary register

LO4   To help learners learn the appropriate use of articles, prepositions and adverbs

LO5   To facilitate in learners, the ability to create a narration based on hints

LO6   To build confidence in the learners to speak English for specific purposes

UNIT	TOPICS	
I	**POETRY** William Shakespeare P. B. Shelley Oliver Goldsmith	"All the World's a Stage" "Ozymandias" "The Village Schoolmaster"
II	**SHORT STORIES** A. J. Cronin Stephen Leacock Ernest Hemingway	"Two Gentlemen of Verona" "The Conjuror's Revenge" "A Day's Wait"
III	**PROSE & SHORT STORIES** C. L. N. Prakash O. Henry Natsume Soseki	"Rethink Your Thinking" "The Gift of the Magi" "I am a Cat"
IV	**LANGUAGE COMPETENCY** 1. Homonyms, Homophones, Homographs 2. Articles 3. Prepositions 4. Adverbs 5. Constructing a story using hints	
V	**SPOKEN ENGLISH** 1. Reading aloud 3. Describing a picture 2. Describing a process 4. Personal Conversation (Habits, Hobbies, Future Plan)	

COURSE OUTCOMES

CO1   Read and understand English in poetry and prose (Fiction and Non-Fiction)

CO2   Write coherent essays about prescribed literature

CO3   Use words from acquired vocabulary register

CO4   Use articles, prepositions and adverbs appropriately

CO5   Create a narration from hints

CO6   Speak English confidently in a descriptive as well as expository style

TEXTBOOKS

1. Board of Editors. *Spotlight III,* India: Ponnsai Publishers & Distributors, 2015.

2. Board of Editors. *Active English Grammar and Composition.* India: Trinity Press, 2022.

REFERENCE

- Bhatnagar, R. P. *English for Competitive Examinations.* India: Trinity Press, 2017.

- Joseph. K. V, *A Textbook of English Grammar & Usage,* India:McGraw Hill Education, *2015*

- Sinha, R. P. *Current English Grammar and Usage with Composition.* India: Oxford University Press, 2018.

S. No.	QUESTION PATTERN	Marks
I	1 Short Essay (200 words) out of 2 from Unit I	10
II	1 Essay (300 words) out of 2 from Unit II	15
III	1 Essay (300 words) out of 2 from Unit III	15
IV	5 passages with 2 Qns. each (from Units I,II &III)	10
V	Homonyms, Homophones, Homographs	10
VI	Articles	10
VII	Prepositions	10
VIII	Adverbs	10
IX	Constructing a story	10
	Total	**100**

COURSE - IV

Hours: 6	Course Code: 23UGEL14, 23UGEL24, 23UGEL44	Credits: 3

LEARNING OUTCOMES

LO1 To make learners read and understand intermediate level poetry and prose

LO2 To encourage learners to continue building a vocabulary register as the students interpret, speak and write about prescribed literature

LO3 To enable learners fashion sentences to make paragraphs with unity of sense and structure

LO4 To enable learners plan, organise ideas and write an essay

LO5 To help learners learn the different types of letter, their structures and the use of appropriate language

LO6 To make learners use grammatical structures in meaningful constructions

UNIT	TOPICS	
I	**POETRY** William Shakespeare John Milton Lewis Carroll Nissim Ezekiel	"Shall I Compare Thee" "On His Blindness" "The Walrus and the Carpenter" "The Professor"
II	**PROSE** Amitav Ghosh Desmond Morris Mark McCormack	"The Town by the Sea" "A Little Bit of What You Fancy" "To Know When to Say It's None of Your Business"
III	**SHORT STORIES & DRAMA** Aldous Huxley Oscar Wilde Fritz Karinthy	"The Portrait" "The Happy Prince" "The Refund"
IV	**LANGUAGE COMPETENCY** 1. Tenses (with Verb Grid) 2. Concord 3. Describing a thing / a place / an event 4. Spotting Errors (Tenses and Concord) 5. Letter Writing (Personal & Official)	
V	**SPOKEN ENGLISH** 1. Reading Aloud 2. Issue based conversation 2. Speaking about prescribed literature 4. Speaking on a given topic	

COURSE OUTCOMES

CO1 Read, interpret and analyse intermediate level of English in poetry, prose and fiction

CO2 Write coherent essays on prescribed literature

CO3   Use the various tense forms accurately with proper subject - verb agreement

CO4   Write descriptive paragraphs with unity of sense

CO5   Identify common errors in the usage of Tenses and Concord

CO6   Speak English fluently with confidence in an expository as well as analytical style

TEXTBOOKS

1. Board of Editors. *Spotlight IV*. India: Ponnsai Publishers & Distributors, 2015.

2. Board of Editors. *Active English Grammar and Composition.* India: Trinity Press, 2022.

REFERENCE

- Bhatnagar, R. P. *English for Competitive Examinations.* India: Trinity Press, 2017.

- Joseph K. V. *A Textbook of English Grammar & Usage,* India:McGraw Hill Education, *2015*

- Sinha, R. P. *Current English Grammar and Usage with Composition*, India: Oxford University Press, 2018.

S. No.	QUESTION PATTERN	Marks
I	1 Short Essay (200 words) out of 2 from Unit I	10
II	1 Essay (300 words) out of 2 from Unit II	15
III	1 Essay (300 words) out of 2 from Unit III	15
IV	5 passages with 2 Qns. each (from Units I, II & III)	10
V	Tenses	10
VI	Concord	10
VII	Describing a thing / a place / an event	10
VIII	Spotting Errors	10
IX	Letter Writing	10
	Total	**100**

GENERAL ENGLISH

COURSE – V

Hours: 6	Course Code: 23UGEL25, 23UGEL35	Credits: 3

LEARNING OUTCOMES

LO1 To introduce learners to intermediate level of English through prescribed d literature

LO2 To make learners read, interpret and write about prescribed pieces of literature

LO3 To make learners learn complex language structures and appropriate use of conjunctions

LO4 To help learners become familiar with the accurate use of language with an awareness of common errors in language use

LO5 To make learners understand the logical sequence of ideas within a paragraph

LO6 To make learners speak English fluently with confidence and accuracy for specific purposes

UNIT	TOPICS	
I	**POETRY** William Wordsworth Robert Frost Mina Assadi H.W. Longfellow Philip Larkin	"The Solitary Reaper" "The Road Not Taken" "A Ring to Me Is Bondage" "A Slave's Dream" "Next Please"
II	**PROSE, DRAMA AND SHORT STORY**	
	Dr. Radhakrishnan Collins & Lapiere Oscar Wilde Somerset Maugham A. A. Milne	"Humanities Vs Sciences" "The Second Crucifixion" "The Model Millionaire" "The Ant and the Grasshopper" "The Boy Comes Home"
III	**LANGUAGE COMPETENCY (Grammar & Vocabulary)** 1. Words often confused 2. Synonyms and Antonyms 3. Synthesis and Transformation of Sentences (Simple, Compound & Complex) 4. Conjunctions 5. Active - Passive Voice	
IV	**LANGUAGE COMPETENCY (Composition)** 1. Expansion of Ideas / Proverbs 2. Sentence Arrangement 3. Dialogue Writing	
V	**SPOKEN ENGLISH** 1. Reading and Interpreting 2. Turncoat 3. Expand a Proverb 4. Issue Based Conversation	

COURSE OUTCOMES

CO1 Read, interpret and analyse poetic English to understand open possibility of inferences

CO2 Write logically planned essays to address specific questions concerning prescribed literature

CO3 Understand the forms and structural differences in different types of sentences and their specific purposes

CO4 Use complex language structures with appropriate conjunctions

CO5 Use vocabulary actively with an awareness of homonyms, homophones, synonyms and antonyms

CO6 Use Spoken English fluently with confidence and accuracy for specific purposes such as analytical, argumentative and expository talks

TEXT BOOKS

1. Board of Editors. *Spotlight V,* India:Ponnsai Publishers & Distributors, 2015.

2. Board of Editors. *Active English Grammar and Composition.* India:Trinity Press, 2022.

REFERENCE

- Bhatnagar, R. P. *English for Competitive Examinations*, India: Trinity Press, 2017.
- Joseph K. V. *A Textbook of English Grammar & Usage,* India: McGraw Hill Education*, 2015*
- Sinha, R. P. *Current English Grammar and Usage with Composition*, India: Oxford University Press, 2018

S. No.	QUESTION PATTERN	Marks
I	1 Short Essay (200 words) out of 2 from Unit I	10
II	1 Essay (300 words) out of 2 from Unit II	15
III	5 passages with 2 Qns. each (from Units I, II & III)	10
IV	Vocabulary	15
V	Synthesis of sentences	10
VI	Transformation of sentences	05
VII	Active - Passive Voice	10
VIII	Conjunction	05
IX	Expansion of Ideas / Proverbs (2x5=10)	10
X	Sentence Arrangement	05
XI	Dialogue Writing	05
	Total	**100**

COURSE - VI

Hours: 6	Course Code: 23UGEL36, 23UGEL46	Credits: 3

LEARNING OUTCOMES

LO1 To introduce learners to advanced level of poetic English through representative pieces, to make them understand oblique use of language

LO2 To make them read and understand modern English prose through samples of biography, autobiography, short story and one act play

LO3 To familiarise them with advanced language structures and the use of idioms and phrasal verbs

LO4 To make them understand and use different degrees for comparison and use language for reporting speech

LO5 To acquaint them with the skills of expanding or developing, and condensing ideas

LO6 To make them speak English fluently and accurately for specific purposes

UNIT	TOPICS	
I	**POETRY** Edwin Arnold Sylvia Plath John Keats John Donne Maya Angelou	"Siddhartha" "The Mirror" "La Belle Dame Sans Merci" "Death Be Not Proud" "I Know Why the Caged Bird Sings"
II	**PROSE, SHORT STORY & DRAMA** Anne Frank C.P. Snow Chinua Achebe Hugh Chesterton	"The Diary of a Young Girl" "Hardy and Ramanujan" "Marriage is a Private Affair" "The Pie and the Tart"
III	**LANGUAGE COMPETENCY (Grammar and Vocabulary)** 1. Degrees of Comparison 2. Direct- Indirect Speech 3. Cloze Test. 4. Idioms and Phrasal verbs 5. Spotting Errors	
IV	**LANGUAGE COMPETENCY (Composition)** 1. Précis Writing 2. Essay Writing	

V	**SPOKEN ENGLISH**
	   1. Reading and Interpretation 2. Issue Based Conversation
	   3. Public Speaking on subject topic 4. Extempore	

COURSE OUTCOMES

CO1 Read and interpret the oblique language of poetry and write appreciative essays on the prescribed literature

CO2 Read, interpret and write analytical essays about prescribed prose pieces

CO3 Use advanced grammar structures to report speech and use the three degrees of comparison for intended emphasis

CO4 Use advanced nuances of language such as idioms and phrasal verbs

CO5 Write reflective, descriptive, expository and imaginative essays with appropriate content, and condense material to a précis

CO6 Use English fluently and accurately for public speaking, extempore and other specific purposes

TEXT BOOKS

- Board of Editors. *Spotlight VI*, India: Ponnsai Publishers & Distributors, 2016.
- Board of Editors. *Active English Grammar and Composition*, India: Trinity Press, 2022

REFERENCE

- Bhatnagar, R. P. *English for Competitive Examinations,* India: Trinity Press, 2017.
- Joseph K. V. *A Textbook of English Grammar & Usage,* India: McGraw Hill Education, 2015
- Sinha, R. P. *Current English Grammar and Usage with Composition.* India: Oxford University Press, 2018.

S. No.	QUESTION PATTERN	Marks
I	1 short essay (200 words) out of 2 from Unit I	10
II	1 essay (300 words) out of 2 from Unit II	15
III	5 Passages with 2 Qns. each (from Units I & II)	10
IV	Degrees of Comparison	05
V	Direct Indirect Speech	10
VI	Making sentences – Idioms	05
VII	Phrasal verbs	05
VIII	Spotting errors (Multiple Choice)	10
IX	Correcting the errors (Rewriting)	05
X	Cloze Test	05
XI	Precis Writing	10
XII	Essay Writing	10
	Total	**100**

GENERAL ENGLISH

COURSE - VII

Hours: 6	Course Code: 23UGEL47	Credits: 3

LEARNING OBJECTIVES

LO1 To facilitate learners' reading advanced English through representative pieces of Literature

LO2 To help learners infer and interpret prescribed literature and write coherent, Analytical essays

LO3 To help learners acquire the advanced use of English for professional purposes

LO4 To help learners prepare resume and CVs for professional use

LO5 To encourage learners in using English skillfully and creatively to discuss, brainstorm or debate a topic, through active practice

LO6 To equip learners with the soft skills necessary for employability

I	**DRAMA** William Shakespeare *Julius Caesar*
II	**FICTION** Charles Dickens *Oliver Twist*
III	**SOFT SKILLS 1 (Theory and Practice)** 1.Interview skills* 2. Group Discussion* 3.Debate 4. Interpersonal Skills * Included for Spoken English Viva Voce also
IV	**SOFT SKILLS 2 (Theory and Practice)** 1. Time Management 2. Problem Solving Techniques 3. Teamwork 4. Leadership
V	**APPLICATION & RESUME** 1. Chronological Resume. 2. Functional Resume 3. Responding to the given advertisement

COURSE OUTCOMES

CO1 Read and understand advanced forms of English in Literature

CO2 Interpret and write analytical essays on topics concerning prescribed pieces of literature

CO3 Speak English fluently and accurately in professional contexts

CO4 Prepare application with appropriate Resume structure for employment

CO5 Use English effectively and creatively for interview, group discussion etc.,

CO6 Behave, react and handle situations connected to employability, using the acquired knowledge of soft skills

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TEXT BOOKS

- Shakespeare, William. *Julius Caesar,* United Kingdom: Oxford University Press, 2008.

- Dickens, Charles. *Oliver Twist*, United Kingdom: Penguin Classics, 2003

REFERENCE

- Bhatnagar, R. P. *English for Competitive Examinations.* India: Trinity Press, 2017.

- Joseph K. V. *A Textbook of English Grammar & Usage,* India: McGraw HillEducation, 2015
- Sinha, R. P. *Current. English Grammar and Usage with Composition*, India: Oxford University Press, 2018.

S. No.	QUESTION PATTERN	Marks
I	5 Multiple Choice Questions from Unit I	05
II	5 Multiple Choice Questions from Unit II	05
III	1 Essay (400 words) out of 3 from Unit I	15
IV	1 Essay (400 words) out of 3 from Unit II	15
V	2 Annotations out of 3 from Unit I	10
VI	2 Paragraphs out of 3 from Unit II	10
VII	1 Essay out of 2 from Unit III	15
VIII	1 Essay out of 2 from Unit IV	15
IX	Responding to the given Advertisement	10
	Total	**100**

DEPARTMENT OF HUMAN EXCELLENCE

St. Xavier's College (Autonomous), Palayamkottai

Courses offered

Semester	Category	Course Code	Course Title
I	FC	23UHER11/ 23UHEE11	Religion: Catholic Doctrine / Ethics
II	SEC3	23UHEI21	Integrated Personality Development
III	SEC4	23UHEL31	Life Coping and Entrepreneurial Skills Management
IV	EVS	23UEVS41	Environmental Studies
V	VE	23UVEH51	Human Rights and Social Analysis

NME

Semester	Category	Course Code	Course Title
I	Library	23ULBN11	Foundations of Library Science
I	XRF	23UXRN11	Traditional Knowledge of Indian Medicinal Systems
II	Library	23ULBN21	Information Resources
II	XRF	23UXRN21	Indian Traditional Medicinal Foods
III	XRF	23UXRN31	Food Microbiology
IV	XRF	23UXRN41	Herbal Resources and Their Conservation
IV	MAX Forum	23UMXN41	Society, Economy and Politics in Contemporary India

Common Question Pattern

Internal Test

Part A	Answer ALL the questions in one or two lines	5 x 2 = 10
Part B	Answer ALL the questions, each in a paragraph	3 x 5 = 15
Part C	Write an essay on the following	1 x 10 = 10

Semester Exam

Part A	Answer ALL the questions in one or two lines	10 x 3 = 30
Part B	Answer ALL the questions, each in a paragraph	5 x 8 = 40
Part C	Write an essay on each the following	2 x 15 = 30

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RELIGION: CATHOLICDOCTRINE
(23UHER11)

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SEMESTER:I	VE	HOURS:2	CREDITS: 2	TOTALHOURS:30

Course Outcomes:
Upon completion of the course the students will be able to

1. Recite the Sacraments(K1)
2. Identify the challenges of the present day church(K1)
3. Associate Old and New testaments of the bible(K2)
4. Explain the Church history(K2)
5. Discuss the Marian worship (K2)
6. Summarize the catholic social teachings(K2)

Unit I: Introduction to Bible (6 Hours)

Bible as a Word of God, its inspiration, the Canon - Old and New Testaments and their interconnectedness - Traditional and modern interpretations

Unit II: Introduction to the Church history (6Hours)

The beginnings of the Church - Medieval period and its challenges - The importance of the Second Vatican Council and their decrees - Synodality

Unit III: Introduction to the Sacraments (6Hours)

The origin of the seven sacraments - Their practices and meanings - History of thesacraments

Unit IV: Introduction to Mariology (6Hours)

Mary, Mother of God and Jesus - Mary, our Mother and in the Gospels - Mariology in the history of the Church – Mary as a Prophet of revolution

Unit V: Church in the Contemporary World (6Hours)

The challenges of the present day Church – Casteism and Same sex marriage – Ecumenical unity and Inter Religious harmony - Catholic Social Teachings

REFERENCES:

1. Paul C. Jesuraj, Growing in Your Faith, July 2022.
2. Second Vatican Council Documents

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ETHICS
(23UHEE11)

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SEMESTER: I	VE	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

Course Outcomes :

Upon completion of the course the students will be able to

- Describe the Ethical foundations and human history (K1)
- Identify Ethics and its relationship with Religions (K1)
- List the personal ethical codes to be practices in day to day life (K1)
- Associate ethics in family and society (K2)
- Summarize modern ethical issues and problems (k2)
- Discuss bio and environmental ethics (k2)

Unit I : Introduction to Ethics (6 Hours)

Meaning, Nature and Scope of Ethics - Challenges and Importance of ethics - Basic Ethical Foundations

Unit II : Ethics in Religions (6 Hours)

Ethical foundations and meanings in big and small traditions - Ethics and its relationship with Religions

Unit III : Personal Ethics (6 Hours)

Moral precepts - Dynamics of personal morality - Moral Conscience - Ethical aspects of Thirukural – Evils of Corruption – Gandhi's Seven Deadly Sins.

