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 in IV Cycle)
(Star College Programme by DBT, Govt. of India.)
Affiliated to Manonmaniam Sundaranar University Tirunelveli

SYLLABUS

Preserve this copy of the syllabus until you complete the course, as it is an important document of your present course of study.

Name _____

BACHELOR OF COMPUTER APPLICATIONS

Choice Based Credit System (CBCS)

(w.e.f. June 2023-2024)

PROGRAMME NAME : BCA
PROGRAMME CODE : UCA

COMPUTER APPLICATIONS (BCA)

Programme Structure

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	General English - I	6	3
	III	Core-T1	23UCAC11	Object Oriented Programming with C++	5	5
	III	Core-P1	23UCAC12	**Practical:** C++ Programming	5	4
	III	EC-T1	23UCAE11	Discrete Mathematics / Computer Organization and Architecture	4	4
	IV	SEC1	23UCAN11	MS-Word and PowerPoint (NME)	2	2
	IV	FC	23UHER11/ 23UHEE11	Foundation Course: 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	General English - II	6	3
	III	Core-T2	23UCAC21	Relational Database Concepts	4	5
	III	Core-P2	23UCAC22	**Practical:** Oracle	4	3
	III	EC-T2	23UCAE21	Operation Research / Microprocessor and Microcontroller	4	3
	III	EC-P2	23UCAE22	**Practical:** Operation Research using C++ / Microprocessor and Microcontroller	2	2
	IV	SEC2	23UCAN21	MS-Excel and Access (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	General English – III	6	3
	III	Core-T3	23UCAC31	Programming in Java	4	5
	III	Core-P3	23UCAC32	**Practical:** Programming in Java	4	3
	III	EC-T3	23UCAE31	Numerical and Statistical Methods / Visual Basic	4	3
	III	EC-P3	23UCAE32	**Practical:** Numerical and Statistical Methods / Visual Basic	2	2
	IV	SEC4	23UHEL31	Life Issues & Entrepreneurial Skill Development	2	2
	IV	SEC5	23UCAN31	Macromedia Flash (NME)	2	2
					30	23
	I	Lang	23UGTL41	General Tamil – IV	6	3
	I	Lang	23UGHL41	Hindi – IV		
	I	Lang	23UGFL41	French – IV		

IV	II	Lang	23UGEL41	General English – IV	6	3
	III	Core-T4	23UCAC41	Python Programming	4	4
	III	Core-P4	23UCAC42	**Practical:** Python Programming	3	3
	III	EC-T4	23UCAE41	Data Structures and Algorithms / Computer Graphics	3	3
	III	EC-P4	23UCAE42	**Practical:** Data Structures using C++ / Computer Graphics	2	2
	IV	SEC6	23UCAN41	Web Designing with HTML (NME)	2	2
	IV	SEC7	23UCAS42	Software Engineering / E-Commerce	2	2
	IV	EVS	23UEVS41	Environmental Studies	2	2
					30	24
V	III	Core-T5	23UCAC51	Net Programming using C#	5	5
	III	Core-T6	23UCAC52	PHP Programming	5	5
	III	Core-P5	23UCAC53	**Practical: .**Net Programming using C#	5	3
	III	Core-P6	23UCAC54	**Practical:** PHP Programming	5	3
	III	EC-T5	23UCAE51	Operating Systems and LINUX / Data Analytics Using R Programming	4	3
	III	EC-P5	23UCAE52	**Practical:** LINUX / R Programming	4	3
	IV	VE	23UVEH51	Human Rights & Social Analysis	2	2
	IV	Internship	23UCAI51	Internship	-	2
					30	26
VI	III	Core-T7	23UCAC61	Android Programming	4	4
	III	Core-T8	23UCAC62	J2EE	4	4
	III	Core-P7	23UCAC63	**Practical:** Android Programming	4	2
	III	Core-P8	23UCAC64	**Practical:** J2EE	4	2
	III	Core	23UCAC65	Project with Viva Voce	8	3
	III	EC-T6	23UCAE61	Computer Networks / Introduction to Artificial Intelligence	4	3
	IV	SEC8	23UCAS61	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 (Any one)	23UCAAO1 /23UCAAO2	MS Word / Web Designing		2
II UG		Value Added (Any one)	23UCAVA1/ 23UCAVA2	C Programming / Red Hat Certified System Administration – RHEL v9		2
III UG		ECC (Any one)	23UCAEC1	Fundamentals of Computers		2
			23UCAEC2	Cloud Computing		
			23UCAEC3	Data mining		
			23UCAEC4	Wireless Technology		
			23UCAEC5	Internet of Things		
			23UCAEC6	Social Networks		
				Grand Total	**180**	**146**

பொதுத்தமிழ்-1

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 - சென்ரியூ 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.ஃ.ப். 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

பொதுத் தமிழ் - 2

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.ஃ.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

பொதுத் தமிழ் - 3
Sub Code: 23UGTL31

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

பொதுத்தமிழ் - 4
Sub Code: 23UGTL41

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

Learning objectives: கற்றலின் நோக்கங்கள்

1. இலக்கியங்களின் சிறப்பினை உணர்த்துதல்
2. சங்க இலக்கியத்தின் மும் வாழிவயல 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 அறிதல (K1,K2)
CO2 – தமிழின் தொன்மையையும் செம்மொழித் தன்மையையும் உணர்தல் (K2)
CO3 – நாடக இலக்கியம் மூலம் நடிப்பாற்றலையும் கலைத்தன்மையையும வளர்த்தல (K4)
CO4 – நாடக இலக்கியம் அறிமுகப்படுத்தப்படுவதால் சிந்தனை ஆற்றல், படைப்பாற்றல், கற்பனைத் திறன் வளர்தல் (K4)
CO5 – தமிழிலிருந்து அலுவலகக் கடிதங்களை மொழிபெயர்க்கும் அறிவைபபெறுதல் (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**

GENERAL ENGLISH

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**

GENERAL ENGLISH

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**

GENERAL ENGLISH

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

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

RELIGION: CATHOLICDOCTRINE
(23UHER11)

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

ETHICS
(23UHEE11)

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.

OBJECT ORIENTED PROGRAMMING USING C++
(Course Code: 23UCAC11)

SEMESTER – I	CORE – T1	HOURS – 5	CREDITS – 5	TOTAL HOURS: 75

COURSE OUTCOMES:

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

CO1: Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects. (**K1**)|

CO2: Understand dynamic memory management techniques using pointers, constructors, destructors, etc. (**K2**)

CO3: Describe the concept of function overloading, operator overloading, virtual functions and polymorphism (**K3**)

CO4: Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming (**K4**)

CO5: To understand concept of Binary and ASCII Files (**K5**)

CO6: Demonstrate the use of various OOPs concepts with the help of programs (**K6**)

UNIT I INTRODUCTION (15 HOURS)

Introduction to C++ - key concepts of Object-Oriented Programming –Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures: - Decision Making and Statements: If...Else, jump, goto, break, continue, Switch case statements – Loops in C++: for, while, do – functions in C++ - inline functions – Function Overloading.

UNIT II CLASSES AND OBJECTS (15 HOURS)

Classes and Objects: Declaring Objects – Defining Member Functions – Static Member variables and functions – array of objects –friend functions – Overloading member functions – Bit fields and classes – Constructor and destructor with static members.

UNIT III OPERATOR OVERLOADING (15 HOURS)

Operator Overloading: Overloading unary, binary operators – Overloading Friend functions – type conversion – **Inheritance**: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes.

UNIT IV POINTERS AND ARRAYS (15 HOURS)

Pointers – Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – **Arrays** – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding, Polymorphism and Virtual Functions.

UNIT V FILE OPERATIONS (15 HOURS)

Files – File stream classes – file modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling – String – Declaring and Initializing string objects – String Attributes – Miscellaneous functions

TEXT BOOK

E. Balagurusamy, "Object-Oriented Programming with C++", TMH 2013, 7th Edition.

REFERENCE BOOKS

1. Ashok N Kamthane, "Object-Oriented Programming with ANSI and Turbo C++", Pearson Education 2003.
2. Maria Litvin & Gray Litvin, "C++ for you", Vikas publication 2002.
3. Object-Oriented Programming Using C++ by Alok Kumar Jagadev , Amiya Kumar Rath , Satchidananda Dehuri , PHI Learning, 2017

WEB RESOURCES

- https://alison.com/course/introduction-to-c-plus-plus-programming
- https://www.geeksforgeeks.org/object-oriented-programming-in-cpp/
- https://www.w3schools.com/cpp/cpp_oop.asp

PRACTICAL: C++ PROGRAMMING

(Course Code: 23UCAC12)

SEMESTER – I	CORE – P1	HOURS – 5	CREDITS – 4	TOTAL HOURS: 75

LIST OF PROGRAMS

1. Write a C++ program to demonstrate function overloading, Default Arguments and Inline function.
2. Write a C++ program to demonstrate Class and Objects
3. Write a C++ program to demonstrate the concept of Passing Objects to Functions
4. Write a C++ program to demonstrate the Friend Functions.
5. Write a C++ program to demonstrate the concept of Passing Objects to Functions
6. Write a C++ program to demonstrate Constructor and Destructor
7. Write a C++ program to demonstrate Unary Operator Overloading
8. Write a C++ program to demonstrate Binary Operator Overloading
9. Write a C++ program to demonstrate:
    A. Single Inheritance
    B. Multilevel Inheritance
    C. Multiple Inheritance
    D. Hierarchical Inheritance
    E. Hybrid Inheritance
10. Write a C++ program to demonstrate Virtual Functions.
11. Write a C++ program to manipulate a Text File.
12. Write a C++ program to perform Sequential I/O Operations on a file.
13. Write a C++ program to find the Biggest Number using Command Line Arguments
14. Write a C++ program to demonstrate Class Template
15. Write a C++ program to demonstrate Function Template.
16. Write a C++ program to demonstrate Exception Handling.

DISCRETE MATHEMATICS
(Course Code: 23UCAE11)

SEMESTER – I	EC – T1	HOURS – 4	CREDITS – 4	TOTAL HOURS: 60

COURSE OUTCOMES:

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

CO1: Describe the relations and functions and be able to determine their Properties. (K1)
CO2: Illustrate the basic principles of sets and operations in sets. (K2)
CO3: Solve basic set equalities. (K3)
CO4: Classify the counting principles to determine probabilities. (K4)
CO5: Determine if the argument is valid or not valid. (K5)
CO6: Formulate and solve real world problems using graphs and trees. (K6)

UNIT I SET THEORY AND RELATION (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 and Partitions. **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 FUNCTIONS (12 HOURS)

Introduction – Functions – One-to-One-Onto and Inevitable Functions – Mathematical Functions, Exponential and Logarithmic Functions – Sequences, Indexed Classes of sets – Recursively Defined Functions – Cardinality

UNIT III LOGIC AND PROPOSITIONAL CALCULUS (12 HOURS)

Introduction – Propositions and Compound Propositions – Basic Logical Operations – Propositions and Truth Tables – Tautologies and Contradictions – Logical Equivalences –Algebra of Propositions – Conditional and Bi-conditional Statements – Arguments – Logical Implication – Prepositional Functions, Quantifiers – Negation.

UNIT IV COUNTING (12 HOURS)

Introduction, Basic Counting Principles – Factorial Notation – Binomial Coefficients – Permutations – Combinations – The Pigeonhole Principle – The Inclusion – Exclusion Principle

UNIT V GRAPH THEORY (12 HOURS)

Graphs – Complete, Regular and Bipartite Graphs – Labeled and Weighted Graphs –Subgraphs – Paths, Connectivity – The Bridges of Konigsberg, traversable Multigraphs – Tree Graphs – Planar Graphs – Spanning Tree – Minimal Spanning Tree – Euler's Formula

TEXT BOOK

Seymour Lipschutz, Marc Lipson, "Discrete Mathematics", Second Edition, Tata McGraw Hill, 2019. Chapters **: 1, 2, 3, 4, 5, 8.1-8.10**

REFERENCE BOOKS

1. B.S. Vatsa, "Discrete Mathematics", Third Edition, Wishwa Prakashan, 2018.
2. K.D. Joshi, "Foundation of Discrete Mathematics", Wiley Eastern Ltd., 2019.