Unit IV : Family Ethics and Social Ethics (6 Hours)

Role of Family in ethical formulations- Respecting persons - Peace and Justice - Human Duties

Unit V : Modern Ethical Issues (6 Hours)

Bio Ethics - Media Ethics - Environmental Ethics –Cyber Ethics

REFERENCES:

1. Ethics prepared by School of Interdisciplinary and Trans-disciplinary Studies, Indira Gandhi National Open University (MPYE 002)
2. Course material prepared by the Department of Human Excellence.

INTEGRATED PERSONALITY DEVELOPMENT
(23UHEI21)

SEMESTER: II	SEC3	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

Course Outcomes:

Upon completion of the course the students will be able to

- Identify personal strengths and weaknesses (K1)
- Identify the means of self-esteem (K1)
- Identify the means of improving personal performance(K1)
- Explain the techniques of self-management(K2)
- Describe coping strategies of learning (K2)
- Discuss the traits of personal competence(K2)
- Summarize different dimensions of Personality (K2)

UNIT I: Self – Knowledge (6 Hours)

Exploring habits, attitudes, preferences and experience –SWOC analysis – Johari Window – Enhancing one's self image, self-esteem, self confidence

UNIT II: Self-Management (6 Hours)

Understanding of life story - Focusing on Internal narratives - Managing change, confusion and uncertainty –Goal setting – Personal Vision and Mission statements

UNIT III: Personal Competence and Maturity (6 Hours)

Motivation - Developing rapport - Giving and receiving constructive criticism - Assertiveness and negotiation skills – Leadership – Type of Leadership – Qualities of a good leader

Unit IV: Dimensions of Personality Development (6 Hours)

Recognizing the gradual growth in different dimension of one's personality such as (a) Physical (b) Intellectual (c) Emotional (d) Moral (e) Social and (f) Spiritual - Learning the Development process; Tools and Skills - Helping to maximize one's potentials

Unit IV: Academic Learning Strategies (6 Hours)

Memory - Art of generative listening, learning and writing - Note making - Presentation skills - Time management - Receptive skills - Classroom etiquettes - Cyber knowledge

REFERENCE BOOKS:

1. Dr. Xavier Alphonse S.J., We Shall Overcome, ICRDEC Publications, Chennai, 2004.
2. Personality Development, Harold R. Wallace and L. Ann Masters, South-Western, Cengage Learning India PL, New Delhi, 2006.
3. Course material prepared by the Department of Human Excellence

LIFE COPING AND ENTREPRENEURIAL SKILLS MANAGEMENT
(23UHEL31)

SEMESTER: III	SEC4	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

Course Outcomes :

Upon completion of the course, the students will be able to

1. Identify the various challenges faced in adolescence (K1)
2. Tabulate healthy habits and lifestyle (K1)
3. Identify problem solving strategies (K1)
4. Discuss family and professional relationship(K2)
5. Explain cognitive, emotional and behavioural perspectives (K2)
6. Describe evils of addiction and the remedies available (K2)

Unit I: Physical AND Mental Wellbeing (6 Hours)

Adolescent Health and Holistic Health - Understand and appreciate physical Self - Personal hygiene and grooming - Balanced diet - Healthy habits and lifestyle - Sound body and mind - Nurturing health at home, in campus –Definition of Health - Women health – various medicine systems

Unit II: Interpersonal and Social Wellbeing (6 Hours)

Family Relationship: Values in family relationship, Nuclear, Joint Family, Dependence, Overdependence, Happy family, Broken Family - Caring Elders - Rapport Building with Peers/ Friends, Strangers, Transgenders - Professional Relationship : Officials, Mentors, Staff & Service Personnel- Other centeredness and others point of view and Empathy

Unit III: Problem-solving and Decision making skills (6 Hours)

Decision making processes - Lateral Thinking and problem-solving strategies - Select and apply problem-solving strategies to more complex tasks and problems - Gain familiarity with concepts such as performance indicators and benchmarking – Counseling.

Unit IV: Coping Strategies (6 Hours)

Conflict/Crisis Management –Stress Management – Emotional Management - Team, Task and Resource Management – Ignatian Discernment Process

Unit V: Overcoming Addiction (6 Hours)

Various stages of addiction- Gadgets addiction - Substance abuse - Media addiction – Internet addiction – Impact, prevention and remedies.

REFERENCE BOOKS:

1. Dr. Xavier Alphonse S.J., We Shall Overcome, ICRDEC Publications, Chennai, 2004.
2. Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publishers, 1998.
3. Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998.
4. Course Material prepared by the Department of Human Excellence.

ENVIRONMENTAL STUDIES
(23UEVS41)

SEMESTER: IV	EVS	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

Course objective:

To cater to students from diverse disciplinary backgrounds and to sensitise them about the commitment of our nation towards achieving sustainable development goals and addressing global environmental challenges.

Course outcomes:

The student will be able to:

1. Describe various natural resources and the need for sustainable development (K1).
2. Relate biodiversity and its conservation approaches (K2).
3. Solve the environmental issues of concern and discover prevention strategies (K3).
4. Sensitize and categorize the adverse health impacts of pollution (K3).
5. Assess environmental quality and risks for climate change mitigation (K4 & K5).
6. Recognize the major treaties to safeguard Earth's environment and resources (K2).

Unit I: Natural Resources and Sustainable Development   **(6 hours)**

Overview of natural resources: definition, classification. Biotic resources: major types, status and challenges. Water resources: types, over-exploitation, issues, challenges, water scarcity, conflicts. Soil and mineral resources: important minerals, problems, soil as a resource. Energy resources: sources, conventional and non-conventional, implications. Introduction to sustainable development: SDGs, targets and indicators, challenges and strategies.

Unit II: Conservation of Biodiversity and Ecosystems   **(6 hours)**

Biodiversity and its distribution: Levels and types, India and world, hotspots, threat categories. Ecosystems and ecosystem services: major types in India, basic characteristics, significance. Threats to biodiversity and ecosystems: land use, commercial exploitation of species and invasive species. Major conservation policies: in situ, ex situ, protected areas, traditional knowledge, community based conservation, gender and conservation.

Unit III: Environmental Pollution and Health   **(6 hours)**

Understanding disaster and pollution: definitions, natural and man-made, point source and non-point source, kinds. Air and water pollution: criteria pollutants, sources, and adverse effects, quality standards. Soil and noise pollution: sources and health effects. Thermal and radioactive pollution: sources and impact on health and ecosystems.

Unit IV: Climate Change: Impacts, Adaptation and Mitigation   **(6 hours)**

Understanding climate change: structure of atmosphere, natural and anthropogenic variations, importance of 1.5 °C and 2.0 °C limits to global warming, projections of climate change in Indian subcontinent. Impacts, vulnerability and adaptation to climate change. Mitigation of climate change: GHG reduction vs. sink enhancement, concept of carbon intensity, energy intensity and carbon neutrality; policy instruments, carbon capture and storage, climate justice.

Unit V: Environmental Treaties and Legislation (6 hours)

Overview of instruments of international cooperation: bilateral, multilateral, conventions and protocols, COPs. Major International Environmental Agreements: CBD, CITES, UNCCD, UNFCCC. Major Indian Environmental Legislations: acts, rules, sites, areas, zones and judgements. Major International organisations and initiatives: UNEP, IUCN, WCED, UNESCO, IPCC, MAB.

Reference books

1. Singh, J.S., Singh, S.P., Gupta, S.R. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications.
2. Harris, Frances (2012). Global Environmental Issues, 2nd Edition. Wiley- Blackwell.
3. Krishnamurthy, K.V. (2003). Textbook of Biodiversity, Science Publishers, Plymouth, UK.
4. Ahluwalia, V. K. (2015). Environmental Pollution, and Health. The Energy and Resources Institute (TERI).
5. Pittock, Barrie (2009). Climate Change: The Science, Impacts and Solutions. 2nd Edition. Routledge.
6. Ministry of Environment, Forest and Climate Change (2019). A Handbook on International Environment Conventions & Programmes.
7. KanchiKohli, Manju Menon (2021). Development of Environment Laws in India, Cambridge University Press.

HUMAN RIGHTS AND SOCIAL ANALYSIS
(23UVEH51)

SEMESTER: V	VE	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

Course Outcomes :

Upon completion of the course, the students will be able to

- Describe Indian social scenario (K1)
- List the different kinds of fundamental rights (K1)
- Discuss major social problems in India (K2)
- Analyze critically society and its network of relationships (K4)
- Analyze local and global social problems (K4)
- Describe redressal mechanisms for human rights violations (K6)

Unit I: World trends today and Indian Scenario   **(6 Hours)**
Some basic data – Globalization - World Social Forum vs World Economic Forum - The North South divide – Democracy - Types of Governance in the world – Demography and Basic Data of India

Unit II: IndianSocial System   **(6 Hours)**
Social Analysis - Social system and its components - Interdependence of human being and society - A land of cultural linguistic and religious diversity - secularism-communalism-fundamentalism-Indian politics and religion-problems of the minority.

Unit III: Major Social Problems I   **(6 Hours)**
Indian Economic inequality and Poverty; Manifestation and Measurement; Incidence and Magnitude; Causes, problems of poor and pains of poverty; the remedy - Ignorance in Governance and corruption: The Concept; Causes and Impact of Corruption; Combating Corruption - Illiteracy:Magnitude, Causes and Consequences

Unit IV: Major Social Problems II   **(6 Hours)**
Caste Discrimination: caste discrimination and process of exclusion, Honour Killing, Untouchability, Caste Politics, Reservation policy –Dalit Empowerment - Child abuse, child labour - Effects of Abuse on Children - Violence against women: Harassment; Nature, Extent and Characteristics– Empowerment of Women - LGBTQIA+ – Currently pressing issues.

Unit V: Human Rights, Indian Constitutionsand Empowerment   **(6 Hours)**
Universal Human Rights: The concept – Evolution – Organizations and Recent Developments – Indian Constitutions: Preamble - Political and Civil fundamental rights and duties. Empowerment Models: Communitarian and Local Models – Social Reformers: Ambedkar, Gandhi, Muthulakshmi Reddy and Periyar - Dreams and hopes for better India.

REFERENCE BOOKS:
1. P.N. Sharma, "Social problems and issues in India", Bharat Book Centre, 2014
2. New India, The Reality Reloaded, Gurjot S. Kaler, Chandigarh, India, 2018
3. Course Material Prepared by the Department of Human Excellence

FOUNDATIONS OF LIBRARY SCIENCE
(23ULBN11)

SEMESTER: I	NME	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

COURSE Outcomes: At the end of the course the students will be able to

CO1.	Comprehend the Evolution, Significance, and Fundamental Operations of Libraries.	(K2)
CO2.	Develop Effective Reading Strategies and Critical Thinking Skills.	(K3)
CO3.	Differentiate and grasp the distinct roles and functions of various types of libraries.	(K4)
CO4.	Explore Modern Library Services and the Impact of Digital Resources.	(K4)
CO5.	Recognize the potential of VR, AI, and chatbots in enhancing user support within library environments.	(K5)

UNIT 1 (6 Hours)
INTRODUCTION TO LIBRARY
The history and evolution of libraries - Need - Purpose - Functions - Five Laws of Library Science.

UNIT 2 (6 Hours)
TYPES OF LIBRARY
Public – Academic – Special - National. (Definition, purpose and functions of each type of library.

UNIT 3 (6 Hours)
LIBRARY SERVICES AND COLLECTION DEVELOPMENT
Reference services and reader advisory- Collection development and Management - E-books - E-journals Database - Bulletin Boards.

UNIT 4 (6 Hours)
EMERGING TECHNOLOGIES IN LIBRARIES
Virtual reality and augmented reality in libraries - AI and chatbots for user support - Internet of Things (IoT) applications in libraries.

UNIT 5 (6 Hours)
READING CULTURE FOR LIBRARY PRACTITIONERS
Value of Reading in Professional Development - Exploring Diverse Reading Materials - Effective Reading Techniques - Critical Thinking and Reflection.

Text Book
Kumar P S G, Foundations of Library and Information Science B. R. Publishing Corporation

Reference
1. Khanna J K, Library and Society, Kurukshetra University, Kurukshetra
2. Kumar P S G, Foundation of Library and Information Science Paper 1 of UGC Model Curriculum, B.R. Publishing Corporation

TRADITIONAL KNOWLEDGE OF INDIAN MEDICINAL SYSTEMS
(23UXRN11)

SEMESTER: I	NME	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

Course outcomes: At the end of the course the students will be able to

CO1: Understand the concepts of ethno botany and its branches (K1).

CO2: Provide a strong foundation in the principles of ethno medicine and its applications (K2 & K4).

CO3: Inculcate knowledge and make the students aware of the commercial value of medicinal plants (K2 & K3).

CO4: Give an insight into the edible and medicinal plants in tribal medicine (K3).

CO5: Comprehend the advances made in the field of plant biotechnology in conservation of medicinal plant resources (K4).

CO6: Understand ethno botany of the Western Ghats, their medicinal and commercial values and conservation (K1- K4).

Unit I: Ethnobotany (6 hours)

History of Ethnobotany, concept, scope and objectives. The relevance of ethnobotany in the present context. Major ethnic groups in Tamil Nadu.

Unit II: Traditional medicines (6 hours)

Medicinal plants used by Tribals. Ethnobotanical formulations; Ethnobotanical uses of selected medicinal plants with a) *Azadiracthaindica* b) *Ocimumtenuiflorum* c) *Vitexnegundo.* d) *Gloriosasuperba* e) *Tribulusterrestris* f) *Pongamiapinnata* g) *Senna auriculata* h) *Indigoferatinctoria*. Importance and scope of medicinal plants used by *Paliyans*.

Unit III: Commercial value of traditional medicinal plants (6 hours)

Raw drugs from ethnomedicinal plants - Economic potentials of selected ethnomedicinal plants. Ethnobotany as a source of important drugs a) Reserpine b) Artemisin c) Gugulipid d) Cathranthin e) Strychnine. Export of medicinal plants and their products.

Unit IV: Collection, Utilization and Conservation of Traditional Medicinal Plants
(6 hours)

The significance of wild medicinal plants – Collection and utilization of medicinal plants – Therapeutics uses of wild medicinal plants. Role of ethnic groups in the conservation of plant genetic resources. Participatory forest management.

Unit V: Conventional and modern aspects of medicinal plant propagation (6 hours)

Plant Propagation; Methods of propagation – conventional - vegetative cutting, layering grafting etc., Modern methods- Tissue culture; Micropropagation, isolation of secondary metabolites from *in vitro* culture

Textbooks:

1. P.C. Trivedi, Dr. Pravin Chandra 2011. Text Book of Ethnobotany, Pointer Publishers.
2. Bir Bahadur, K. V. Krishnamurthy, T. Pullaiah. 2021. Ethnobotany of India, 5-Volume Set. Apple Academic Press
3. Jain, A. and Jain, S.K. 2016. Indian Ethno botany - Bibliography of 21st Century Scientific Publishers (India).
4. Cunningham, A. B. (2001). Applied Ethnobotany. Earthscan publishers Ltd. London & Sterling
5. Indian Medicinal Plants -An Illustrated Dictionary-C.P. Khare (Ed.) 2019, ©Springer Science+Business Media, LLC.

Reference Books

1. Paul E. Minnis 2000. Ethnobotany: A Reader. University of Oklahoma Press
2. Gary J. Martin, 2014. Ethnobotany A Methods Manual. Springer US.
3. T. Pullaiah, Bir Bahadur, K. V. Krishnamurthy. 2016. Ethnobotany of India Western Ghats and West Coast of Peninsular India. Apple Academic Press
4. Ministry of Environment and Forests. 1994. Ethno biology in India. A Status Report. All India Coordinated Research Project on Ethno biology. Ministry of Environment and Forests. New Delhi
5. Albuquerque, U.P., Ramos, M.A., Júnior, W.S.F., and De Medeiros, P.M. 2017. Ethnobotany.