WEB RESOURCES

- https://discrete.openmathbooks.org/dmoi3.html
- https://www.academia.edu/22551485/Seymour_Lipschutz_Marc_Lipson_Schaums_Outline_of_Discrete_Mathematics_McGraw_Hill_Osborne_Media_2007_

COMPUTER ORGANIZATION AND ARCHITECTURE
(Course Code: 23UCAE11)

SEMESTER – I	EC – T1	HOURS – 4	CREDITS – 4	TOTAL HOURS: 60

COURSE OUTCOMES:

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

CO1: Describe the components of computer system and number system. **(K1)**

CO2: Discuss about the logic design and Arithmetic – Logic Unit. **(K2)**

CO3: Demonstrate the basic concepts of digital principles. **(K3)**

CO4: Classify the various memory elements. **(K4)**

CO5: Summarize the input-output devices and control unit. **(K5)**

CO6: Formulate the addressing techniques and RISC-CISC Architecture. **(K6)**

UNIT I NUMBER SYSTEM AND GATE NETWORKS (12 HOURS)

Computer Operation: Basic Components of Digital Computer – Programming Overview – Assembly Languages – High level Languages. **Number Systems**: Binary Addition and Subtraction – Binary Multiplication and Division – Converting Decimal Numbers to Binary – Negative Numbers – Use of Complements to represent Negative Numbers – BCD Number Representation – Octal and Hexadecimal Number System **Boolean Algebra and Gate Networks**: Fundamental concepts of Boolean Algebra – AND and OR Gates – Complementation and Inverters – Evaluation of Logical Expressions – Basic Laws of Boolean Algebra.

UNIT II LOGIC DESIGN AND ARITHMETIC – LOGIC UNIT (12 HOURS)

De Morgan's Theorem – Derivation of a Boolean Expression – Interconnecting Gates – Sum of Products and Product of Sums – Derivation of a Three – Input – Variable Expression – NAND and NOR Gates. **Logic Design**: Flip flops – Clocks – Flip flop Designs – Shift Register – Binary Counter – BCD Counters – Integrated Circuits – Medium, Large and Very Large – Scale Integration. **The Arithmetic – Logic Unit**: Construction of the ALU – Integer Representation – Binary Half Adder – Full Adder – A Parallel Binary Adder – Multiplexers.

UNIT III RAM, ROM, VIRTUAL AND CACHE MEMORY (12 HOURS)

The Memory Element: Random Access Memories – Static and Dynamic RAMs – ROMs – Magnetic Disk Memories – Flexible Disk Storage System – The Floppy Disk – Magnetic Tape – Optical Storage Devices – Computer Word Structures – Storage hierarchies – Virtual Memory – Cache memory.

UNIT IV INPUT – OUTPUT DEVICES AND CONTROL UNIT (12 HOURS)

Input Output devices: Terminals, Personal Computers and Workstations – Input Media – Character Recognition – Output Equipment – Error– Detecting and Error– Correcting codes – Buses for Personal Computers and Work stations. **Control Unit**: Construction of an Instruction Word – Instruction and Execution cycle Organization of Control Registers – Branch, Skip or Jump Instructions – Shift Instructions – Register Transfer Language.

UNIT V RISC AND CISC ARCHITECTURE (12 HOURS)

Computer Architecture: Instruction Word formats– Number of Addresses – Representation of Instructions and Data – Addressing techniques – Direct Addressing – Immediate Addressing – Relative Addressing – Indirect Addressing – Indexed Addressing – BRANCH and JUMP Instructions – Flags, Condition Codes and Status Registers – Subroutine calls – Interrupts – Pipelined computers – RISC and CISC architecture – Security and protection.

TEXT BOOK

Thomas C Bartee, "Computer Architecture & Logic Design", Tata McGraw Hill, 2010.

Chapters:

UNIT I: **1.4 – 1.5** (Pg: 6-12), **1.7 – 1.8** (Pg: 16-19), **2.4 – 2.10** (Pg: 24-38), **3.1 – 3.5** (Pg: 55-65)

UNIT II: **3.6 –3.11** (Pg: 65-78), **4.1 – 4.8** (Pg: 132-162), **5.1– 5.5**(Pg: 190-197), **5.13** (Pg: 227-229)

UNIT III: **6.1** (Pg: 245-247), **6.6 – 6.11** (Pg: 263-286), **6.14 – 6.18** (Pg: 288-309)

UNIT IV: **7.1 – 7.6** (Pg: 322-344), **9.1 – 9.2** (Pg: 417-424), **9.5 – 9.7** (Pg: 433-441)

UNIT V: **10.1 – 10.15** (Pg: 452-483)

REFERENCE BOOKS

1. William Stallings, "Computer Organization and Architecture: Designing for Performance", Tenth Edition, Pearson Education, 2019.
2. M. Morris Mano, "Computer System Architecture", Revised Third Edition, Pearson Education, 2017.
3. Smut Ranjan Sarangi, "Computer Organization and Architecture", First Edition, McGraw Hill Education, 2017.

WEB RESOURCES

- https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/
- https://www.javatpoint.com/computer-organization-and-architecture-tutorial

MS-WORD AND POWERPOINT

(**Course Code: 23UCAN11**)

SEMESTER – I	SEC – 1	HOURS – 2	CREDITS – 2	TOTAL HOURS: 30

COURSE OUTCOMES:

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

CO1: Define basic functions and new formatting features in Word 2010. **(K1)**

CO2: Describe the Header and Footer content and update page numbers and dates. **(K2)**

CO3: Examine the various features of Word. **(K3)**

CO4: Analyze the presentation techniques. **(K4)**

CO5: Evaluate presentations with video, pictures, and animations. **(K5)**

CO6: Design various presentations. **(K6)**

UNIT I GETTING STARTED WITH WORD (6 HOURS)

Introducing the New Features in Word 2010 – Creating a New Blank Document – Saving in Different Formats – Beginning a New Word Project – Formatting Text in the Documents – Inserting the Symbols and Changing Date Styles – Adding Bullets and Numbered Lists – Searching and Replacing in the Document.

UNIT II PAGE NUMBERS, HEADER AND FOOTER (6 HOURS)

Adjusting the Structure of Document – Changing the Margins – Changing the Page Orientation – Inserting Page Numbers – Inserting Header and Footer – Adding Foot notes and End notes – Creating Columns in a Longer Document.

UNIT III WORKING IN TABLES (6 HOURS)

Creating Table – Adding and Deleting Rows/Columns – Merging Cells – Modifying Borders – Working with Graphics and Effects – Inserting a Picture – Adding a Clip Art Image – Cropping an Image – Applying Picture Style and Effects – Inserting a Smart Art Diagram – Using Screenshots or Screen Clippings.

UNIT IV GETTING STARTED WITH MS POWERPOINT (6 HOURS)

Getting started with PowerPoint 2010 – Adding and Editing Text – Adding Slides with Bullets – Moving Slides – Applying Theme from the Design Tab – Using Slide Masters.

UNIT V WORKING WITH TABLE, CHART, ANIMATION (6 HOURS)

Creating Table – Adding Chart – Inserting a Picture – Adding Slide Transitions – Adding Animations to Content – Using the Animation Painter Tool – Inserting and Trimming Video – Using Online Video.

TEXT BOOK

Tom Bunzel, "Easy Microsoft Office 2010", Que Publishing, First Edition, 2010.

REFERENCE BOOKS

1. Gary B. Shelly, Misty E. Vermaat, "Microsoft Office 2010: Introductory", Cengage Learning, First Edition 2012.
2. Katherine Murray, "Microsoft Office 2010 Plain & Simple", Microsoft Press, First Edition, 2010.

WEB RESOURCES

- https://freecomputerbooks.com/Microsoft_Office_Powerpoint.html
- https://freecomputerbooks.com/Microsoft-Office-Word-2007.html

PRACTICAL LIST

1. Design a Bio-data in MS Word
2. Design an Invitation in MS Word
3. Newspaper formatting in MS Word
4. Bullets and Numbering in MS Word
5. Create a simple presentation using MS-Power Point
6. Presentation using Themes
7. Presentation using Animation

RELATIONAL DATABASE CONCEPTS
(Course Code: 23UCAC21)

SEMESTER - II	CORE-T2	HOURS - 4	CREDITS – 4	TOTAL HOURS: 60

COURSE OUTCOMES:

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

CO1: Define the fundamentals of RDBMS. **(K1)**
CO2: Design database using ER diagram and normal forms**. (K2)**
CO3: Use Oracle for Creating and manipulating relational database. **(K3)**
CO4: Analyze Set Operators and making other transactions. **(K4)**
CO5: Apply SQL queries in procedural language, PL/SQL. **(K5)**
CO6: Develop Procedures and Exception Handling in PL/SQL. **(K6)**

UNIT I PURPOSE OF DATABASE SYSTEMS (12 HOURS)

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 OVERVIEW OF DESIGN PROCESS (12 HOURS)

ER Model – E – R Diagrams– Extended E – R Features – Features of Good Relational Design – Atomic Domains and First Normal Form – 2NF – 3NF – BCNF – Decomposition Using Functional Dependencies.

UNIT III NAMING RULES AND CONVENTIONS (12 HOURS)

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 BUILT – IN FUNCTIONS (12 HOURS)

Grouping Data – Join – Set Operators – Subquery – Top – N Analysis – Correlated Subquery – Views – Sequences – Synonyms – Index – Transactions – Locking Rows for Update – Controlling Access.

UNIT V FUNDAMENTALS OF PL/SQL (12 HOURS)

PL/SQL Block Structure – Comments– Data Types– Variable Declaration – Bind Variable – Control Structures – SQL in PL/SQL – Data Manipulation in PL/SQL – Cursors – Exception Handling – Procedure – Function – Packages.

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, "Database System Concepts", McGraw Hill, Seventh edition, 2019. **(Units I & II)**
2. Nilesh Shah, "Database Systems using Oracle A simplified guide to SQL and PL/SQL", Prentice Hall of India, 2009. **(Units III, IV & V)**

REFERENCE BOOKS

1. Ivan Bayross, "SQL, PL/SQL, The Programming Language of Oracle", BPB Publications, 2020.
2. Alexis Leon and Mathews Leon, "Fundamentals of Database Management Systems", Vijay Nicole Imprints, 2010.
3. Scott Urman, "Oracle 9i Pl/SQL Programming", Tata McGraw Hill, 2006.

WEB RESOURCES

- https://www.tutorialspoint.com/plsql/index.htm
- https://www.javatpoint.com/oracle-tutorial
- https://www.w3schools.com/mysql/mysql_rdbms.asp

PRACTICAL: ORACLE

(Course Code: 23UCAC22)

SEMESTER - II	CORE - P2	HOURS -4	CREDITS -4	TOTAL HOURS: 60

LIST OF PROGRAMS

1. Creating, modifying and dropping Tables.
2. Creating tables with Referential and Check Constraints.
3. Inserting, Modifying, Deleting Rows.
4. Retrieving rows with Operators in where Clause.
5. Retrieving rows with Character, Number and Date functions.
6. Retrieving rows with Group functions and Having.
7. Joining Tables. (Inner and Outer).
8. Retrieving rows with Sub Queries.
9. PL/SQL programs with Control Structures.
10. PL/SQL programs with Cursors.
11. PL/SQL programs with Exception Handling.
12. Creating and Calling Procedures and Functions.

OPERATIONS RESEARCH
(Course Code: 23UCAE21)

SEMESTER - II	EC-T2	HOURS - 4	CREDITS -3	TOTAL HOURS: 60

COURSE OUTCOMES:

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

CO1: Solve Integer Programming Problems. **(K1)**
CO2: Explain Multi-criteria decision techniques. **(K2)**
CO3: Compute various Transportation and Assignment Problems. **(K3)**
CO4: Classify the Methodology of Operations Research. **(K4)**
CO5: Compare and solve the different Linear programming Problems. **(K5)**
CO6: Design Network flow Diagram. **(K6)**

UNIT I INTRODUCTION (12 HOURS)

Introduction: The Nature and Meaning of OR – Management – Applications of OR – Modeling in OR – General methods for solving OR models – Scope of OR.

Linear programming problem: Formulation of LP problems – Graphical solution of LP problems – General formulation of LPP – Slack and Surplus variables – Standard form of LPP – Some important form of LPP – Simplex Method.

UNIT II ARTIFICIAL VARIABLE TECHNIQUES (12 HOURS)

Artificial variable techniques: Two phase method: **Integer programming problem:** Importance – Definitions– Gromory's Pure Integer Programming Problem.

UNIT III ASSIGNMENT PROBLEM (12 HOURS)

Assignment problem: Mathematical formulation – Hungarian method –Unbalanced assignment problem – Various types.

Transportation model: Mathematical formulation – Matrix form – Methods for finding Initial Basic Feasible Solution and optimal solution – Degeneracy in Transportation problems – Unbalanced Transportation problem.

UNIT IV SEQUENCING PROBLEM (12 HOURS)

Sequencing problem: Assumptions – Solutions to sequencing problems: Processing on jobs through 2 machines – Processing n jobs through 3 machines – Processing n jobs on m machines**.**

UNIT V PERT AND CPM TECHNIQUES (12 HOURS)

Pert and cpm techniques: Basic Steps – Network diagram representation – Rutes for Drawing Network diagram – Labeling Fulkerson's I-J Rule – Time Estimates and Critical Path in Network analysis – Examples on optimum duration and minimum duration cost – PERT.

TEXT BOOK

S.D. Sharma, "Operations Research", Kedamath Ramnath & Co. Meerut, 2018

REFERENCE BOOKS

1. HamdyTaha, "Operations Research", Prentice Hall, 2010.
2. V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan, "Resource Management Techniques", A.R. Publications, 2016.