Web Resources

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2816487/
- https://www.wipo.int/edocs/pubdocs/en/wipo_pub_tk_6.pdf
- https://main.ayush.gov.in/ayush-systems/ayurveda/faq
- https://www.who.int/news
- https://www.csir.res.in/documents/tkdl
- https://www.meity.gov.in/content/national-digital-library

INFORMATION RESOURCES
(23ULBN21)

SEMESTER: II	NME	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

Course Outcomes: Upon completion of the course, the students will be able to

CO1.	learn all kinds of Secondary Sources.	(K1)
CO2.	Learn electronic reference materials.	(K1)
CO3.	Understand the concept and importance of Primary, Secondary and Tertiary sources	(K2)
CO4.	Analyze the different Non Documentary Sources	(K4)
CO5.	Assess electronic information sources, including e-books and e-journals.	(K4)

UNIT-I : Introduction to Information Sources **(6 Hours)**

Definition, Type, Characteristics - Primary, Secondary, Tertiary –Evaluation of print Reference Sources

UNIT-II: Secondary Sources **(6 Hours)**

Definition, Types- Dictionaries, Encyclopedia, Directories, Manuals and Handbooks, Bibliographic sources

UNIT-III : Non – Documentary Source **(6 Hours)**

Formal and Informal – Human Sources, Institutional Information Sources, Technological Gate Keepers and Invisible Colleges.

UNIT-IV : Electronic Information Sources **(6 Hours)**

Meaning- Characteristics- Research database Open Access Resources-Audio resources

UNIT-V: Online Publishers **(6 Hours)**

Detailed study of E-books (Amazon, Sage Publication), E-journals (Springer, Verlog), Database (PROQUEST, EBSCO), Evaluation of E-Resources.

Reference Books:

- Singh, G. (2011).Digital libraries and digitization. EssEss Publications.
- 2. Baby M.D. (2000) Peter Clayton, G. E. Gorman. Managing Information Resources in Libraries. Cambridge Publishers.

INDIAN TRADITIONAL MEDICINAL FOODS
(23UXRN21)

SEMESTER: II	NME	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

Course outcomes: At the end of the course the students will be able to

CO1: Know the foundational principles of health supplements such as functional foods, nutraceuticals, superfoods, etc., and assess their potential within the market context (K1).

CO2: Understand thecore principles of nutrition, including carbohydrates, proteins, lipids, vitamins, minerals, health-enhancing phytochemicals, and antinutritional factors (K2).

CO3: Get knowledge about the origins, traditional uses, nutritional composition, and health advantages of selected plant-based foods (K1).

CO4: Know the scientific rationale underlying the health benefits and potential adverse effects of various food substances (K3).

CO5: Identify the indigenous wild edible plants found in the Southern Western Ghats and their role in enhancing food security (K1).

CO6: Comprehend the fundamental concepts related to food and its significance in promoting health, specifically addressing contemporary health challenges, and demonstrate the ability to apply this knowledge in daily life (K1-K3).

Unit I: FOOD CULTURE (**6 Hours**)
Concept of food and its medicinal value - Food and health in Indian traditional medicine - Effect of globalization on food culture - Fast foods, Junk foods and their impact on the health of children and youth population - Emerging trends in health supplements

Unit II: MACRONUTRIENTS (**6 Hours**)
Carbohydrates and their role in health - Cereals, Millets, and Pseudo - Cereals - Proteins and their importance on health -Pulses and their health benefits **-** Lipids and their health impacts **-** Nuts and oil seeds

Unit III: MICRONUTRIENTS (**6 Hours**)
Vitamins, minerals and their health impacts - Hidden hunger - Greens, Vegetables and Fruits

Unit IV: PHYTOCHEMICALS (**6 Hours**)
Health promoting phytochemicals and antinutritional factors - Spices, and beverages - Lower plants as food sources - Mushrooms and their health benefits

Unit V: WILD EDIBLES & FOOD SECURITY (**6 Hours**)
Tribal knowledge of food plants - Seasonal foods and wild edible plants of *Kanikaran* and *Paliyan* tribes of Tamil Nadu - Sustainability, Food Security, and Health

Text books:
1. Begum, R.M. 2008. A Textbook of Foods, Nutrition & Dietetics, Sterling Publishers Pvt. Ltd.
2. Mudambi, S.R., Rajagopal, M.V. 2007. Fundamentals of foods, nutrition and diet therapy. New Age International.

References:
1. Gopalan, C., Sastri, B.V.R., Balasubramanian, S.C. 2014. Nutritive Value of Indian Foods, National Institute of Nutrition, Hyderabad
2. Dietary Guidelines for Indians – A Manual (English), National Institute of Nutrition, Hyderabad

FOOD MICROBIOLOGY
(23UXRN31)

SEMESTER: III	NME	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

Course outcomes: Upon successful completion of this course, students should be able to:

CO1: Understand the fundamental principles of food microbiology and its importance in the food industry; Apply laboratory techniques for microbial analysis in food samples (K1).

CO2: Identify and characterize common food borne pathogens and their sources (K2).

CO3: Evaluate methods for food spoilage prevention and preservation (K2).

CO4: Describe the role of fermentation in food production and its health implications (K2).

CO5: Analyze emerging trends and ethical considerations in food microbiology; Apply regulatory guidelines and best practices for ensuring food safety and quality (K3).

CO6: Communicate effectively about food microbiology topics in both written and oral formats; Demonstrate critical thinking and problem-solving skills in food safety and quality assurance (K1-4).

Unit 1: Introduction to Food Microbiology (6 hours)

Overview of Food Microbiology; Historical Perspective; Microbial Classification and Taxonomy; Microbial Growth and Factors Affecting Growth; Laboratory Techniques in Food Microbiology

Unit 2: Food borne Pathogens (6 hours)

Common Food borne Pathogens (e.g., *Salmonella, Escherichia coli, Listeria, Campylobacter*); Sources of Food borne Pathogens; Detection and Control Strategies; Food borne Illness Outbreaks and Investigations; Food Safety Regulations

Unit 3: Food Spoilage Microorganisms (6 hours)

Types of Food Spoilage Microorganisms; Factors Influencing Food Spoilage; Spoilage Detection and Prevention; Food Preservation Methods; Food Packaging and Shelf-Life Extension

Unit 4: Food Fermentation (6 hours)

Fermentation in Food Production; Microorganisms Used in Fermentation; Fermented Food Products (e.g., yogurt, cheese, bread); Health Benefits of Fermented Foods; Quality Control in Fermentation

Unit 5: Food Safety and Quality Assurance (6 hours)

Food Safety Management Systems (HACCP); Good Manufacturing Practices (GMPs); Food Testing and Analysis; Risk Assessment and Management; Emerging Trends in Food Safety

Reference Books:

1. Food Microbiology: An Introduction by Thomas J. Montville and Karl R. Matthews, 2017
2. Foodborne Pathogens: Microbiology and Molecular Biology by Pina M. Fratamico, Arun K. Bhunia, and James L. Smith, 2005
3. Food Microbiology: Fundamentals and Frontiers by Michael P. Doyle, Robert L. Buchanan, and Vijay K. Juneja, 2019
4. Fermented Foods and Beverages of the World by Jyoti Prakash Tamang,2010
5. Food Safety Management: A Practical Guide for the Food Industry by Yasmine Motarjemi and HuubLelieveld, 2014

HERBAL RESOURCES AND THEIR CONSERVATION
(23UXRN41)

SEMESTER: IV	NME	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

Course outcomes: At the end of the course the students will be able to

CO1: Understand the concepts in herbalism, medicinal plant trade and National policies (K2)

CO2: Recognize the threats and importance of conserving the medicinal plant resources (K2)

CO3: Explore the important medicinal plant resources of India, their scientific rationale and applications (K3)

CO4: Learn the good agricultural and collection practices of medicinal plants (K1)

CO5: Know the cultivation and post-harvest processing of selected medicinal plants cultivated Tamil Nadu (K2)

CO1: Understand the role of plant resources in global healthcare and its conservation (K1-K3)

Unit I: SCENARIO OF HERBALISM   (6 Hours)
History of herbalism - Herbalism across the globe - Trade of herbals in ancient and contemporary India - Global herbal market and India's position

Unit II: UNSUSTAINABLE USE OF HERBAL RESOURCES   (6 Hours)
Basics of endemism, IUCN categories of threat and CITES - Market demand - Negative impacts of collection from wild resources - Overexploited medicinal plants of India - *In situ* and *ex situ* conservation

Unit III: HIGHLY USED HERBALS OF INDIA   (6 Hours)
Botany, identification, chemistry and applications of *Aswagandha, Seenthil, Nilavembu, Brahmi, Garcinia, Glycyrrhiza, Amla, Vilvam, Keelanelli*and*Satavari*

Unit IV: CULTIVATION & POST-HARVEST PROCESSING   (6 Hours)
Good agricultural practices - Good collection practices - Storing medicinal plants – Post-harvest methods and value addition

Unit V: CULTIVATION OF SELECTED MEDICINAL PLANTS   (6 Hours)
Good agricultural and collection practices for *Senkanthal, Senna, Vinca,Tulsi* and *Asogu*- Government schemes for cultivation of medicinal plants - Kitchen and home herbal gardens

Text book:
Wallis, T.E. 2018. Textbook of Pharmacognosy (Reprinted edition), CBS Publishers, New Delhi.

References:
1. Anonymous, Agro-techniques of selected medicinal plants Vols. I-III. 2014. National Medicinal Plants Board, Government of India.
2. Anonymous, WHO guidelines on good agricultural and collection practices (GACP) for medicinal plants. 2003. WHO, Geneva.
3. Ravikumar, K., Ved, D.K. 2000. Illustrated Field Guide to 100 Red Listed Medicinal Plants of Conservation Concern in southern India, FRLHT, Bangalore.
4. Ved, D.K., Goraya, G.S. 2007. Demand and Supply of Medicinal Plants in India. NMPB, New Delhi & FRLHT, Bangalore.

SOCIETY, ECONOMY AND POLITICS IN CONTEMPORARY INDIA
(23UMXN41)

SEMESTER: IV	NME	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30

Course Outcome:

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

CO1:   Relate the concept of state and government (K1)

CO2:   Understand and evaluate different types of societies in India (K2 & K5)

CO3:   Identify and compare role of market in different types of economy (K3)

CO4:   Examine and compare ideas of Ambedkar with other social, economic and political reformers (K4 & K5).

CO5:   Analyse and formulate the casteless society in India.

UNIT I: STATE AND GOVERNMENT   **(6 Hours)**

State and Government: Meaning and concepts – Features, characteristics and Nature of State and its dynamics in India

UNIT II: DYNAMICS OF SOCIETY   **(6 Hours)**

Society: concept, meaning and basic characteristics of society – different types of societies – stratification of societies in India – Rural-Urban Structures and social Institutions.

UNIT III: ECONOMY AND MARKET   **(6 Hours)**

Economy and Market: Meaning and concept, basic characteristics and types of economies – dynamics of economy and market in new economic policy era.

UNIT IV: SOCIAL, ECONOMIC AND POLITICAL THINKERS IN INDIA   **(6 Hours)**

JyotiraoPhule, Periyar, Gandhi, Ambedkar and Amartya Sen on interaction of society, economy and politics and its dynamics.

UNIT V: BUILDING CASTELESS SOCIETY   **(6 Hours)**

Annihilation of Caste: Meaning and concept - Meaning of sati, childhood marriage, endogamous and exogamy of marriage - Status of Dalit and women in Indian society – Dalit and women emancipation.

References:

1.   Jodhka, S. S. (2002). Nation and village: Images of rural India in Gandhi, Nehru and Ambedkar. *Economic and political weekly*, 3343-3353.
2.   Jodhka, S. S. (2010). Dalits in business: Self-employed scheduled castes in North-West India. *Economic and Political Weekly*, 41-48.
3.   Jodhka, S. S. (2016). Ascriptive hierarchies: Caste and its reproduction in contemporary India. *Current Sociology*, *64*(2), 228-243.
4.   Jodhka, S. S., &Fazal, T. (2021). Religion and Politics in South Asia. Sociological Bulletin, 70(4), 447–452. https://doi.org/10.1177/00380229211062752
5.   Mitra, S. K. (1993). Caste, democracy and the politics of community formation in India. *The Sociological Review*, *41*(1_suppl), 49-71.

6. Mosse, D. (2020). The modernity of caste and the market economy. *Modern Asian Studies*, *54*(4), 1225-1271.

7. Nayyar, D. (1998). Economic development and political democracy: interaction of economics and politics in independent India. *Economic and Political Weekly*, 3121-3131.

8. Robinson, R. (2014). Planning and economic development: Ambedkar versus Gandhi. *Invoking Ambedkar: Contributions, Receptions, Legacies*, 59-71.

9. Singh, A. (2014). Gandhi and Ambedkar: Irreconcilable Differences? *International Journal of Hindu Studies*, *18*(3), 413-449.

10. Stiglitz, J. E. (2016). *The state, the market, and development* (No. 2016/1). WIDER Working Paper.

11. Vikas, R. M., Varman, R., & Belk, R. W. (2015). Status, caste, and market in a changing Indian village. *Journal of Consumer Research*, *42*(3), 472-498.

PROGRAMMING IN C
(23UCSC11)

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Remember the syntax of the basic constructs of C language (K1)

CO2: Differentiate different constructs of C language (K2)

CO3: Apply arrays, structures, pointers and files in suitable situations (K3)

CO4: Analyze and understand programs written in C language (K4)

CO5: Evaluate and debug programs written in C language (K5)

CO6: Design algorithm and write program in C language for the given problem (K6)

UNIT I   **(15 Hours)**

Overview of C: History of C-Importance of C-Basic Structure of C programs-Programming Style. **Constants, Variables and Data Types:** Character set-C Tokens-Keywords and Identifiers-Constants-Variables-Data Types-Declaration of Variables-Declaration of Storage Class-Assigning values to variables-Defining symbolic constants-Declaring a Variable as Constant. **Operators and Expressions:** Operators-Arithmetic Expressions-Evaluation of Expressions-Precedence of Arithmetic Operators-Type Conversions in Expressions-Operator Precedence and Associativity.

UNIT II   **(15 Hours)**

Managing Input and Output Operations: Reading a character-Writing a character-Formatted Input-Formatted Output. **Decision making and Branching:** Decision making with IF –Simple IF Statement-The IF-ELSE statement-nesting of IF—ELSE Statements –The IF-ELSE Ladder-The Switch statement-The Ternary operator-The GOTO statement. **Decision Making and looping:** The WHILE statement-The DO Statement-The FOR Statement-Jumps in loops –concise test expressions.

UNIT III   **(15 Hours)**

Arrays: One Dimensional Arrays-Two Dimensional Arrays-Multi-dimensional Arrays-Dynamic Arrays**. Character Arrays and Strings:** Declaring and initializing String Variables, Reading Strings from Terminal-Writing Strings to Screen-Arithmetic Operations on characters-Putting strings together-Comparing two strings-String handling functions-Array of Strings.

UNIT IV   **(15 Hours)**

User –Defined Functions: Elements of User-defined functions-Definition of function-function calls-Function Declaration-Nesting of Functions-Recursion-Passing Arrays to functions-Passing String to functions-Scope, Visibility and lifetime of variables.

Structure and Union: Defining Structure-Declaring structure variables-Accessing Structure members-Structure Initialization-copying and comparing structure variables-Operations on individual members-Array of Structures-Array within Structures-Structure within Structure-Structure and functions-unions.

UNIT V **(15 Hours)**

Pointers: Understanding pointers-Accessing the address of a variable-Declaring Pointer variables-Initialization of pointer variables-Accessing a variable through pointer-Chain of Pointers-Pointer expression-Pointers and arrays-Array of pointers-Pointers and functions-Pointers as function arguments-Functions returning pointers- Pointers and structures. **File Management in C:** Defining and Opening a File-Closing a File-Input/Output Operations on Files-error Handling-I/O Operations - Random Access to Files-Command Line Arguments.

Text Book:

E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill Education India Pvt, Ltd., Eighth Edition, 2019.

Reference Books:

1.Yashavant Kanetkar, "Let us C", BPB Publications; 19th Edition, 2019
2.Salim Y. Amdani, " 'C' Programming " Laxmi Publications; First edition, 2016

Web Resources: Web content from NDL / SWAYAM or open source web resources.

PRACTICAL –PROGRAMMING IN C
(23UCSC12)

SEMESTER-I	CORE-P1	HOURS-5	CREDITS-5	TOTAL HOURS: 75

Course Outcomes:
Upon completion of the course, the students will be able to
CO1: Develop C programs for simple applications using Control Structures (K6)
CO2: Develop C programs using arrays and strings (K6)
CO3: Develop C programs involving functions, recursion (K6)
CO4: Develop C programs involving pointers (K6)
CO5: Develop C programs involving structures (K6)
CO6: Design applications using files (K6)

List of Practical

1.   Simple C programs

2.   Simple C program using functions

3.   Programs based on control structures

       i. Decision Making (if, if-else, nested if-else, else if ladder)

      ii. Looping (for, while, do-while)

4.   Program using single dimensional Array

5.   Program using two dimensional Arrays

6.   Program using string handling functions

7.   Program using function and recursive function

8.   Program using Structure

9.   Program using pointers

10.   Program to create, access and process file

11.   Program with command line arguments

DIGITAL LOGIC FUNDAMENTALS
(23UCSE11)

SEMESTER-I	ELECTIVE	HOURS-4	CREDITS-3	TOTAL HOURS: 60

Course Outcomes: Upon completion of the course, the students will be able to

CO1: Recall the fundamentals of digital logic and elements of a digital computer (K1)
CO2: Demonstrate the logics of sequential and combinational circuits (K2)
CO3: Solve the problems on logic circuits using digital logics (K3)
CO4: Classify the digital logics of sequential and combinational circuits (K4)
CO5: Interpret the functioning of logic circuits and memory elements (K5)
CO6: Perform Counter design and learn its operations.(K5)

UNIT- I   (12 Hours)
Number Systems: Number systems - Decimal, Binary, Octal, Hexadecimal - conversion from one to another. Characters and codes: ASCII code, Excess3 code, gray code - binary addition, subtraction, multiplication and division - unsigned binary numbers - signed magnitude numbers - complements in number systems.