WEB RESOURCES

- https://www.tutorialspoint.com/linear_programming/index.asp
- https://www.analyticsvidhya.com/blog/2017/02/lintroductory-guide-on-linear-programming
- https://commerceiets.com/assignment

MICROPROCESSOR AND MICROCONTROLLER
(Course Code: 23UCAE21)

SEMESTER - II	EC-T2	HOURS - 4	CREDITS -3	TOTAL HOURS: 60

COURSE OUTCOMES:

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

CO1: Remember the Basic binary codes and their conversions. **(K1)**
CO2: Understanding the 8085 instruction set and their classifications. **(K2)**
CO3: Applying different types of instructions to convert binary codes. **(K3)**
CO4: Analyze how peripheral devices are connected to 8085 using Interrupts and DMA controller. **(K4)**
CO5: Compare and understand the Microprocessor and Micro Controller. **(K5)**
CO6: Implement and execute Interrupts in 8051. **(K6)**

UNIT l INTRODUCTION TO DIGITAL COMPUTERS (12 HOURS)

Digital Computers - Micro computer Organization-Computer languages – Microprocessor Architecture and its operations – Microprocessor initiated operations and 8085 Bus organization – Internal Data operations and 8085 registers - Peripheral or External initiated operations.

UNIT lI 8085 MICROPROCESSOR (12 HOURS)

8085 Microprocessor – Pinout and Signals – Functional block diagram 8085 Instruction Set and Classifications.

UNIT lII BCD (12 HOURS)

BCD to Binary and Binary to BCD conversions - ASCII to BCD and BCD to ASCII conversions - Binary to ASCII and ASCII to Binary conversions. BCD Arithmetic-BCD addition and Subtraction – Multi byte Addition and Subtraction – Multiplication and Division.

UNIT lV RIM AND SIM (12 HOURS)

The 8085 Interrupts – RIM AND SIM instructions – 8259 Programmable Interrupt Controller-Direct Memory Access (DMA) and 8257 DMA controller.

UNIT V MICROCONTROLLER (12 HOURS)

Introduction to Microcontroller-Microcontroller Vs Microprocessor - 8051 Microcontroller architecture -8051 pin description. Timers and Counters–Operating Modes – Control Registers Interrupts – Interrupts in 8051 – Interrupts Control Register – Execution of interrupt.

TEXT BOOKS

1. R.S.Gaonkar-"Microprocessor Architecture-Programming and Applications with 8085" - 5th Edition – Penram International Publications, 2009.[For unit I to unit IV]
2. Soumitra Kumar Mandal –‒ Microprocessors and Microcontrollers – Architectures, Programming and Interfacing using 8085, 8086, 8051‖, Tata McGraw Hill Education Private Limited.[for unit V].

REFERENCE BOOKS

1. Mathur -‒Introduction to Microprocessor - 3rd Edition-Tata McGraw - Hill-1993.
2. RajKamal-‒Microcontrollers: Architecture, Programming, Interfacing and System Design ‖, Pearson Education, 2005.

WEB RESOURCES

- From NDL Library, E-content from open source libraries

PRACTICAL : OPERATIONS RESEARCH USING C++

(Course Code: 23UCAE22)

SEMESTER - II	EC-P2	HOURS - 2	CREDITS-2	TOTAL HOURS: 30

LIST OF PROGRAMS

1. Program for formulation of Linear Programming Problem.
2. Implementing North-West Corner Rule
3. Implementing Least Cost method
4. Program to implement Transportation Problem.
5. Program to implement Assignment Problem.
6. Program to implement PERT / CPM.

PRACTICAL : MICROPROCESSOR AND MICROCONTROLLER

(Course Code: 23UCAE22)

SEMESTER - II	EC-P2	HOURS - 2	CREDITS-2	TOTAL HOURS: 30

I. Addition and Subtraction

1. 8-bit addition
2. 16-bit addition
3. 8-bit subtraction
4. BCD subtraction

II. Multiplication and Division

1. 8-bit multiplication
2. BCD multiplication
3. 8-bitdivision

III. Sorting and Searching

1. Searching for an element in an array.
2. Sorting in Ascending and Descending order.
3. Finding the largest and smallest elements in an array.
4. Reversing array elements.

IV. Code Conversion

1. BCD to Hex and Hex to BCD.
2. Binary to ASCII and ASCII to binary.
3. ASCII to BCD and BCD to ASCII.

MS-EXCEL AND ACCESS
(Course Code: 23UCAN21)

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

COURSE OUTCOMES:

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

CO1: Describe the basic concepts of MS Excel and Access. **(K1)**

CO2: Summarize the usage of Excel. **(K2)**

CO3: Examine a chart in Excel. **(K3**)

CO4: Apply the Formulas and Functions in Excel **(K4)**

CO5: Analyze database concepts in Access. **(K5)**

CO6: Create table in Access. **(K6)**

UNIT I GETTING STARTED WITH EXCEL 2010 (6 HOURS)

The Excel Interface – Working and Worksheets – Cell and Range Selection – Entering data – Editing Data – Reorganizing a Worksheet – Filling Cells – Importing Data – Finding/Replacing Data – Sorting Data – Naming cells and Ranges – Password Protecting Workbooks.

UNIT II FORMATTING WORKSHEETS AND DATA (6 HOURS)

Setting Column Width and Row Height – About Data and Cell Formatting – Character and Paragraph Formatting – Fitting Text within a Cell – Number Formatting – Conditional Formatting – Adding Cell Backgrounds and Borders – Removing, Replacing and Reusing Formats – Worksheet Formatting.

UNIT III FORMULAS AND FUNCTIONS (6 HOURS)

Formulas and Functions: About Cell Reference – Formula Essential – Creating Formulas – Editing Formulas.

UNIT IV CREATING CHARTS (6 HOURS)

Creating Charts: Chart Elements – Creating charts – Changing the Background – Adding and Formatting Text – Rows or Columns – Changing Layout Style – Displaying the Data Set – Working with Gridlines – Working with the Legend – Adding Trend Lines – Modifying the Axes – Creating Spark lines – Changing the Chart Data.

UNIT V INTRODUCING ACCESS, BUILDING DATABASE TABLES (6 HOURS)

Introducing Access: What is a Database – Tables, Queries, Forms, and Other Objects – Creating a Database File **Building Your Database Tables:** Creating a Database Table – Opening and Viewing Tables – Entering and Altering Table Fields – Field Properties for Making Sure that Data Entries are Accurate – Indexing for Faster Sorts, Searches, and Queries

TEXT BOOK

Steve Schwartz, "Microsoft Office 2010", Dorling Kindersley (India) Pvt. Ltd, Pearson Education, 2012.

REFERENCE BOOKS

1. Prof. Satish Jain, M. Geetha, Kratika, "MS-OFFICE 2010 Training Guide", 2017.
2. Joyce Cox, Joan Lambert, Curtis Frye, "Microsoft office Professional 2010 Step by Step", Microsoft Publisher, 2011.
3. Peter Weverka, "Office 2010 ALL-IN-ONE FOR DUMMIES", Wiley Publishing, Inc., Indianapolis, Indiana, 2010.

WEB RESOURCES

- https://www.w3schools.com/EXCEL
- https://www.javatpoint.com/excel-tutorial
- https://www.javatpoint.com/microsoft-access
- https://www.tutorialspoint.com/ms_access

PRACTICAL LIST

1. Simple arithmetic calculations using MS-Excel
2. Mark sheet preparation using MS-Excel
3. Preparing charts using MS-Excel
4. Mathematical functions using MS-Excel
5. Text functions using MS-Excel
6. Electricity Bill preparation using MS-Excel.
7. Creating table using MS-Access

PROGRAMMING IN JAVA

(CourseCode : 23UCAC31)

SEMESTER – III	CORE – T3	HOURS – 4	CREDITS – 5	TOTAL HOURS: 60

COURSE OUTCOMES:

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

CO1: Describe how object-oriented concepts are incorporated into Java language**. (K1)**

CO2: Discuss the problem-solving and programming skills using OOP concepts. **(K2)**

CO3: Use the Control Structures, Arrays and Interfaces. **(K3)**

CO4: Illustrate the Multithreaded Programming & Exception Handling. **(K4)**

CO5: Create User Defined Packages. **(K6)**

CO6: Develop Java applets using applet programming. **(K6)**

UNIT I FUNDAMENTALS OF JAVA (12 HOURS)

FUNDAMENTALS OF OBJECT-ORIENTED PROGRAMMING: Introduction – Object Oriented paradigm – Basic Concepts of OOP – Benefits of OOP – Applications of OOP – Java features: **OVERVIEW OF JAVA LANGUAGE**: Introduction – Simple Java program structure – Java tokens – Java Statements – Implementing a Java Program – Java Virtual Machine – Command line arguments. **CONSTANTS, VARIABLES AND DATA TYPES:** Introduction – Constants – Variables – Data Types – Declaration of Variables – Giving Value to Variables – Scope of variables – Symbolic Constants – Type casting – Getting Value of Variables – Standard Default values. **OPERATORS AND EXPRESSIONS**.

UNIT II TYPES OF STATEMENTS , CLASSES AND OBJECTS (12 HOURS)

DECISION MAKING AND BRANCHING: Introduction – Decision making with if statement – Simple if statement – if-else statement – Nesting of if-else statements – else-if ladder – switch statement – Conditional operator. **LOOPING**: Introduction – while statement – do-while statement –for statement – Jumps in loops.**CLASSES, OBJECTS AND METHODS**: Introduction – Defining a class – Adding variables – Adding methods – Creating objects – Accessing class members – Constructors – Method overloading – Static members – Nesting of methods.

UNIT III INHERITANCE, ARRAYS AND INTERFACES (12 HOURS)

INHERITANCE: Extending a class – Overloading methods – Final variables and methods – Final classes – Abstract methods and classes; **ARRAYS – STRINGS AND VECTORS:** Arrays – One-dimensional arrays – Creating an array – Two-dimensional arrays – Strings – Vectors – Wrapper classes; **INTERFACES:** Multiple Inheritance– Introduction – Defining interfaces – Extending interfaces – Implementing interfaces – Assessing interface variables.

UNIT IV MULTITHREADED PROGRAMMING AND EXCEPTIONS (12 HOURS)

MULTITHREADED PROGRAMMING: Introduction – Creating Threads – Extending the Threads – Stopping and Blocking a Thread – Lifecycle of a Thread – Using Thread Methods – ThreadExceptions – Thread Priority – Implementing the 'Runnable'. Interface. **MANAGING ERRORS AND EXCEPTIONS:** Types of errors: Compile-time errors – Runtimeerrors – Exceptions – Exception handling – Multiple Catch Statements – Using finally statement.

UNIT V PACKAGES, APPLETS AND INPUT/OUTPUT FILES (12 HOURS)

PACKAGES: Introduction – Java API Packages – Using System Packages – Naming conventions – Creating Packages – Accessing a Package – using a Package. **APPLET PROGRAMMING:** local and remote applets – Applets and Applications – Building Applet code – Applet Life cycle: Initialization state – Running state – Idle or stopped state – Dead state – Display state. **MANAGING INPUT/OUTPUT FILES:** Introduction – Concept of Streams – Stream classes – Byte Stream Classes – Input Stream Classes – Output Stream Classes – Character Stream classes: Reader stream classes – Writer Stream classes – Using Streams – Reading and writing files.

TEXT BOOK

E.Balaguruswamy, "Programming with JAVA", Sixth Edition, McGraw Hill Education, 2019.

REFERENCE BOOKS

1. Herbert Schildt, "JAVA A Beginner's Guide", Seventh Edition, McGraw-Hill Education, 2017.
2. Herbert Schildt, "Java: The Complete Reference", Tenth Edition, McGraw-Hill Education, 2017.

WEB RESOURCES

1. https://www.geeksforgeeks.org/java/
2. https://www.iitk.ac.in/esc101/share/downloads/javanotes5.pdf
3. https://www.tutorialspoint.com/java/java_tutorial.pdf

PRACTICAL: PROGRAMMING IN JAVA
(Course Code: 23UCAC32)

SEMESTER – III	CORE – P3	HOURS – 4	CREDITS – 3	TOTAL HOURS: 60

LIST OF PROGRAMS

1. Program to demonstrate the use of control structures.
2. Program to arrange the given strings in Alphabetic Order.
3. Program to implements Addition and multiplication of two Matrices.
4. Program to demonstrate the use of Constructor.
5. Program to display a use of method overloading.
6. Program to demonstrate the use of overriding Method.
7. Program for implementing Inheritance.
8. Program for implementing Interface.
9. Program for to implement Thread, Thread Priority.
10. Program to demonstrate Exception handling.
11. Program to demonstrate the use of Packages.
12. Program using Applet.