UNIT –II   (12 Hours)
Logic Gates: AND, OR, NOT, NOR & NAND gates, EX-OR gates. Boolean Algebra and Boolean laws and theorems: De Morgan's theorems - Duality theorem - simplification of sum of product and product of sum expressions - Karnaugh map and simplifications.

UNIT- III   (12 Hours)
Simple Arithmetic Circuits: Half and Full adders - Binary adder/subtracter - BCD adder Data processing circuits: Multiplexers - Demultiplexers -Encoders and Decoders.

UNIT- IV   (12 hours)
Sequential Logic Design: Flip-flops - RS, JK, D & T Flip flops - Master / Slave Flip flop - Shift Registers - Counters - Asynchronous and Synchronous Counters.

UNIT- V   (12 hours)
Memory Elements: RAM - static RAM - Dynamic RAM - ROM - Magnetic Disk memories- Magnetic tape - Cache Memory.

Text Books:

1. Donald P. Leach, Albert Paul Malvino and Goutam Saha "Digital Principles and Application", Seventh Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2010.
2. Thomas C. Bartee, "Computer Architecture and Logic Design", McGraw Hill International Edition, New Delhi, 2010.

Reference Books:

1.Virendra Kumar, "Digital Technology Principles and Practice", New Age International, New Delhi, 2006.
2. Jaydeep Chakravorty, "Digital Electronics and Logic Design", Universites Press, 2012. 3. John F. Wakerly, "Digital Design: Principles And Practices", Pearson Publication, 2008

Web Resource
1.   https://www.tutorialspoint.com/digital_circuits/index.htm

SEMESTER-I	SEC1	HOURS-2	CREDITS-2	TOTAL HOURS: 30

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Understand the basics of computer systems and its components. (K1)

CO2: Understand and apply the basic concepts of a word processing package. (K2)

CO3: Understand and apply the basic concepts of electronic spread sheet software. (K3)

CO4: Understand and apply the basic concepts of database management system. (K4)

CO5: Understand and create a presentation using Power Point tool. (K5)

CO6: To process text, images, data tables in a systematic manner. (K5)

UNIT I (6 Hours)

Introductory concepts: Memory unit– CPU-Input Devices: Keyboard, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS– UNIX–Windows. Introduction to Programming Languages.

UNIT II (6 Hours)

Word Processing: Open, Save and close word document; Editing text – formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing–Preview, merge.

UNIT III (6 Hours)

Spreadsheets: Excel–opening, entering text and data, formatting, navigating; Formulas–entering, handling and copying; Charts – creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.

UNIT IV (6 Hours)

Database Concepts: The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of datafiles; Understanding Programming environment in DBMS; Developing menu drive applications inquery language(MS–Access).

UNIT V (6 Hours)

Power point: Introduction to Power point - Features – Understanding slide typecasting & viewingslides – creating slide shows. Applying special object – including objects & pictures – Slide transition–Animation effects, audio inclusion, timers.

Recommended Text Book

1. Peter Norton,"Introduction to Computers" Tata McGraw-Hill: New York, 2008.

Reference Books

1. Jennifer Ackerman Kettel, GuyHat-Davis, Curt Simmons, "Microsoft2003", Tata McGraw - Hill: New York.

Web resources: Web content from NDL / SWAYAM or open source web resources.

LIST OF PRACTICAL

WINDOWS
1. Creating, Renaming, Moving, Copying, Deleting, Saving and Searching Files and Folders.

MS - WORD
1. Creating an Error Free Neat Document.
2. Creating Formatted Document using Formatting Attributes (Bullets and Numbering, Header and Footer)
3. Creating Documents with Columns.
4. Preparing Invitation using Word Art and Pictures.
5. Table Creation.
6. Mail Merge.

MS - EXCEL
1. Preparing Payroll.
2. Preparing Charts.

MS - ACCESS
1. Creating Table.
2. Formatting Worksheets.
3. Using Formulas.
4. Preparing Charts.

MS - POWER POINT
1. Simple Presentation.
2. Presentation using Animation and Transition effect.

DATA STRUCTURE AND ALGORITHMS
(23UCSC21)

SEMESTER II	HOURS-5	CREDITS-5	TOTAL HOURS-75

Outcomes: At the end of the course the students must be able to

CO1: Define data structure and algorithms (K1)
CO2. Describe data structures like stack, queue, tree and graph (K2)
CO3: Apply data structures in solving the problems (K3)
CO4: Use algorithm techniques for solving problems. (K3)
CO5: Analyze the time complexity of algorithms (K4)
CO6: Assess various algorithmic techniques (K5)

Unit I   **(15 hours)**
Introduction : History of Algorithms – Definitions – Structure and Properties of Algorithms – Development of an algorithm – Data Structures and Algorithms – Data Structure Definition and Classification.
Analysis of Algorithms: Efficiency of Algorithms – Apriori Analysis – Asymptotic Notations – Time complexity of an Algorithm using O notation – Polynomial versus Exponential Algorithms – Average, Best and Worst Case complexities – Analyzing recursive programs.
Arrays: Introduction – Array Operations – Number of elements in an array – Representation of arrays in memory – Applications.

Unit II   **(15 hours)**
Stacks: Introduction – Stack operations – Applications. **Queues:** Introduction – operations on Queues – Circular Queues – Other Types of Queues – Applications.
Linked Lists : Introduction – Singly linked list – Circularly linked list – Doubly linked list – Multiply linked list – Applications.

Unit III   **(15 hours)**
Trees and Binary Trees: Introduction – Trees: Definition and basic terminology – Representation of Trees – Binary Trees: Basic Terminology and types – Representation of Binary Trees – Binary Tree Traversal – Threaded Binary Tree – Applications.
Graphs: Introduction – Definition and Basic Terminology – Representation of Graphs – Graph Traversals- Applications.

Unit IV   **(15 hours)**
Divide and Conquer: General method - Binary Search- Finding the Maximum and Minimum- Merge Sort - Quick Sort
The Greedy Method: General Method – Knapsack Problem – Tree Vertex Splitting-Job Sequencing with Deadlines – Minimum Cost Spanning Trees – Single Source Shortest Paths.

Unit V   **(15 hours)**
Dynamic Programming : General Method – Multi Stage Graph – All Pairs Shortest Paths – Single Source Shortest Paths – 0/1 Knapsack – Reliability Design – Travelling Salesperson Problem – Flow Shop Scheduling.

Text Books:
1. G.A.Vijayalakshmi Pai, "Data Structures and Algorithms Concepts, Techniques and Applications", Tata Mcgraw Hill Publishing Company Limited, New Delhi 2008.
2. Ellis Horowitz, Sartaj Sahani, and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", Universities Press (India) Private Limited, 2008, Reprint 2018.

Reference Book:
1. Ellis Horowitz and Sartaj Sahani, " Fundamentals of Data Structures",
   Computer Science Press Inc, Galgotia Book Sources Publishers, New Delhi.

PRACTICAL - DATA STRUCTURE AND ALGORITHMS
(23UCSC22)

SEMESTER II	HOURS-5	CREDITS-5	TOTAL HOURS-75

Outcomes:

At the end of the course the students must be able to

CO1: Understand the use arrays in polynomial addition (K2)

CO2: Write program for STACK operation (K3)

CO3: Developing programming skill in handling Queues (K3)

CO4: Effectively handle linked list (K2)

CO5: Understand various sorting methods (K2)

CO6: Select proper functions and recursion for solving problems (K4)

List of Practical

1. Polynomial addition using arrays.

2. Implementation of Stack

3. Implementation of Queue

4. Single Linked list.

5. Doubly Linked list

6. Implementation of Search Techniques.

7. Merge sort.

8. Quick sort.

9. Minimum spanning tree

10. Tree traversal

11. Graph traversal – breadth first and depth first

12. Single source shortest path problem

DISCRETE MATHEMATICS
(23UCSE21)

SEMESTER II	HOURS-4	CREDITS-3	TOTAL HOURS-60

Outcomes:
At the end of the course the students must be able to
CO 1: Define concepts of set theory (K1)
CO 2: Describe algorithms for solving problems (K2)
CO 3: Use logics and inferences (K3)
CO 4: Apply graph theory for solving problems (K3)
CO 5: Illustrate the concept of counting (K4)
CO 6: Select proper functions and recursion for solving problems (K4)

UNIT I (12 HOURS)
SET THEORY – Introduction – Sets and elements – Universal set and empty set – Subsets – Venn Diagrams – set operations – Algebra of sets and duality – Finite sets, counting principle – Class of sets, power sets, partitions – Mathematical induction.
RELATIONS – Introduction – Product sets – Relations – Pictorial representations of relations – Composition of relations – types of relations – Closure properties – Equivalence relations – Partial ordering relations – n-ary relations.

UNIT II (12 HOURS)
FUNCTIONS AND ALGORITHMS – Introduction – functions – One – to – one – Onto and Inevitable functions – Mathematical functions, Exponential and logarithmic functions – sequences, indexed classes of sets – Recursively defined functions – Cardinality – Algorithms and functions – complexity of algorithms.

UNIT III (12 HOURS)
LOGIC AND PROPOSITIONAL CALCULUS – Introduction – propositions and compound propositions – Basic logical operations – propositions and truth tables – tautologies and contradictions – logical equivalences – Algebra of propositions – Conditional and biconditional statements – Arguments – Logical implication – Prepositional functions, Quantifiers – Negation of quantified statements.

UNIT IV (12 HOURS)
COUNTING – Introduction, Basic counting principles – Factorial Notation – Binomial coefficients – Permutations – Combinations – The pigeonhole principle – the inclusion – Exclusion principle – ordered and unordered partitions.

UNIT V (12 HOURS)
GRAPH THEORY – Introduction, data structures – Graphs and multigraphs – subgraphs, Isomorphic and homeomorphic graphs – paths, connectivity – the bridges of Konigsberg, Traversable multigraphs – labeled and weighted graphs – complete, regular, and bipartite graphs – tree graphs-Minimum Spanning Trees-Directed Graphs- Basic Definitions- Rooted Trees – Graph Coloring.

Text Book:
1. Seymour Lipschutz, Marc Lipson Discrete Mathematics Third Edition 2010, Tata McGraw Hill.
Books for Reference:
1. B.S.Vatsa, "Discrete Mathematics", WishwaPrakashan, Third Edition.
2. K.D.Joshi, "Foundation of Discrete Mathematics", Wiley Eastern Ltd.

ADVANCED EXCEL
(23UCSN21)

SEMESTER-II	SEC2	HOURS-2	CREDITS-2	TOTAL HOURS: 30

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Work with big data tools and its analysis techniques. (K1)
CO2: Analyze data by utilizing clustering and classification algorithms..(K2)
CO3: Learn and apply different mining algorithms and recommendation systems for large volumes of data.(K3)
CO4: Perform analytics on data streams. (K4)
CO5: Learn No-SQL databases and management. (K5)
CO6: Understanding the Historagram Analysis of Data (K2)

UNIT I   (6 Hours)

Basics of Excel- Customizing common options- Absolute and relative cells- Protecting and un-protecting worksheets and cells- Working with Functions - Writing conditional expressions - logical functions - lookup and reference functions- VlookUP with Exact Match, Approximate Match- Nested VlookUP with Exact Match- VlookUP with Tables, Dynamic Ranges- Nested VlookUP with Exact Match- Using VLookUP to consolidate Data from Multiple Sheets.

UNIT II   (6 Hours)

Creating Pivot tables Formatting and customizing Pivot tables- advanced options of Pivot tables- Pivot charts- Consolidating data from multiple sheets and files using Pivot tables- external data sources- data consolidation feature to consolidate data- Show Value As % of Row, % of Column, Running Total, Compare with Specific Field- Viewing Subtotal under Pivot- Creating Slicers.

UNIT III   (6 Hours)

More Functions Date and time functions- Text functions- Database functions- Power Functions - Formatting Using auto formatting option for worksheets- Using conditional formatting option for rows, columns and cells- What If Analysis - Goal Seek- Data Tables- Scenario Manager.

UNIT IV   (6 Hours)

Database Concepts: The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding Programming environment in DBMS; Developing menu drive applications in Query Language (MS–Access).

UNIT V   (6 Hours)

Charts - Formatting Charts- 3D Graphs- Bar and Line Chart together- Secondary Axis in Graphs- Sharing Charts with PowerPoint / MS Word, Dynamically- New Features Of Excel Sparklines, Inline Charts, Data Charts- Overview of all the new features.

Text Books
1. Excel 2019 All.
2. Microsoft Excel 2019 Pivot Table Data Crunching

Reference Book
1. Excel 2019 All-in-One for Dummies, Greg Harvey, 1st edition

Web Resources

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

List of Practical

1. Working with basic operations and functions
2. Working with formulas and functions
3. Working with filters
4. Working with Dates
5. Working with histogram and descriptive statistics
6. Working with graphs and charts

SEMESTER–III	CORE-T3	HOURS–5	CREDITS–5	TOTAL HOURS: 75

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Define Object Oriented Programming Paradigm using Java Language (K1)
CO2: Describe the given problem using the syntactical structures of JAVA language (K2)
CO3: Use the programming skill to debug and run the programs (K3)
CO4: Implement various object-oriented concepts (K4)
CO5: Design an algorithmic solution for a given problem in JAVA language (K5)
CO6: Understand the difference between core and web applications in JAVA (K6)

UNIT I   **(15 Hours)**
Evolution of Java – Java Buzzwords - An overview of Java: Object-oriented Programming –
using blocks of code – lexical issues – Java class libraries. Data Types, Variables and Arrays:
Java is a strongly typed language – The primitive types– Integers - Floating point types –
Characters – Boolean – a close look at literal – variables - Type Conversion and casting –
Automatic type promotion in expressions – Arrays – Type inference with local variables.
Operators: Arithmetic operators   - the bitwise operator - relational operator – Boolean logical
operator the assignment operator – the?: Operator – operator precedence – using parenthesis.
Control statements: Java selection statements – Iteration statements – Jump statements.

UNIT II   **(15 Hours)**
Introducing Classes: Class fundamentals – Declaring objects – Assigningobject reference
variables – Introducing methods – Constructors- The this keyword – Garbage collection –
The finalized method – A stack class. Inheritance: Inheritance basics - using super – creating
a multilevel hierarchy – when constructors are called – method overriding – dynamic method
dispatch – using abstract classes - using final with inheritance - the object class.
Packages and Interfaces: Packages – access protection – interface – default interface methods
– private interface methods.

UNIT III   **(15 Hours)**
Exception Handling: Fundamentals - Exception types – Uncaught exceptions – Using try and
catch clauses – nested try statements – throw –throws- Java's built in exceptions – creating
your own exceptions subclasses. Multithreaded Programming : The Java Thread Model – The
Main Thread – Creating Thread – Creating Multiple Threads – Using isAlive() and join() –
Thread Priorities – Synchronization - Interthread Communication – Suspending , Resuming
and stopping Threads – using Multithreading.

UNIT IV   **(15 Hours)**
String handling – String constructors – Special String operations – Additional String methods
- Event handling: Two event handling mechanisms – the delegation event model – Event
classes – Sources of events – Event listener interfaces – Using the delegation eventmodel –
Adapter classes – Inner classes.

UNIT V   **(15 Hours)**
Introducing AWT: AWT Classes - Window fundamentals – Frame windows – Working with
graphics, color and fonts – managing text output using font metrics – Introducing Swing –
Components and Containers – Exploring swing - JButton - JCheckBox - JComboBox -

JLabel - JList - JRadioButton - JScrollPane – JtabbedPane - JTable - JTextField - JToggleButton – Jtree.

Text book:
1. Herbert Schildt, "The Complete Reference Java 2", McGraw Hill Publication (India), Twelfth Edition, 2021.
   Chapters: 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 18, 25, 26, 32, 33.

Reference Books:
1. John Zukowski, "Mastering Java2", BPB Publications, First Indian Edition, 2000
2. Aaron Walsh and John Fronckoviak, "Java Programming Bible", IDG Books World wideInc, First Edition, 2000.
3. Cay S. Horstmann and Garry Cornell, "Core Java 2", Pearson Education Asia, First Edition, 2001.
4. Deborah S. Ray and Eric J. Ray, "Mastering HTML 4.0", BPB Publications, First Indian Edition, 1998.
5. C Xavier, "World Wide Web Design with HTML", Tata McGraw Hill Publication, First Edition, 2000.