NUMERICAL AND STATISTICAL METHODS

(Course Code:23UCAE31)

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

COURSE OUTCOMES:

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

CO1: Analyze the different samples of data at different level of significance using various hypothesis testing. **(K4)**

CO2: Develop a framework for estimating and predicting the different sample of data. **(K6)**

CO3: Describe errors, source of errors and its numerical computations. **(K2)**

CO4: Examine how to obtain numerical solution of nonlinear equations using Bisection, Newton-Raphson and Iteration methods. **(K3)**

CO5: Solve system of linear equations numerically using direct and iterative methods. **(K1)**

CO6: Summarize the applications of Statistics & Probability in real life domain. **(K5)**

UNIT I APPROXIMATION AND ERRORS IN COMPUTATION (12 HOURS)

Introduction - numbers - Errors - Error in the approximation of a function - Errors in a series approximation - order of approximation - propagation error.

Solution of Algebraic and Transcendental Equations Introduction - Basic properties of equations - bisection method - Regula falsi method - Secant method - Iteration method - Newton Raphson method

UNIT II SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS (12 HOURS)

Solution of linear simultaneous equations - Direct methods of solution - Gauss elimination method, Gauss - Jordan method, - Iterative methods of solution - Jacobi, Gauss - Seidal.

UNIT III (12 HOURS)

Interpolation and integration Linear Interpolation – Newton's Forward and Backward interpolation methods – Newton's Divided Difference interpolation methods – Lagrange's methods – Trapezoidal rule, Simpson's One Third(1/3) & Three Eighth(3/8) rules – Weddle Rule.

Differential equations Runge-Kutta Fourth order Method – Milne-Simpson Method and Adams Base Forth method – Moulton Method.

UNIT IV STATISTICS (12 HOURS)

Statistics basics Mean – Median – Mode – Standard Deviation – Variance – Coefficient of variation of frequency distribution

Curve fitting and least squares Fitting of a Straight line and Parabola, Conversion of Data to Linear form.

UNIT V CORRELATION AND REGRESSION (12 HOURS)

Correlation and regression: Correlation – Correlation Coefficient, Rank Correlation, Regression – Lines and Curves of Regression.

Discrete and continuous distributions: Binomial, Poison and Normal distributions – Fitting of these distributions

TEXT BOOKS

1. B.S. Grewal, "Numerical methods in Engineering & Science", Khanna Publishers, Fifth Edition, April 2018.

2. S. Arumugam, A.Thangapandi Isaac, "Statistics", New Gamma Publishing House, 2018.

REFERENCE BOOKS

1. R.S. Salaria, "Computer Oriented Numerical Methods", Khanna Publishers, Fifth Edition, 2016. 2. S.C. Gupta, V.K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons, Twelfth Edition, 2020.

WEB RESOURCES

- https://www.geeksforgeeks.org/data-structures
- https://www.studytonight.com/data-structures

VISUAL BASIC
(Course Code: 23UCAE31)

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

COURSE OUTCOMES

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

CO1: Describe the Visual Basic Components and Controls. **(K1)**
CO2:Interpret the Visual Basic's Integrated Development Environment. **(K2)**
CO3.:Illustrate the Procedure and Function in Visual Basic programs. **(K3)**
CO4: Test the Connection between Visual Basic and Database. **(K5)**
CO5: Create Custom Menu in Visual Basic. **(K6)**
CO6: Design, Create and Build Visual Basic applications. **(K6)**

UNIT I VISUAL BASIC COMPONENTS AND CONTROLS (12 HOURS)

Working with Visual Basic Window Components: Menu Bar– Tool Bar – Project Explorer Window – Form Layout Window – properties Window – Toolbox – Code Editor Window Working with Forms: Properties – Events –Methods.**Working with Basic Controls:**Label –CommandButton –TextBox –OptionButton – Frame –CheckBox –ListBox –ComboBox – Image – Scroll – Picture – Timer – DriveListBox –DirListBox –FileListBox and Shape Controls.

UNIT II PROGRAMMING FUNDAMENTALS (12 HOURS)

Basic Programming Fundamentals: Variables – Data types – Constant – Conversion Function. **Scope of Variable:** Public – Private Static. Operators: Logical – Arithmetic – Concatenation – Comparison. **Decision Structure:**If.. Then –If..Then..Else – Select Case.. End Case. **Loop Structure:**Do..While – While.. Wend –For.. Next –With..EndWith.DoEvents().

UNIT III ARRAYS – PROCEDURE AND FUNCTION (12 HOURS)

Arrays: Dynamic Array – Preserve and Control arrays. **Procedure:** General procedure – General Methods for Passing Arguments to a Procedure –**Functions:** User-Interaction – String – Math – Date – And Conversion Functions. Modules: Form – Standard.

UNIT IV MENUS AND DATABASE HANDLING (12 HOURS)

Menus: Creating – Adding Menu Items – Creating Shortcut – Adding Separators Bars – Submenus – Code for Menus. Creating Popup Menu: System – Custom**. Database Handling:** Database Concepts – Creating and Accessing Database – Using Data Control. Using DAO object library.

UNIT V ADO DATA CONTROLS (12 HOURS)

Using ADO Data Control – Data Link – ODBC Data Source name – Using Connection String – Creating Navigating buttons. Working with Advanced **Data Controls:**DataListControl –DataCombo Control –DataGrid Control and Msflexgrid Control. Handling Errors : Run Time – Trapping and Handling Error – ERR Object. Data Environment and Data Reports.

TEXT BOOK

1. SomaDasgupta, "Visual Basic to Advance", BPB Publications, 2008.

REFERENCE BOOKS

1. Steven Holzner, "Visual Basic 6 Programming Black", Dreamtech Press, First Edition, 2000.
2. Mohammed Azam, "Programming with Visual Basic 6.0", Vikas Publication House Pvt. Ltd., First Edition, 2001.

WEB RESOURCES

- https://takelessons.com/en-in
- https://en.wikipedia.org/wiki/Visual_Basic

PRACTICAL: NUMERICAL AND STATISTICAL METHODS

(Course Code:23UCAE32)

SEMESTER - III	EC – P3	HOURS - 2	CREDITS – 2	TOTAL HOURS: 30

LIST OF PROGRAMS

1. Solution for Bisection method
2. Solution for Newton-Raphson method
3. Solution of simultaneous equations using Gauss elimination method
4. Solution of simultaneous equations using Gauss-seidal iteration method
5. Numerical integration: Trapezoidal rule and Simpson's one-third rule
6.. Curve fitting, Fitting a straight line and Fitting a second degree parabola
7. Correlation: Computing Correlation Coefficient and Rank Correlation

PRACTICAL: VISUAL BASIC

(Course Code: 23UCAE32)

SEMESTER - III	EC – P3	HOURS - 2	CREDITS – 2	TOTAL HOURS: 30

LIST OF PROGRAMS

1. Program using conditional control structures.
2. Program using loop control structures.
3. Program to work with controls.
4. Program to Design a Calculator.
5. Program using Scroll bar control.
6. Program using File Controls.
7. Program to create a menu.
8. Database connectivity using DAO.