Java Programming- Practical
(23UCSC32)

| SEMESTER–III | CORE-P3 | HOURS–5 | CREDITS–5 | TOTAL HOURS: 75 |

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Code, debug and execute Java programs to solve the given problems (K6)

CO2: Implement multi-threading and exception-handling (K6)

CO3: Implement functionality using String and String Buffer classes (K6)

CO4: Demonstrate Event Handling. (K6)

CO5: Create applications using Swing and AWT (K6)

CO6: Develop programs to implement object oriented Concepts (K6)

List of Practical

1. Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer.
2. Write a Java program to multiply two given matrices.
3. Program using Constructor and Method overloading.
4. Program using Inheritance
5. Program using Interfaces
6. Program using Packages
7. Write a program to do String Manipulation using Character Array and perform the Following string operations:
    a. String length
    b. Finding a character at a particular position
    c. Concatenating two strings
8. Write a program to perform the following string operations using String class:
    a. String Concatenation
    b. Search a substring
    c. To extract a substring from the given string
9. Write a program to demonstrate the use of the following exceptions.
    a. Arithmetic Exception
    b. Number Format Exception
    c. Array Index Out of Bound Exception
    d. Negative Array Size Exception
10. Write a Java program that implements a multi-thread application that has three threads.
    The first thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.
11. Write a program to work with Graphics and fonts.
12. Write a Java program that handles all mouse events.
13. Write a Java program to handle all keyboard events.
14. Write a Java program that works as a simple calculator using Swing. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.
15. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "stop" or "ready" or "go" should appear above the buttons in a selected color. Initially there is no message shown.

Artificial Intelligence and Machine Learning

(23UCSE31)

SEMESTER-III	EC-T3	HOURS-4	CREDITS-3	TOTAL HOURS: 60

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Recall the basic concepts of Artificial Intelligence and Search Techniques (K1)
CO2: Explain the different knowledge representations for AI problems (K2)
CO3: Analyze / Classify the types of reasoning (K4)
CO4: Apply suitable heuristic search technique for the given problem (K3)
CO5: Summarize the types of learning (K5)
CO6: To Classify Artificial Neural networks and Expert Systems. (K4)

UNIT I (12 Hours)
Introduction: Definitions of Artificial Intelligence (AI) – AI problems - Topics of AI – Production Systems – State Space Representation - Branches of AI – Applications of AI.
Heuristic search techniques: Generate and test - Hill Climbing - Search Techniques – Depth First Search, Breadth First Search, Greedy Method, Best First Search Algorithm, A*Algorithm - Problem Reduction – AND-OR Graphs, The AO* Algorithm, Towers of Hanoi problem.

UNIT II (12 Hours)
Knowledge representation: Knowledge Management - Value of Knowledge Management - Categories of Knowledge - Types of Knowledge - Knowledge Representation – Approaches to Knowledge Representation - Issues in Knowledge Representation - Knowledge Base.

UNIT III (12 Hours)
Knowledge representation structures: First-order Logic - Frames – Conceptual Dependency - Scripts - Semantic Network. **Reasoning**: Types of Reasoning – Nonmonotonic Inference Methods - Non-monotonic Reasoning - Truth Maintenance Systems - Reasoning with Fuzzy Logic - Rule-based Reasoning - Diagnosis Reasoning.

UNIT IV (12 Hours)
Learning: Types of Learning - Machine Learning - Intelligent Agents. **Association Learning**: Basics of Association- Apriori Algorithm- **Clustering**- K-means Clustering – Fuzzy clustering- Hierarchical Clustering

UNIT V (12 Hours)
Artificial Neural Nets: ANN Basics - ANN—Learning Process - Types of Networks -Perceptron - Multilayer Perceptron- Case Studies: Character Recognition- **Supervised Learning:** Support Vector Machines-**Unsupervised Learning:** Self organizing Maps- **Expert Systems:** Characteristics of Expert System- Components of an Expert system- Expert System Development.

Learning Resources:
Text Book
1. Vinod Chandra S.S. and Anand Hareendran S., "Artificial Intelligence and Machine Learning", PHI Learning Private Limited, 2014.

Reference Books
1. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill
2. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", 3rd Edition, Prentice Hall.
Web Resources
1. https://github.com/dair-ai/ML-Course-Notes
2. https://web.cs.hacettepe.edu.tr/~erkut/ain311.f21/index.html
3. https://www.toolify.ai/?gclid=CjwKCAjwvdajBhBEEiwAeMh1U6tlqU1LXlRFbcghLMZVw ICm_4PkIRcDRE-VYq_wTDcuaQeq_bCHnhoCcm4QAvD_BwE

Cloud Applications and Security
(23UCSN31)

| SEMESTER-III | SEC 5 | HOURS-2 | CREDITS-2 | TOTAL HOURS: 30 |

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Understand the fundamental concepts and Technologies in Cloud Computing. (K1)
CO2: Able to understand various cloud service types and their uses and pitfalls. (K2)
CO3: Able to understand Cloud Applications and working with them. (K2)
CO4: Understand the various aspects of application design (K3)
CO5: Understand various Case Studies in Cloud Computing. (K3)
CO6: Develop Secured Cloud Applications. (K4)

UNIT I   **(Hours 6)**
Understanding Cloud Computing -.Cloud Computing for Everyone - Centralizing Email Communications - Collaborating on Schedules - Collaborating on Grocery Lists - Collaborating on To-Do Lists.

UNIT II   **(Hours 6)**
Collaborating on Household Budgets - Collaborating on Contact Lists - Collaborating on School Projects - Sharing Family Photos - Cloud Computing for the Corporation - Managing Schedules – Managing Contact Lists – Managing Projects -

UNIT III   **(Hours 6)**
Collaborating on Reports - Collaborating on Marketing Materials - Collaborating on Expense Reports. - Collaborating on Calendars, Schedules, and Task Management - Exploring Online Calendar Applications.

UNIT IV   **(Hours 6)**
Collaborating on Word Processing - Web-Based Word Processing Works - Exploring Web-Based Word Processors – Collaborating on Spreadsheets - Web-Based Spreadsheets Work - Exploring Web-Based Spreadsheets - Collaborating on Databases - Understanding Database Management - Exploring Web-Based Database.

UNIT V   **(Hours 6)**
Collaborating on Presentations. - Preparing Presentations Online Evaluating Web-Based Presentation Applications - Storing and Sharing Files and Other Online Content - Sharing Services Exploring Online Bookmarking Services - Sharing Digital Photographs - Online Photo-Editing Applications.

TEXT BOOK
1. Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, 2008.

REFERENCE BOOKS

1.   Toby Velte, Anthony Velte, Robert C. Elsenpeter, "Cloud Computing: A
        Practical Approach", Tata McGraw-Hill, 2009.
2.   David Crookes, "Cloud Computing in Easy Steps", In Easy Steps Limited, 2012.

WEB REFERENCES

1.https://www.teachthought.com/pedagogy/teachers-guide-to-cloud-based-word-
   processing/
2.https://www.androidauthority.com/how-to-use-google-docs-tutorial-tips-tricks-3110289/
3.https://edu.gcfglobal.org/en/googledocuments/#

Cloud Computing Practical

1. Using Google Docs to create resume
2. Brochures using Zoho cloud
3. Working with Google and Zoho sheets
4. Presentation using Google slides and Zoho show.
5. Form designing using Zoho forms.
6. Quiz preparation using Google forms
7. Scheduling Events
8. Sharing documents online

RDBMS WITH PL / SQL -THEORY
(23UCSC41)

SEMESTER–IV   CORE –T4   HOURS – 4   CREDITS -4   TOTAL HOURS:60

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Gain knowledge about the fundamentals of RDBMS concepts (K1)
CO2: Design database using ER diagram and normal forms (K2)
CO3: Create and manipulate relational database using Oracle (K4)
CO4: Use SQL queries in a procedural language, PL/SQL (K3)
CO5: Update knowledge to learn any feature advanced version of language (K4)
CO6: To Build Normalized Relational Database (K3)

UNITI   (Hours 12)
Purpose of database systems – View of data – Database languages – Relational database – Database Architecture – Database users and administrators
Structure of relational database – Database schema – Keys – Schema diagrams – Relational Query Languages – Relational operations.

UNIT II   (Hours 12)
Overview of design process – ER model — E-R diagrams – extended E-R features
Features of good relational design – Atomic domains and first normal form – Decomposition using Functional dependencies – functional dependency theory – more normal forms-database design process.

UNITIII   (Hours 12)
Naming rules and conventions – Data types – Constraints – Creating table – Displaying information – Altering existing table – Dropping, renaming and Truncating a table.
Adding new records – Updating and deleting records – Retrieving data from table – Arithmetic Operations – where clause – Sorting–CASE.

UNIT IV   (Hours 12)
Built-in functions – Grouping data – join – Set operators – Subquery – top-N analysis – Correlated Subquery – Views – Sequences – Synonyms – Index – Transactions – Locking rows for update – controlling access. **Fundamentals of PL/SQL** – PL/SQL block structure – Comments–data types – variable declaration – Bind variable – Control structures

UNIT V   (Hours 12)
– SQLin PL/SQL – Data manipulation in PL/SQL – Cursors – Exception Handling – Procedure–function – Packages – Trigger. **MongoDB** - A database for modern web - MongoDB through the Javascript shell - Constructing Queries - Aggregation

Text Books:
1. Abraham Silberschatz, Henry F. Korth and S. Sudarsan, ”Database system concepts”,   Sixth edition, McGraw Hill, 2011. (For UNIT I & II)
2. Nilesh Shah, ”Data systems using Oracle A simplified guide to SQL and PL/SQL”,
3. Prentice Hall of India, 2009. (For UNIT III, IV & V)
4. Kyle Banker, Peter Bakkum Shaun Verch, Douglas Garrett, Tim Hawkins, "MongoDB in Action", 2nd Edition- 2020, Manning Publications.

References:
 1. Alexis Leon and Mathews Leon, Fundamentals of Database Management Systems, Vijay Nicole Imprints, 2010.
 2. Scott Urman, ”Oracle 9i Pl/SQL programming”, Tata McGraw Hill, 2006
 3. Ivan Bayross, “SQL, PL/SQL, The programming language of Oracle”, BPB Publications, 2010.

RDBMS WITH PL / SQL -PRACTICAL
(23UCSC42)

SEMESTER – IV	CORE –P4	HOURS – 4	CREDITS –4

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Use the basic syntax of ORACLE (K6)
CO2: Apply DDL, DML of ORACLE (K6)
CO3: Developing programming skill in handling advanced concepts using PL/SQL (K6)
CO4: Effectively handle functions, procedures, packages and reports in ORACLE (K6)
CO5: Learn to apply any feature of the Language (K6)
CO6: To develop Quries on Normalized Relational Database (K6)

List of Practical

1. Creating, modifying and dropping Tables.
2. Creating tables with referential and check constraints.
3. Inserting, modifying, deleting rows.
4. Dropping ,disabling /enabling constraints
5. Retrieving rows with operators in where Clause.
6. Retrieving rows with Character functions.
7. Retrieving rows with Number and Date functions.
8. Retrieving rows with Group functions and HAVING.
9. Joining Tables. (Inner and Outer).
10. Retrieving rows with Sub Queries.
11. Simple PL/SQL programs.
12. PL/SQL programs with control structures.
13. PL/SQL programs with Cursors.
14. PL/SQL programs with Exception Handling.
15. Create a database and collections
16. Inserting, updating and Deleting documents
17. Find Documents
18. Aggregation
19. Text Search
20. Relationships

SEMESTER–IV   EC-T4   HOURS–4   CREDITS–4   TOTAL HOURS : 60

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Gain basic knowledge of analysis and design of systems (K1)
CO2: Understand software engineering principles and techniques (K2)
CO3: Ability to apply software engineering principles and techniques (K3)
CO4: Model a reliable and cost-effective software system (K4)
CO5: Ability to design an effective model of the system (K5)
CO6: Perform Testing at various levels and produce an efficient system. (K6)

Unit I   **(12 Hours)**
Introduction: The Software Engineering Discipline –Software Development Projects - Emergence of Software Engineering. **Software Life Cycle Models:** Basic concepts - Waterfall Model and Its Extensions - Rapid Application Development (RAD) - Agile Development Models - Spiral Model -A Comparison of Different Life Cycle Models

Unit II   **(12 Hours)**
Requirements Analysis and Specification: Requirements Gathering and Analysis - Software Requirements Specification (SRS). **Software Design**: Overview of the Design Process – Characterizing a Good Software Design - Cohesion and Coupling - Layered Arrangement of Modules – Approaches to Software Design.

Unit III   **(12 Hours)**
Function-Oriented Software Design: Overview of SA/SD methodology - Structured Analysis - Developing the DFD Model of a System- Structured Design - Detailed Design – Design Review.**User-Interface design:** Characteristics of a Good User Interface - Basic Concepts - Types of User Interfaces – Fundamentals of Component-based GUI Development - A User Interface Design Methodology.

Unit IV   **(12 Hours)**
Coding and Testing: Coding - Code Review – Software Documentation – Testing - Unit Testing - Black-Box Testing - White-Box Testing – Debugging - Integration Testing - System Testing.**Software Maintenance:** Characteristics of Software Maintenance - Software Reverse Engineering - Software Maintenance Process Models – Estimation of Maintenance Cost

Unit V   **(12 Hours)**
Object-Oriented Software Development: Introduction to Patterns -Some Common Design Patterns - An Object-Oriented Analysis and Design (OOAD) Methodology - Applications of the Analysis and Design Process - OOD Goodness Criteria. **Software Project Management:** Software Project Management Complexities - Responsibilities of a Software

Project Manager -Project Planning – Metrics for Project Size Estimation - Project Estimation Techniques - Empirical Estimation Techniques - COCOMO—A Heuristic Estimation Technique - Halstead's Software Science—An Analytical Technique – Risk Management.

Text Books

1. Rajib Mall, Fundamentals of Software Engineering, Fifth Edition, Prentice-Hall of India, 2018.

Reference Books

1. Ian Sommerville, Software Engineering, 9th Edition, Pearson Education Asia, 2011.
2. Richard Fairley, Software Engineering Concepts, Tata McGraw-Hill publishing company Ltd, Edition 1997.
3. Roger S. Pressman, Software Engineering, Seventh Edition, McGraw-Hill.
4. James A. Senn, Analysis & Design of Information Systems, Second Edition, McGraw-Hill International Editions.

MULTIMEDIA SYSTEMS
(23UCSN41)

SEMESTER – IV	SEC-6	HOURS – 2	CREDITS – 2	TOTAL HOURS : 30

Outcomes: At the end of the course the students must be able to

CO1: Understand the basics concept of Animation (K1)
CO2: Understand about image frame   (K1)
CO3: Learning Animation skills using tools (K2)
CO4: Developing video using frame by frame animation. (K4)
CO5: Update knowledge to learn 3D animation (K3)
CO6: Apply skills to develop Video games.(K4)

Unit I   **(6 Hrs)**
Multimedia Definition - Use Of Multimedia - Delivering Multimedia - Text: About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext.

Unit II   **(6 Hrs)**
Images: Plan Approach - Organize Tools - Configure Computer Workspace - Making Still Images - Color - Image File Formats. Sound: The Power of Sound - Digital Audio - Midi Audio - Midi vs. Digital Audio - Multimedia System Sounds.

Unit III   **(6 Hrs)**

Animation: The Power of Motion - Principles of Animation - Animation by Computer - Making Animations that Work. Video: Using Video - Working with Video and Displays - Digital Video Containers.

Unit IV   **(6 Hrs)**
Multimedia Data Representation: Multimedia and Hyper Media – Multimedia Software Tools. Obtaining Video Clips - Shooting and Editing Video.

Unit V   **(6 Hrs)**
Multimedia Authoring Tools: Multimedia Authoring – Editing Tools –VRML. Graphics and Data Representations: Graphics Data Types – Polar File Format.

Text Books:

1. Tay Vaughan, "Multimedia: Making It Work", 9th Edition, Osborne/McGraw- Hill, 2014.

Reference Books:
1. S Drew, Fundamentals of Multimedia,
2. Robert Reinhardt and John Warren Lentz, "Flash 8 Bible" IDG Books India (P) Ltd.
3. Ze-Nian Li and Mark Pearson Edn.
4. International, Third Edition, 2005.

Web References:
 1. www.geeksforgeeks.org/multimedia-systems-with-features-or-characteristics
 2. NPTEL Resources.

List of Practical:

1. Frame by Frame Animation
2. Motion Tweening.
3. Tint Tweening.
4. Guided Motion Tweening.
5. Masking
6. Adding fade effect
7. Shape Tweening
8. Cartoon Animation
9. Audio mixing

INTRODUCTION TO DATA SCIENCE
(23UCSS42)

SEMESTER-IV	SEC-7	HOURS-2	CREDITS-2	TOTAL HOURS: 30

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Learn the fundamentals of Data Science. (K1)
CO2: Understand the process of Data analytics. (K2)
CO3: Design Algorithmic solutions for Data Science (K4)
CO4: Work with NOSQL and other Domains for implementing Data Science (K3)
CO5: Understand Data visualization tools and its applications of Data Science (K2)
CO6: Develop Data analytical skills. (K2)

UNIT I   **(6 Hours)**
 Data science in a big data world– Benefits and Uses of Data Science and big Data – Facets of Data-
Big data ecosystem and data science - **Data science process**: Overview of THE DTA Science
Process (Six Steps).

UNIT II   **(6 Hours)**
Machine Learning: Introduction- The Modeling Process – Types of Machine Learning – Semi
supervised Learning- **Handling large data on a single computer –** The   Problems You Face
Handling Large Data – General Techniques for handling large volumes of Data – General
Programming tips for Dealing with Large Data Sets.

UNIT III   **(6 Hours)**
Join the NoSQL Movement –Introduction to NoSQL – Introducing Connected Data and Graph
Databases - Text mining and Text Analytics – Text Mining in the Real World –Text Mining
Techniques.

UNIT IV   **(6 Hours)**
Data visualization to the End user : Data Visualization Options-Cross filter, The Javascript Map
reduce Library -   Dashboard Development Tools.

UNIT V   **(6 Hours)**
Decision Trees and ensemble Methods – Introduction - Top down Construction of Decision Trees –
Additional considerations- Controlling the Tree Shape .

Text Books
1. Davy Cielen, Arno D. B. Meysman, Mohamed Ali, "Introducing Data Science", Manning
    publications 2016. (UNIT I, II, III, IV)
2. Dirk P. Kroese, Zdravko I. Botev, Thomas Taimre, Radislav Vaisman,"Data Science and Machine
    Learning-Mathematical and Statistical Methods", CRC Press, 2023. (UNIT V)

Reference Books
1. Roger Peng, "The Art of Data Science", lulu.com 2016.
2. MurtazaHaider, "Getting Started with Data Science – Making Sense of Data with Analytics",
   IBM press, E-book.
3. Davy Cielen, Arno D.B. Meysman, Mohamed Ali,"Introducing Data Science: Big Data, Machine
   Learning, and More, Using Python Tools", Dreamtech Press 2016.

Web resources:
1. https://www.simplilearn.com/resources-to-learn-data-science-online-article
2. https://learn.microsoft.com/en-us/training/paths/understand-machine-learning/
3. https://www.w3schools.com/datascience/ds_introduction.asp

DOT NET CORE PROGRAMMING
(23UCSC51)

SEMESTER-V	CORE – T5	HOURS–5	CREDITS-5	TOTAL HOURS:75

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Remember the Core Dot Net Development Environment (K1)
CO2: Differentiate different Versions of Core Dot Net Frameworks (K2)
CO3: Apply Form Elements, Data Base Applications, Deployment in suitable Situations (K3)
CO4: Analyze and understand Web Applications Made using Core Dot Net Framework (K4)
CO5: Evaluate, debug and Deploy The applications Using Core Dot Net (K5)
CO6: Design and develop Applications using Core Dot Net framework for the Real time Problems (K6)

Unit I **(15 Hours)**
Part 1: Introduction : ASP.NET. Part 2: Visual Studio and C# - Visual Studio - Desktop Applications - C# Programming Language. Part 3: Web Fundamentals - The Web - HTML - CSS - JavaScript - Server-side Frameworks

Unit II **(15 Hours)**
Part 4: ASP.NET Core - Introduction to ASP.NET Core - ASP.NET Core Fundamentals – Razor. Part 5: Database Communication - Database Systems - ADO.NET - Data from Database.

Unit III **(15 Hours)**
CRUD Applications: Database - Models - Show Data - New Data - Edit Data - Delete Data. Part 6: Additional ASP.NET Core Features - Session Data.

Unit IV **(15 Hours)**
Part 8: APIs - Class Libraries - Web API. Part 9: User Login and ASP.NET Core Identity - User Identity and Login - .NET Core Identity

Unit V **(15 Hours)**
Part 11: Deployment - Web Servers - Internet Information Services (IIS). Part 12: Microsoft Azure - Introduction to Azure - Databases in Azure - Web Applications in Azure

Text Book :
Hans-Petter Halvorsen, "Web Programming ASP.NET Core", 2021

Reference Books:

1. Adam Freeman, "Pro ASP.NET Core 6: Develop Cloud-Ready Web Applications Using MVC, Blazor, and Razor Pages", Copyright © 2022 by Adam Freeman.
2. Andrew Lock, "ASP.NET Core in Action", 2018, Manning Publications.

MOBILE APPLICATION DEVELOPMENT
(23UCSC52)

SEMESTER-V	CORE-T6	HOURS-5	CREDITS-5	TOTAL HOURS: 75

Course Outcomes:
Upon completion of the course, the students will be able to
CO1: Identify the advantages of React Native. (K1)
CO2: Know how to create simple App. (K2)
CO3: Apply proper interface setup, styles &themes, storing and management. (K3)
CO4: Analyze the problem and use various React Native features including components and forms. (K4)
CO5: Examine the native modules. (K4)
CO6: Execute Platform specific components. (K4)

UNIT I (15 Hours)
Getting started with React Native - Introducing React and React Native - Understanding how React Native works - React Native's strengths - React Native's drawbacks - Creating and using basic components - **Understanding React**: Managing component data using state - Managing component data using props -React component specifications - React lifecycle methods - **Building first React Native app** - Laying out the todo app - Coding the todo app - Opening the developer menu -Continuing building the todo app.

UNIT II (15 Hours)
Developing applications in React Native: Introduction to styling - Applying and organizing styles in React Native - Styling view components - Styling Text components - **Styling in depth** - Platform-specific sizes and styles - Using transformations to move, rotate, scale, and skew components - Using flexbox to lay out components.

UNIT III (15 Hours)
Navigation - React Native navigation vs. web navigation - Building a navigation-based app - Persisting data - Using Drawer Navigator to create drawer-based navigation - **Animations** - Introducing the Animated API - Animating a form input to expand on focus - Creating a custom loading animation using interpolation - Creating multiple parallel animations - Creating an animated sequence - **Using the Redux data architecture library** - Redux Introduction - Using context to create and manage global state in a React application - Implementing Redux with a React Native app - Creating Redux reducers to hold Redux state - Adding the provider and creating the store - Accessing data using the connect function - Adding actions -Deleting items from a Redux store in a reducer.

UNIT IV (15 Hours)
Implementing cross platform APIs - Using the Alert API to create cross-platform notifications - Using the AppState API to detect the current application state - Using the AsyncStorage API to persist data - Using the Clipboard API to copy text into the user's clipboard - Using the Dimensions API to get the user's screen information - Using the Geolocation API to get the user's current location information - Using the Keyboard API to

control the location and functionality of the native keyboard - Using NetInfo to get the user's current online/offline status - Getting information about touch and gesture events with PanResponder.

UNIT V   **(15 Hours)**
Implementing iOS-specific components and APIs - Targeting platform-specific code – DatePickerIOS - Using PickerIOS to work with lists of values -Using Progress ViewIOS to show loading indicators - Using Segmented ControlIOS to create horizontal tab bars - Using TabBarIOS to render tabs at the bottom of the UI - Using Action SheetIOS to show action or share sheets - **Implementing Android-specific components and APIs** - Creating a menu using Drawer Layout Android - Creating a toolbar with Toolbar Android - Implementing scrollable paging with View Pager Android - Using the Date Picker Android API to show a native datepicker - Creating a time picker with Time Picker Android - Implementing Android toasts using Toast Android.

Text Book
1. NaderDabit,"React Native in Action", Manning Publications Co., 2019.
   Unit 1- Ch. 1, 2, 3 Unit 2- Ch. 4, 5 Unit 3- Ch. 6, 7, 8 Unit 4- Ch. 9 Unit 5- Ch. 10, 11

Reference Books

1. Bonnie Eisenman,"Learning React Native - Building Native Mobile Apps with
    JavaScript", SECOND EDITION, O'Reilly Media, Inc., 2018.
2. Jonathan Lebensold,"React Native Cookbook", O'Reilly Media, Inc., 2018.

Web Resources

1.https://reactnative.dev/docs/tutorial
2.https://www.tutorialspoint.com/react_native

DOT NET CORE PROGRAMMING - PRACTICAL
(23UCSC53)

SEMESTER–V   CORE – P5   HOURS – 5   CREDITS –3 TOTAL HOURS : 75

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Develop Core Dot Net simple applications (K6)
CO2: Develop Core Dot Net using form Elements (K6)
CO3: Develop Core Dot Net programs involving Data Bases (K6)
CO4: Develop Core Dot Net programs involving CRUD (K6)
CO5: Develop Core Dot Net programs using User Identity and Login (K6)
CO6: Design applications using AZURE (K6)

List of Practical

1) ASP.NET Core Application
2) ASP.NET Core Application with Form data
3) ASP.NET Core Application with Data from Database
4) CRUD Applications
    a)Create (Insert) Data
    b)Read (Select) Data
    c) Update Data
    d) Delete Data
5) ASP.NET Core with Session Data
6) ASP.NET Core Application with User Identity and Login
7) Web Applications Using Azure

MOBILE APPLICATION DEVELOPMENT- Practicals
(23UCSC54)

SEMESTER-V	CORE-P6	HOURS-5	CREDITS-3	TOTAL HOURS: 75

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Apply the basic elements. (K6)

CO2: Apply proper interface setup, styles &themes. (K6)

CO3: Implementing the Components. (K6)

CO4: Using the Persistent Storage. (K6)

CO5: To determine the concepts of Simple Animation. (K6)

CO6: Displaying Remote Images and building App with API. (K6)

List of Practical

1. Layout with Flexbox

2. Breaking down a UI into Components

3. Dealing with the Keyboard

4. Listing Data with the FlatList

5. Persistent Storage

6. Dealing with Remote Images on Slow Networks

7. Playing with Animations

8. Complex Navigation Structure

9. Build a Swiper Component

10. Making a Declarative API for an Imperative API

11. Integrate React Native with MongoDB

PHP PROGRAMMING
(23UCSE51)

SEMESTER–V	EC-T5	HOURS–4	CREDITS–3	TOTAL HOURS : 60

Course Outcomes:
Upon completion of the course, the students will be able to
CO1: Impart knowledge of dynamic web design issues(K3)
CO2: Impart theoretical knowledge about PHP (K1)
CO3: Develop programming skills in PHP (K3)
CO4: Introduce database connections to MySQL through PHP(K4)
CO5: Implement object-oriented programming in PHP (K4)
CO6: Update knowledge to learn any future advanced version of the language (K5)

UNIT I   (12 Hours)
Basics of PHP: Basic Syntax- PHP Data type - Defining variables and constant- whitespace-Code Blocks-Opening and Closing Code Islands- Mixed Mode Processing -Comments- Automatic Type Conversion- Including Other Files- Operator and Expression- Conditional Statements -Control Structures.

UNIT II   (12 Hours)
Function: Call by value - Call by reference, Recursive function-Default arguments- String Creating and accessing, String Searching - Replacing String, Formatting String, String Related Library function – Array- Creating index-based and Associative array- Accessing array, Element Looping with Index based array, Looping with associative array using each () and for each()- Array related Library functions.

UNIT III   (12 Hours)
HTML Forms: Form design-Handling data-Validating Input-GAIN ,POST methods – is set() – Superglobals - MySQL: What is MySQL - MySQL Connect - MySQL create DB – MySQL create Table - Insert Data Select Data - Delete Data-Update Data - Limit Data.

UNIT IV   (12 Hours)
Session and Cookie: Introduction to Session Control, Session Functionality – Working with Cookie, Setting Cookies with PHP. Using Cookies with Sessions, Deleting Cookies, Registering Session variables, Destroying the variables and Session. Working with files and Directories: Understanding file& directory, Opening and closing a file, Coping, renaming and deleting a file, working with directories, Creating and deleting folder, File Uploading &Downloading.

UNIT V   (12 Hours)
Object Oriented PHP: Objects -Declaring a class-The new keyword - constructor Destructor-Access method - properties using this variable -Public, private, protected - Static properties and method-Class constant -Inheritance and code reusability –Polymorphism - Parent:: & self:: keyword –Instance of operator - Abstract method and class –Interface –Final Exception Handling-Understanding Exception and error Try, catch, throw.

Text Books:
1. Paul Hudson, "PHP in a Nutshell", O' Reilly Publications, 2005.
2. Andy Harris, "PHP5/MYSQL Programming for the absolute beginner", Thomson
Course Technology, 2015.

Reference Books :
1. Robin Nixon, "Learning PHP, MySQL and JavaScript", O'reilly Publishers, 2009.
2. K.Meena, R. Sivakumar and A.B. Karthick Anand Babu, "Web Programming Using
   PHP and MySQL", Himalaya Publishing House, 2012.

| SEMESTER–V | EC-P5 | HOURS–4 | CREDITS–3 | TOTAL HOURS : 60 |

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Write simple PHP programs. (K6)
CO2: Write programs using control structures. (K6)
CO3: Develop application using COOKIES. (K6)
CO4: Create database application. (K6)
CO5: Update knowledge to learn any future advanced version of language (K6)
CO6: Design a full-fledged dynamic website (K6)

List of Practical
1. Simple PHP Program.
2. Sort an Array.
3. Program using if condition.
4. Palindrome.
5. Retrieve Form values and display.
6. Upload Files.
7. Session, Cookies and Query string
8. Create database and table using PHP.
9. Insert values in a database.
10. Display table data in Grid Format.
11. Update and delete table data.
12. Program using Files (Create, Read, Write and Modify).
13. Program using class.

PYTHON PROGRAMMING
(23UCSC61)

SEMESTER-VI	CORE-T7	HOURS-5	CREDITS-4	TOTAL HOURS: 75

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Learn the basics of python, Do simple programs on python, Learn how to use an array. (K1)

CO2: Develop program using selection statement, Work with Looping and jump statements. (K2)

CO3: Work with functions, Strings and modules. (K3)

CO4: Work with List, tuples and dictionary, Write program using list, tuples and dictionary. (K4)

CO5: Usage of File handlings in python, Concept of reading and writing files, Do programs Using files. (K5)

CO6: Update Knowledge to learn any future advanced version of language. (K6)

UNIT I (15 Hours)
Basics of Python Programming: History of Python-Future of Python-Literal-Constants-Variables - Identifiers–Keywords- Data Types-Output Statements –Input Statements-Comments – Indentation- Operators-Expressions-Type conversions. **Python Arrays**: Defining and Processing Arrays – Array methods.

UNIT II (15 Hours)
Control Statements: Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, the else suite and nested loops. **Jump Statements:** break, continue and pass statements**.**

UNIT III (15 Hours)
Functions: Function Definition – Function Call – Variable Scope and Lifetime-Return Statement. **Function Arguments**: Required Arguments, Keyword Arguments, Default Arguments and Variable-length Arguments- Recursion. **Python Strings:** String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. **Modules**: import statement- The Python module – dir() function – Modules and Namespace – Defining our own modules.

UNIT IV (15 Hours)
Lists: Creating a list -Access values in List-Updating values in Lists-Nested lists - Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples. **Dictionaries:** Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.

UNIT V **(15 Hours)**

Python File Handling: Types of files in Python - Opening and Closing files- Reading and Writing files: write() and writelines() methods- append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files.

Text Books

1. Reema Thareja, "Python Programming using problem solving approach", First Edition, 2017, Oxford University Press.
2. Dr. R. NageswaraRao, "Core Python Programming", First Edition, 2017, Dream tech Publishers.

Reference Books

1. VamsiKurama, "Python Programming: A Modern Approach", Pearson Education.
2. Mark Lutz, "Learning Python", Orielly.
3. Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication.

Web Resources

1. www.programiz.com/python-programming
2. www.w3schools.com/python/

| SEMESTER–VI | CORE-T8 | HOURS–5 | CREDITS–4 | TOTAL HOURS : 75 |

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Understand the basic concepts of Data Analytics (K2)
CO2: Become familiar with the data analytics life cycle. (K1)
CO3: Understand the various methods to analyze the data and create models. (K2)
CO4: Learn to use the results for using visualization techniques. (k3)
CO5: Learn R language basics (k2)
CO6: Model creations and visualizing the results using R. (k4)

UNIT - I (Hours : 15)
Introduction to Big Data Analytics - Big Data Overview - State of the Practice in Analytics- Key Roles for the New Big Data Ecosystem -Examples of Big Data Analytics - Data Analytics Lifecycle - Data Analytics Lifecycle Overview - Phase 1: Discovery -Phase 2: Data Preparation -Phase 3: Model Planning -Phase 4: Model Building -Phase 5: Communicate Results - Phase 6: Operationalize.

UNIT - II (Hours : 15)
Introduction to R - Handling Packages in R - Getting Started with R-Working with Directory-Data Types in R - Few Commands for Data Exploration - Challenges of Analytical Data Processing - Expression, Variables and Functions - Missing Values Treatment in R - Using the 'as' Operator to Change the Structure of Data - Vectors - Matrices - Factors - List - Few Common Analytical Tasks- Aggregating and Group Processing of a Variable-Simple Analysis Using R- Methods for Reading Data - Comparison of R GUIs for Data Input- Using R with Databases and Business Intelligence.

UNIT – III (Hours : 15)
Exploring Data in R - Data Frames-R Functions for Understanding Data in Data frames-Load Data Frames - Exploring Data - Data Summary - Finding the Missing Values - Invalid Values and Outliers - Descriptive Statistics - Spotting Problems in Data with Visualization - Linear Regression Using R - Model Fitting - Linear Regression - Assumptions of Linear Regression- Validating Linear Assumption - Logistic Regression - Introduction to Generalized Linear Models - Logistic Regression - Binary Logistic Regression - Diagnosing Logistic Regression -Multinomial Logistic Regression Models.

UNIT - IV (Hours : 15)
Decision Tree-What is a Decision Tree-Decision Tree Representation in R-Appropriate Problems for Decision Tree Learning- Basic Decision Tree Learning Algorithm-Measuring Features- Hypothesis Space Search in Decision Tree Learning-Inductive Bias in Decision Tree Learning- Issues in Decision Tree Learning- Time Series in R - Reading Time Series Data - Plotting Time Series Data - Decomposing Time Series Data - Forecasts using Exponential Smoothing - ARIMA Models.

UNIT - V   **(Hours : 15)**

Clustering - Basic Concepts in Clustering - Hierarchical Clustering - k-means Algorithm - CURE Algorithm - Clustering in Non-Euclidean Space - Clustering for Streams and Parallelism - Association Rules - Frequent Itemset- Data Structure Overview - Mining Algorithm Interfaces - Auxiliary Functions - Sampling from Transactions - Generating Synthetic Transaction Data - Additional Measures of Interestingness - Distance based Clustering Transactions and Associations.

TEXT BOOKS:

1. "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", EMC Education Services 2015. Unit I(Chapters 1,2)
2. Seema Acharya, "Data Analytics using R", McGraw Hill Education 2018, 1st Edition. Units II, III, IV and V(Chapters 1-10).

REFERENCE BOOKS:

1. Anil Maheshwari, "Data Analytics Made Accessible".
2. Michael Milton, "Head First Data Analysis".
3. V.K.Jain, "Data Science and Analytics".

WEB REFERENCES:

1. https://analytics.google.com/analytics/academy/course/6
2. https://www.youtube.com/watch?v=D2YcHRiIzCk
3. https://online-learning.harvard.edu/subject/data-anaysis.
4. https://analytics.google.com/analytics/academy

PYTHON PROGRAMMING - PRACTICAL
(23UCSC63)

SEMESTER-VI	CORE-P7	HOURS-4	CREDITS-2	TOTAL HOURS: 60

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Demonstrate the understanding of syntax and semantics of PYTHON language. (K6)
CO2: Identify the problem and solve using PYTHON programming techniques. (K6)
CO3: Identify suitable programming constructs for problem solving. (K6)
CO4: Analyze various concepts of PYTHON language to solve the problem in an efficient way. (K6)
CO5: Determine the methods to create and manipulate Python Programs by utilizing the data structures like lists, dictionaries and tuples (K6)
CO6: Develop a PYTHON program for a given problem and test for its correctness. (K6)

List of Practical

1. Program using variables, constants, I/O statements in Python.

2. Program using Operators in Python.

1. Program using Conditional Statements.

2. Program using Loops.

3. Program using Jump Statements.

4. Program using Functions.

5. Program using Recursion.

6. Program using Arrays.

7. Program using Strings.

8. Program using Modules.

9. Program using Lists.

10. Program using Tuples.

11. Program using Dictionaries.

12. Program for File Handling.

DATA ANALYTICS USING R - PRACTICALS

(23UCSC64)

SEMESTER–VI	CORE-P8	HOURS–4	CREDITS–2	TOTAL HOURS : 60

CO 1: Apply various data types and data structures in R Programming (k6)

CO 2: Apply various Built in functions in R (K6)

CO 3: Apply statistical operations for Data Analytics (K6)

CO 4: Perform pre – processing operators (K6)

CO 5: Perform Clustering operations (K6)

CO 6: Apply KNN classification in R language (K6)

List of Practical

1. To get the input from user and perform numerical operations (MAX, MIN,AVG, SUM, SQRT, ROUND) using in R.
2. To perform data import/export (.CSV, .XLS, .TXT) operations using data frames in R.
3. To get the input matrix from user and perform Matrix addition, subtraction, multiplication, inverse transpose and division operations using vector concept in R.
4. To perform statistical operations (Mean, Median, Mode and Standard deviation) using R.
5. To perform data pre-processing operations i) Handling Missing data ii) MinMax normalization
6. To perform dimensionality reduction operation using PCA for Houses DataSet
7. To perform Simple Linear Regression with R.
8. To perform K-Means clustering operation and visualize for iris data set
9. Write R script to diagnose any disease using KNN classification and plot the results.
10. To perform market basket analysis using Association Rules (Apriori)

DATA COMMUNICATIONS AND COMPUTER NETWORK
(23UCSC65)

SEMESTER-VI   EC -T6   HOURS-4   CREDITS-3   TOTAL HOURS: 60

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: To Understand the basics of Computer Network architecture, OSI and   TCP/IP reference models (K2).
CO2: To Illustrate the protocols used in each layer (K4).
CO3: To Classify various types of Transmission Media and various techniques in Digital Transmission (K5).
CO4: To analyze various services of OSI Layers and identify their relevance for network communications (K4).
CO5: To gain knowledge on Wireless LAN and Routing mechanisms (K2).
CO6: To Identify and apply the network management techniques and the functions of key management in Cryptography for network security (K3)

UNIT I (12 Hours)
Data communications- Networks - Network Types- Protocol Layering- TCP/IP Protocol suite- The OSI Model – **Physical Layer:** Signals- Signal Impairment**- Digital Transmission:** Digital-To-Digital conversion – Analog-To-Digital conversion**. Analog Transmission-** Digital-to-Analog Conversion -Analog-to-Analog Conversion**- Multiplexing** -Frequency-Division Multiplexing **-**Time-Division Multiplexing**-Transmission media:** Guided Media - Unguided Media:Wireless.

UNIT II (12 Hours)
Data Link Layer: - Introduction- **Data link Contol**: Framing- Error Control- TWO DLC Processes**–** **Media Access Protocols**: Random Access- Contolled Access**- Link Layer Addressing:** Three Types of Addresses-Address Resolution Protocol – **Local Area Networks(LANS):** Ethernet- Standard Ethernet**-** Fast Ethernet- Gigabit Ethernet**-** 10 Gigabit Ethernet.

UNIT III (12 Hours)
WIFI-IEEE 802.11 Project: Architecture – MAC Sublayer**-** Addressing Mechanism – **Bluetooth:** Architecture – Bluetooth Layers- **Wide Area Networks(WANS):** Cellular Telephony- Operation- First Generation (1G) - Second Generation (2G) - Third Generation (3G)-Fourth Generation (4G) - **Connecting Devices andVirtual LANs**: Connecting Devices –Hubs- Link Layer Switches – Routers.

UNIT IV (12 Hours)
Virtual LANs: Membership – Configuration- Communication among Switches – Advantages - **Network Layer: Data Transfer:** Services –Packet Swtiching – Performance – **Next Generation IP(IPV6)**: IPv6 Addressing - The IPv6 Protocol – Transition from IPv4 to IPv6- **Network Layer: Routing of Packets**- Introduction**-** Routing Algorithms **-** Distance-

Vector Routing - Link-State Routing - Path-Vector Routing**– Transport Layer Services-** Transport Layer Protocols.

UNIT V **(12 Hours)**
Application Layer: Introduction – Client server Paradigm – **Standard Applications**: World Wide Web and HTTP – FTP – Electronic Mail – Domain Name System – **Network Management**: Introduction- SNMP- **Cryptography and Network Security:** Introduction – Confidentiality: Symmetric key Ciphers – Asymmetric key Ciphers.

Text Book
1. Behrouz A Forouzan, "Data Communications and Networking: With TCP/IP Protocol Suite", Sixth Edition, McGrawHill Education (India), 2022.

Reference Books
1. A. S. Tanenbaum, "Computer Networks", 4th Edition, Prentice-Hall of India, 2008.
2. F. Halsall,"Data Communications, Computer Networks and Open Systems",Pearson Education, 2008.
3. D. Bertsekas and R. Gallagher, "Data Networks", 2nd Edition, PHI, 2008.
4. Lamarca, "Communication Networks", Tata McGraw- Hill, 2002

Web resources:

1. E-Content : http://www.vbspu.ac.in/wp-content/uploads/2020/05/CN-Notes.pdf
2. E-Content:https://mu.ac.in/wp-content/uploads/2021/08/USIT303-Computer-Networks.pdf

PROFESSIONAL COMPETENCY SKILL
(23UCSS61)

SEMESTER-VI	SEC8	HOURS-2	CREDITS-23	TOTAL HOURS: 30

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: To use appropriate words in a professional context
CO2: To gain understanding of basic grammatical structures and use them in right context
CO3: To devise solutions to problems using multi-step arguments, based on and supported by quantitative information.
CO4: Write effective project reports.
CO5: Express and interpret solutions, and/or arguments using verbal, numerical, graphical methods
CO6: Solve any technical problem using algorithmic, computational or symbolic techniques.

UNIT I   **(Hour: 6)**
English competency - Sentence Correction – Prepositions - Grammar - Reading Comprehension - Synonyms & Antonym - Idioms and Phrases - Speech and Tenses – Article - Sentence Selection - Spotting Error - Sentence Arrangement - Rearranging phrases into sentences – Error identification – Tenses – Adjectives – Adverbs - Articles – Clauses – Speech patterns - Telephone messages / social media messages relevant to technical contexts and emails. Writing - Writing emails / letters introducing oneself.

UNIT II   **(Hour: 6)**
Quantitative Aptitude - Numbers – Percentage – Profit and Loss – Average – Ratio and Proportion – Mixture and Alligations – Time and Work – Time speed distance – Probability – Permutation and Combination – Age.

UNIT III   **(Hour: 6)**
Logical Reasoning - Coding pattern and Number series - Data Sufficiency,- Logical Word Sequence – Puzzles - Logical word sequence, Data sufficiency - Blood Relation.

UNIT IV   **(Hour: 6)**
Effective Project Report Writing - Structure of the Project Report: (Part 1) Framing a Title – Content – Acknowledgement — Literature Review, Research Design, Methods of Data Collection - Tools and Procedures - Data Analysis - Interpretation - Findings –Limitations - Recommendations – Conclusion – Bibliography.

UNIT V   **(Hour: 6)**
Programming logic - Data Types - Pointers - Functions & Scope - Recursion & Iteration - File Handling - Arrays - Variables & Registers - Loops - Input Output - OOPs - Stacks And Queues - Linked Lists - Trees – Graphs - Dynamic Programming – Hashing - Time Complexity - Searching & Sorting.

Text Books
1. English for Engineers & Technologists Orient Blackswan Private Ltd. Department of
1. English, Anna University, (2020 edition)
2. Darla-Jean Weatherford - Technical Writing for Engineering Professionals (2016) Penwell
3. Publishers
4. R.S. Aggarwal, A Modern Approach To Verbal & Non Verbal Reasoning, S. Chand
5. Publishers.
3. Dr. R. S. Aggarwal, Quantitative Aptitude for Competitive Examinations, S. Chand Publishers, 2017.
4. Dr. Alok Kumar, MCQs on Computer, Upkar Prakashan.
5. Arshad Iqbal, Computer Fundamentals MCQs, Iindependently published, 2017.

EXTRA CREDIT COURSE

ECC-1 FUNDAMENTALS OF COMPUTER
(23UCSEC1)

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Introduce components of a computer. (K1)
CO2: About operating system. (K2)
CO3: Understand about programming principles. (K2)
CO4: Understand about different types of software. (K3)
CO5: Analysis the relationship between software and hardware. (k4)
CO6: Apply the concepts in practical environments. (K5)

UNIT I
INTRODUCTION: Components of computer (block diagrams) – characteristics of computers – generation of computers – classification of computer – application of computers – number systems (decimal, binary, octal, hexadecimal) – memory hierarchy.

UNIT II
SECONDARY STORAGE: Introduction – Classification of storage devices – Input devices – Key board – Pointing devices – Classification of output – softcopy output devices – Monitors – Projectors.

UNIT III
OPERATING SYSTEMS: Function of operating systems – Managing files with mycomputer and windows explorer - general dos commands – Internal commands – External commands – Creating, Copying, Renaming, Deleting Moving files and folders – searching files.

UNIT IV
COMPUTER PROGRAM: Computer program – Developing a program – Algorithm – Flow chart – Characteristics of good program –Computer languages – Evaluation of Programming languages – Classification of programming languages.

UNIT V
COMPUTER SOFTWARE: Definition – Relationship between hardware and Software – Software categories – System software – Application software – Software terminology.

Text book:
Introduction to Computer Sciene, ITL Education Solution Ltd., Pearson Education, 2014.

Reference Book:
Introduction to Computers and BASIC Programming by Dr. C. Xavier.

(23UCSEC2)

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Explain the basic concepts of the internet. (K1)

CO2: Explain the basic functions of HTML tags. (K1)

CO3: Create simple web pages using HTML. (K3)

CO4: Describe the concepts of tables, frames, form and style sheets. (K2)

CO5: Create web pages using tables, frames and forms. (K4)

CO6: Update knowledge to learn any future advanced version of language. (K6)

UNIT I

Introduction to the Internet – Networking – Internet – Email – Resource sharing – Gopher - World Wide Web.

UNIT II

Internet Technologies – Browsers - Introduction to HTML – History of HTML – HTML documents.

UNIT III

Head and Body Sections – Designing the body section - Ordered and Unordered Lists.

UNIT IV

Table Handling – DHTML and Style sheets

UNIT V

Frames – A Web page design project – Forms.

Text Book

1. C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill publication, First Edition, 2000.

Reference Book:

1. HTML & CSS Design and Build Websites by Jon Duckett Publication, John Wiley and Sons.INC.

Web resources:

1. https://www.geeksforgeeks.org/html/
2. https://www.tutorialspoint.com/html/

ECC-3 WEB DESIGN WITH STYLE SHEETS
(23UCSEC3)

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Understand & implement the basic HTML tags to create static web pages (K1)
CO2: Capable of using hyperlinks, frames, images, tables, in a webpage (K2,K3)
CO3: Able to write dynamic web applications using HTML forms (K4)
CO4: Create Attractive Websites with Animations (K6)
CO5: Understand the effectiveness of HTML5 and CSS3(K2)
CO6: Implement testing strategies for web applications (K5)

Unit I
Coding Basics: Intro to HTML Syntax - The HTML, head, title, & body tags - Headings, paragraphs, & lists - The strong & em tags - The doctype - The lang attribute - The meta tag & the unicode - character set - Coding Links: Absolute & Relative URLs - Anchor tags & hrefs - Linking to other websites - Linking to pages within a website - Opening a link in a new browser window/tab - Adding Images - The break tag - The image tag & source attribute - Using the width, height, & alt attributes Using horizontal rules.

Unit II
HTML Tables – Table Heading – Cellpadding and Cellspacing – colspan – rowspan – table background and borders – Table height and width – Caption – Table header body and footer – nested tables – HTML Lists: Unordered lists - Ordered List – Definition Lists – Frames & Iframes – HTML forms: Form Controls – Embed Multimedia – ASCII Codes – HTML Entities.

Unit III
HTML5: Overview – Syntax – Web Forms 2.0: datetime – datetime-local, date, month, week, time, number, range, email and url – Output element – placeholder attribute – autofocus – required – SVG: Viewing SVG files – Embedding Audio and Video – Video and Audio Attributes – Header – nav- aside – footer – articles – sections – figure – figcaption.

Unit IV
CSS: Intro to Cascading Style Sheets (CSS) - The style tag - Tag selectors - The font-size, font-family, color, & line-height properties -Hexadecimal color codes - CSS Class Selectors - The class attribute - CSS class selectors - The span tag - CSS opacity - Div Tags, ID Selectors, & Basic Page Formatting - Dividing up content with the div tag - Assigning IDs to divs - Setting width & max-width - CSS background-color - Adding padding inside a div - Centering content - CSS borders.

Unit V
CSS3: Introduction – Rounded Corner - Border Images – Multi Background – Color – Gradients – Box Shadow – Box Decoration Break – Text Shadow – Text – 2D Transform – 3D Transform – Transition – Animation – Multi Columns – Box Sizing – Tooltips – Buttons – Pagination – Zoom – Translate – Opacity – Z-Index – Display – Position – Loaders - Float

Text Books:
1.Jennifer Niederst Robbins, "Learning Web Design", O'Reilly Publication, 2021
2.Ian Pouncey, Richard York, "Beginning CSS: Cascading Style Sheets for Web Design",
   Wiley India, 2022

Reference Books:
1. Jon Duckett, "HTML & CSS : design and build websites", Wiley India, 2022
2. Jason Beaird and James George, "The Principles of Beautiful Web Design", Third Edition-Sitepoint

Web Resurces:
  ❖ https://www.youtube.com/watch?v=iG2jotQo9NI
  ❖ https://www.codecademy.com/catalog/language/html-css
  ❖ https://learn.shayhowe.com/

Outcomes: At the end of the course the students must be able to

CO 1: Understand the basic concepts of visual programming. (K1)
CO 2: Design simple applications. (K2)
CO 3: Work with GUI applications. (K4)
CO 4: Understand database applications. (K1)
CO 5: Gain overall knowledge about the subject (K3)
CO 6 : Develop Data base Applications (K4)

UNIT I
VB.NET Training: The .NET Framework Architecture Part 2-Introducing Windows Forms- Implementing Class Library Object in VB.NET.

UNIT II
Introduction and Implementing Inheritance in VB.NET- Visual Studio. NET Namespaces.

UNIT III
Windows Designing a Form using Forms Designer Window-Exploring the Forms Designer generated code-Using Application Class and Message Class-Setting and Adding Properties to a Windows Form - Event Handling In Visual Basic Dot NET.

UNIT IV
Building graphical interface elements-Adding Controls -Common Controls and Handling Control Events-Dialog Boxes in Visual Basic .NET -Common Windows Forms Controls Section-DomainUpDown and NumericUpDown .

UNIT V
Creating Menu and Menu Items-Creating Multiple-Document Interface (MDI) Applications Validation-Exceptions**.** Simple Data Binding-Complex Data Binding-Using the Data Form Wizard-Access and Manipulate Data - The ADO .NET Object Model-Access.

Text Book:
1.   Programming Visual Basic .NET, Dave Grundgeiger , 2008
Reference Books:
1.   Beginning VB.Net, Richard Blaire, Jonathan Crossland, Mathew Renolds, 2nd
        Edition, 2008
2.   Programming VB.Net, Garry Cornell, Jonathan Morrison, APress Publications,
        2007.

ECC 5 - WIRELESS TECHNOLOGY
(23UCSEC5)

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Learn about wireless technology. (K1)
CO2: Understand the layers of network. (K2)
CO3: Understand about the layers of network planning. (K3)
CO4: Knowledge about the applications of wireless technology.(K4)
CO5: Understand the transmission of voice and data through networks.(K5)
CO6: Gain overall knowledge about the subject. (K5)

UNIT I
Overview of Wireless Networks: Introduction, Different generations of wireless networks.
Characteristics of the Wireless Medium: Introduction, radio propagation mechanisms, path-loss modeling and signal coverage, effects of multi path and Doppler, channel measurement and modeling techniques.

UNIT II
Physical layer alternatives for wireless networks: Introduction, applied wireless transmission techniques, short distance base band transmission, UWB pulse transmission, Carrier Modulated transmission, Broadband modems for higher speeds, Spread Spectrum transmission, High –speed Modems for Spread spectrum technology, Diversity and Smart Receiving Techniques, Comparison of modulation schemes, Coding techniques for wireless communications – **Wireless Medium Access Alternatives:** Introduction, fixed-assignment access for Voice –Oriented networks, Random access for Data Oriented Networks, Integration of Voice and Data Traffic.

UNIT III
Network Planning: Introduction, wireless network topologies, cellular Topology, Cell Fundamentals, Signal-to-interface ratio calculation, capacity Expansion Techniques, network planning for CDMA systems. **Wireless Network Operation:** Introduction, mobility management, radio resources and power management, security in wireless networks.

UNIT IV
Wireless Application Protocol: Design and principles of operation. WAP Architecture & Components, WAE overview, WAE Model, WTA Architecture, WTA Framework Components, WSP Specification, WTP Specification, WTLS Specification, WDP Specification.

UNIT V
Bluetooth: Design and principles of operation, Transmitter Characteristics, Bluetooth Security, Link Manager Protocols, Logical Link Control and Adaptation Layer Protocol, Alternatives to Bluetooth. **Wireless LANs:** Benefits of WLANs,

design and principles of operation, WLAN configurations, Microcells and Roaming, Types of WLANs, IEEE802.11, IEEE802.11a, IEEE802.11b.

Text Book
1. Kaveh Pahlavan and Prashant Krishnamurthy, "Principles of Wireless Networks- a Unified approach", Pearson, 2004.
2. Gary S.Rogers et al, An Introduction to Wireless Technology", Pearson, 2007.

Reference Books
1. William Stallings, "Wireless communication and Networks", Pearson education, 2005, ISBN 81- 7808-560-7
2. Jim Geier, "Wireless Networks first-step ", Pearson, 2005.

Web Resources
1. www.tutorialspoint.com
2. en.wikipedia.org/wiki/Wireless

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Learn the Basics of Internet of Things (K1)
CO2: Compare and contrast the deployment of smart objects and the technologies to connect them to network.(K3)
CO3: Classify the IoT design Concepts and supporting technologies (K2)
CO4: Analyze the role of IoT protocols for efficient network communication.(K4)
CO5: Evaluate the building blocks of Internet of Things Network (K5)
CO6: Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.(K3)

Unit I
Introduction to Internet of Things – Physical design of IoT – Logical Design of IOT – IoT enabling technologies – IoT levels and deployment templates

Unit II
IoT and M2M – Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – IoT System management with NETCONF-YANG – Need for IoT systems Management – Simple Network Management Protocol – Network Operator Requirements – NETCONF – YANG.

Unit III
IoT Platforms design methodology – IoT Design Methodology – IoT systems – Logical Design using Python – Python Data Types and Data Structures – Control Flow – Functions – Modules – Packages – File Handling – Classes – Python Packages for IoT.

Unit IV
IoT Physical Devices and Endpoints – Raspberry Pi – Raspberry Pi Interfaces – Programming Raspberry Pi with Python – Other IoT Devices - IoT Physical Servers and Cloud Offerings – WAMP AutoBrain for IoT – Xively Cloud for IoT – Python Web Application Framework – Django.

Unit V
Case Studies Illustrating IoT Design – Home Automation – Cities – Environment – Agriculture – Productivity Applications.

Text Book
1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", First Edition, VPT, 2014.

Reference Books
1. Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017.
2. Honbo zhou "The Internet of Things in the Cloud",CRC Press, London, 2018.

Web Resources:
1. https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT
2. https://www.ibm.com/topics/internet-of-things

DESKTOP PUBLISHING
(23UCSAO1)

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Basics of PageMaker.(K1)
CO2: Learn how to create documents using PageMaker.(K2)
CO3: Work with Photoshop Software.(K3)
CO4: Understand the knowledge of Colors and Brushes.(K2)
CO5: Knowledge of Restoring and Aligning (K4)
CO6: Develop skill in design pattern (K5)

UNIT I
PAGEMAKER: PageMaker – the PageMaker environment – the basics of Creating a new document (The basics of creating a new document) the basics of using PageMaker text – the PageMaker text- the basics of using PageMaker Graphics – Applying Color to simple graphics.

UNIT II
DOCUMENTS IN PAGEMAKER: Meaning of document layout – Managing documents – Managing PageMaker text – Creating document consistency using – Creating tables of contents and indexes –Creating a book in PageMaker.

UNIT III
PHOTOSHOP: Introduction to Photoshop – When to use Photoshop - When to use a drawing program – Inside Photoshops: the Photoshop Desktop – Navigate in Photoshop – Customizing the Interface. Image management: How to open, Duplicate and Save Images. Adding file information- and annotations - Resumption and Cropping.

UNIT IV
COLORS AND BRUSHES: Defining Colors: Selecting And Editing colors – Working in Different Color Modes – Using Photoshop's other color selecting methods. Printing and brushes: Meet the Paint and Edit Tools –Basic Techniquers – Brush size and shape - Brush Modes. Filling and Stroking: Filling selection with color or patterns : Applying gradient files= Applying Strokes and Arrow heads.

UNIT V
RESTORING AND ALINGNING: Retouching and restoring: Cloaning and Healing: Retouching Photographs – Corrective Filtering: Filter Basics – Hightening forms and contrast. Working with Layers – Selecting the content of Layers – Moving, Linking and Aligning.

Text Books:
1. Carolyn M. Connolly, "PageMaker 7 – The Ultimate Reference", Dreametch Press, 2005.
2. Deke McClelland, "Photoshop CS Bible", Wiley Publishing Inc.

Reference Books:
1.Vikas Gupta, "Comdex DTP Course Kit ", Dreametch Press,2002.
2. Roger C. Parker,"Desktop Publishing & Design For Dummies",Wiley 1995.

Web Resource:
Desktop Publishing - Introduction (tutorialspoint.com)

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Understand and use the terminology of typography and desktop publishing (K2)
CO2: Describe what MS Publisher is and what its capabilities are. (K1)
CO3: Determine aligning and formatting objects. (K3)
CO4: Describe ways to customize publication. (K3)
CO5: Demonstrate publishing, printing, and sharing publications (K4)
CO6: Evaluate and redesign documents to improve appearance and functionality (K5)

UNIT I **(6 Hours)**
Getting Started with Publisher - Starting New Publications - Saving and Closing Publications - Opening and Viewing Publications - Printing Publications - Working with Text Boxes - Working with WordArt.

UNIT II **(6 Hours)**
Working with Graphics - Working with Shapes - Working with Pre-Designed Visual Elements - Creating Folded Cards - Creating Postcards - Using Mail Merge

UNI III **(6 Hours)**
Creating Calendars - Working with the Master Page - Packaging Publications for Printing - Building Your Brand - Creating a Logo - Creating Flyers - Aligning and Stacking Objects.

UNIT IV **(6 Hours)**
Creating Brochures - Flowing Text around Objects - Planning Longer Publication - Creating Newsletters.

UNIT V **(6 Hours)**
Organizing Content - Working with a Table of Contents - Editing and Proofing Content - Creating a Basic E-Mail Message - Creating a Message from a Multi-Page Publication – Creating and Modifying a Web Site - Adding Text and Graphics to a Web Page.

TEXT BOOK
Joyce Cox, Joan Preppernau, Microsoft Office Publisher 2007 Step by Step, Microsoft Press, 2008.

REFERENCE BOOK
Jim McCarter and Jacqui Salerno Mabin, "Microsoft® Office Publisher 2007 For Dummies", Wiley Publishing, Inc, 2008.

List of Practical

1. Working with column layout
2. Working with Frames.
3. Formating and editing text.
4. Designing master Page.
5. Designing Invitation cards.
6. Creating table of contents.
7. Creating Index page.

DATA MANAGEMENT AND AUDITING
(23UCSAO3)

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Understand the basics of Data management and value of Data (K1)

CO2: Understand the principles and nuances of Data Governance (K1)

CO3: Enhance the knowledge of Data Auditing (K2)

CO4: Understand Database Auditing (K1)

CO5: Learn various data auditing tools (K2)

CO6: Learn to Create and perform data auditing framework (K3)

Unit I: Data Management: Data Management Platforms-Autonomous Database- Data Management Challenges-Data Management Principles and Privacy-Data Management Best Practices.

Unit II: Data Governance versus Data Management-Data Governance Framework-Benefits of Data Governance Framework-Data Governance framework for Cloud Data

Unit III: Data Auditing-Data Auditing Functions-components of data Auditing-Evaluating Data Quality-Automated Data Auditing-**Audit using DBMS traces**

Unit IV: Database Auditing: SQL Server Auditing Tools-Database Activity Monitoring-open source Audit tools.

Unit V: Data Audit Framework: Planning Data Audit-Identifying and classifying data assets-accessing and management of data Assets-Reporting results and making recommendations.

Text Book

1. Gerardus Blokdyk, "Data Auditing the Ultimate Step-By-Step Guide", 5STARCooks, 2018.

Reference Book

1. Chris Davis, Mike Schiller, "IT Auditing Using Controls to Protect Information Assets",McGraw-Hill Education; 2nd edition, 2011.

Web References:

- ❖ https://www.oracle.com/in/database/what-is-data-management/
- ❖ https://satoricyber.com/data-governance/data-governance-framework/
- ❖ https://www.egnyte.com/guides/governance

VALUE ADDED COURSES

VAC- 1 PC ASSEMBLING AND TROUBLESHOOTING
(23UCSVA1)

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Recognize basics of hardware components and its characteristics (K1)
CO2: Understand about different processors (K2)
CO3: Learn about installation, configuration and upgrading software (K3)
CO4: Learn to install/connect peripherals (K3)
CO5: Learn to troubleshoot in the micro computer (K4)
CO6: Gain overall knowledge about the subject (K5)

UNIT I
Assemble and setup and upgrade personal computer systems : Identify modules that make up a computer system and its operation - Understand that a computer requires both hardware and software to work - Describe the different hardware components inside of and connected to a computer.

UNIT II
Identify each type of computer bus structure - Learn about the many different processors – processor history – processors used for personal computers and notebook computers.

UNIT III
Perform installation, configuration, and upgrading of microcomputer hardware and Software : Assemble/setup microcomputer systems, accessory boards - Learn about the different types of motherboards and how to select one - Install or replace a motherboard - Troubleshoot problems with memory.

UNIT IV
Install/connect associated peripherals : Learn how printers and scanners work- Install printers and scanners and how to share a printer over a local area network - Troubleshoot printer and scanner problems - Solve hard drive problems –

UNIT V
Diagnose and troubleshoot microcomputer systems hardware and software, and other peripheral equipment: Understand how to approach and solve a PC problem -
Troubleshoot a failed boot before the OS is loaded - Describe the general approaches you need to take when installing and supporting I/O devices - diagnose and isolate faulty components.

Text Book:
A+ Guide to Hardware: Managing, Maintaining, and Troubleshooting, "Jean Andrews" Fourth Edition, 2016.

Reference Book:
Computer Science PC Assembling & Troubleshooting by Vinra Publication

Web resources:
https://ncert.nic.in

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Describe the different physical forms of robot architectures. (K1)
CO2: Kinematically model simple manipulator and mobile robots (K2)
CO3: Mathematically describe a kinematic robot system. (K3)
CO4: Analyze manipulation and navigation problems using knowledge of coordinate frames, kinematics, optimization, control, and uncertainty.(K4)
CO5: Program robotics algorithms related to kinematics, control, optimization, and uncertainty. (K5)
CO6: Design models of Robots used in households and industries. (K6)

UNIT I
Introduction : Introduction, brief history, components of robotics, classification, workspace, work-envelope, motion of robotic arm, end-effectors and its types, service robot and its application, Artificial Intelligence in Robotics.

UNIT II
Actuators and sensors : Types of actuators, stepper-DC-servo-and brushless motors- model of a DC servo motor-types of transmissions-purpose of sensor-internal and external sensor-common sensors-encoders tachometers-strain gauge based force torque sensor-proximity and distance measuring sensors. Kinematics of robots :Representation of joints and frames, frames transformation, homogeneous matrix, D-H matrix, Forward and inverse kinematics: two link planar (RR) and spherical robot (RRP). Mobile robot Kinematics: Differential wheel mobile robot.

UNIT III
Localization: Self-localizations and mapping - Challenges in localizations – IR based localizations – vision based localizations – Ultrasonic based localizations - GPS localization systems.

UNIT IV
Path Planning: Introduction, path planning-overview-road map path planning-cell decomposition path planning potential field path planning-obstacle avoidance-case studies Vision system: Robotic vision systems-image representation-object recognition-and categorization-depth measurement- image data compression-visual inspection-software considerations

UNIT V
Application: Ariel robots -collision avoidance robots for agriculture-mining-exploration-underwater-civilian- and military applications-nuclear applications-space applications-Industrial robots-artificial intelligence in robots-application of robots in material handling-continuous arc welding-spot welding-spray painting-assembly operation-cleaning-etc.

Texts Books:
1.Richared D.Klafter. Thomas Achmielewski and Michael Negin, Robotic Engineering an Integrated Approach, Prentice Hall India-New Delhi-2001
2.Saeed.Niku, Introduction to robotics, analysis, control and applications, Wiley-India, 2 nd edition 2011

Reference Books:
1. Industrial robotic technology-programming and application by M.P.Groover et.al, McGrawhill2008.
2. Robotics technology and flexible automation by S.R.Deb, THH-2009

Web resources:
1.   Introduction to robotics | Robot Academy
2.   Introduction to Robotics | Mechanical Engineering | MIT OpenCourseWare

VAC- 3 CLOUD COMPUTING
(23UCSVA3)

CO 1: Understand the fundamental concepts and Technologies in Cloud Computing.
CO 2: Able to understand various cloud service types and their uses and pitfalls.
CO 3: Able to understand Cloud Applications and working with them.
CO 4: Understand the various aspects of application design
CO 5: Understand various Case Studies in Cloud Computing.
CO 6: Understad the Cloud Stoage and its Management.

UNIT I
Understanding Cloud Computing - An Introduction to Cloud Computing - A Short History of Cloud Computing - The Pros and Cons of Cloud Computing - Developing Cloud Services - The Pros and Cons of Cloud Service Development - Types of Cloud Service Development.

UNIT II
Cloud Computing for Everyone - Centralizing Email Communications - Collaborating on Schedules - Collaborating on Grocery Lists - Collaborating on To-Do Lists - Collaborating on Household Budgets - Collaborating on Contact Lists - Collaborating on School Projects - Sharing Family Photos.

UNIT III
Cloud Computing for the Corporation - Managing Schedules – Managing Contact Lists – ManagingProjects - Collaborating on Reports - Collaborating on Marketing Materials - Collaborating on Expense Reports - Collaborating on Budgets - Collaborating on Financial Statements - Collaborating on Presentations - Presenting on the Road - Accessing Documents on the Road.

UNIT IV
Using Cloud Services - Collaborating on Calendars, Schedules, and Task Management - Exploring Online Calendar Applications - Collaborating on Word Processing - How Web-Based Word Processing Works - Exploring Web-Based Word Processors.

UNIT V
Collaboratingon Spreadsheets - How Web-Based Spreadsheets Work - Exploring Web-Based Spreadsheets - Collaborating on Databases - Understanding Database Management - Exploring Web-Based Databases - Collaborating on Presentations. - Preparing Presentations OnlineEvaluating Web-Based Presentation Applications - Storing and Sharing Files and Other Online Content - Understanding Cloud Storage - Evaluating Online File-Storage and -Sharing ServicesExploring Online Bookmarking Services - . Sharing Digital Photographs - Online Photo-Editing Applications.

TEXT BOOK
Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, 2008.

REFERENCE BOOKS
1. Toby Velte, Anthony Velte, Robert C. Elsenpeter, "Cloud Computing: A Practical Approach", Tata McGraw-Hill, 2009.
2. David Crookes, "Cloud Computing in Easy Steps", In Easy Steps Limited, 2012.

WEB REFERENCE
1. www.teachthought.com/pedagogy/teachers-guide-to-cloud-based-word-processing.
2. www.androidauthority.com/how-to-use-google-docs-tutorial-tips-tricks-3110289.
3. https://edu.gcfglobal.org/en/googledocuments/#