MACROMEDIA FLASH
(Course Code: 23UCAN31)

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

COURSE OUTCOMES:
On successful completion of the course, the learners will be able to
CO1: Recognize, locate, and navigate through all aspects of the new Flash user interface. **(K1)**
CO2: Explain and utilize components to create interactivity. **(K2)**
CO3: Utilize and understand sound and sound formats in flash movies. **(K3)**
CO4: Analyze tweens and articulated motions with inverse kinematics to morph shapes. **(K4)**
CO5: Evaluate the Load, control, and remove movie clips and masks in movie content. **(K5)**
CO6: Design, create, edit, and manipulate animation using Adobe XD tools and techniques.**(K6)**

UNIT I INTRODUCTION TO FLASH CS6 (2 HOURS)

The Flash Professional with Environment : Menu Bar – Tools Panel– Properties Panel – Library Panel – Timeline Panel –The Motion Editor Panel – Exploring Drawing Tools

UNIT II WORKING WITH FLASH TOOLS AND GRADIENTS (2 HOURS)

Using Brush Tool – Using Paint Bucket Tool – Using Eyedropper Tool – Exploring Selection and Modification Tools – Using Gradient Transform Tool – Using Bone Tool – Creating Custom Gradients – Altering the Opacity of Gradients.

UNIT III WORKING WITH TEXT FIELDS AND FRAMES (2 HOURS)

Creating Text Fields – Editing a Text Field – Inserting Frames and Keyframes – Converting a Keyframe into a Frame – Copying and Pasting a Frame or Frame Sequence – Changing a Length of a Frame Sequence – Deleting a Frame or Frame Sequence.

UNIT IV WORKING WITH SYMBOLS AND LAYERS (2 HOURS)

Creating symbols in Flash – Creating symbols from an Existing Object – Creating New Symbols - Introduction to layers, Types of Layers-Creating a Layer – Locking and Unlocking a Layer - Hiding a Layer - Creating a Layer Folder – Deleting a layer.

UNIT V WORKING WITH ADOBE XD (2 HOURS)

Introducing Adobe XD – A typical UX design workflow – Starting Adobe XD and opening a file – The Home screen – Exploring the workspace – Getting to know the tools – Working with the Property Inspector – Working with panels – Prototype mode – Changing the view of artwork – Using view commands – Navigating art boards.

TEXT BOOKS

1. Kogent Learning Solutions Inc., "Flash CS6 in Simple Steps", Dreamtech Press, First Edition, 2013.
2. Brian Wood, "Adobe XD Classroom in a Book" , First Edition, Macromedia Press, 2020.

REFERENCE BOOK

Prof. Satish Jain, KratikaBhagia, "Flash Professional CS6 Training Guide", BPB Publications, First Edition, 2016.

WEB RESOURCES

- https://www.tutorialboneyard.com/flash-tutorials/
- https://edutechwiki.unige.ch/en/Flash_tutorials

PRACTICALS LIST

1. Design a simple application using basic tools.
2. Design an application using symbols and multiple layers.
3. Design an application using shape tweening and motion tweening.
4. Create an animation using Frame by Frame animation.
5. Create an application using mask layer.
6. Pasting to Multiple Artboards using Adobe XD.

PYTHON PROGRAMMING
(Course Code: 23UCAC41)

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

COURSE OUTCOMES

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

CO1: Describe the basic Programming Constructs of Python and Applications. **(K1)**

CO2: Describe a systematic approach to design, organize, write and debug programs. **(K2)**

CO3: Analyze the various data structures available in Python programming language. **(K3)**

CO4: Develop proficiency in creating applications using the Python Language. **(K4)**

CO5: Update knowledge to learn any future advanced version of language. **(K5)**

UNIT I DATATYPES, SEQUENCES AND OPERATORS (12 HOURS)

Introduction to Python: Features of Python – Execution of a Python program – Flavors of Python – Python Virtual machine (PVM) – Comparison of Python with Java. **Datatypes in Python:** Built in Data types: None Type - Numeric types: int, float, complex - bool datatype - **Sequences:** string, bytes, bytearray, list, tuple, range - literals. **Operators**: Arithmetic operators – Assignment operators – Unary minus operator – Relational operators – Logical operators – Boolean operators – Bitwise operators - Membership operators – Identity operators - Operator precedence - Mathematical functions.

UNIT II INPUT, OUTPUT, CONDITIONALS, LOOPS AND ARRAYS (12 HOURS)

Input and Output:print() - input() - command line arguments. **Conditionals and Loops**: if statement - if…else statement - if…elif statement - while loop - for loop - the else suite - break statement - continue statement - pass statement - assert statement - return statement. **Arrays in Python:** Creating array – Importing the array module – Indexing and slicing on arrays – Types of arrays – Working with arrays using numpy – Mathematical operations on arrays – Working with multidimensional array – Matrices in numpy.

UNIT III STRINGS, FUNCTIONS, LISTS AND TUPLES (12 HOURS)

Strings and characters: Slicing the strings – String functions and methods – working with characters. **Functions**: Defining a function – Calling a function – Pass by object reference – Recursive functions – lambda functions. **Lists**: list operations – aliasing and cloning list - Methods to process lists – Nested list – list comprehension. **Tuples**: Creating tuples - Basic operations on tuples – Functions to process tuples.

UNIT IV DICTIONARIES, CLASSES AND OBJECTS (12 HOURS)

Dictionaries: Operations on dictionary – Dictionary methods – Using loops with dictionaries – Converting Lists, Strings into dictionary – Passing dictionary to functions – Ordered dictionaries. **Classes and objects:**Creating a Class – Types of Variables – Types of Methods – Constructors in Inheritance – Types of Inheritance – Operator Overloading – Method Overloading - Method Overriding – Interfaces in Python.

UNIT V DATABASE (12 HOURS)

Database Connectivity: Advantages of DBMS over Files **-** Types of Databases used with Python – Using MySQL from Python – Retrieving all rows from a Table – Insertingrows into a Table - Deleting rows into a Table - Updating rows into a Table – Creating Database Tables using Python.

TEXT BOOK

R. Nageswara Rao, "Core Python Programming", Second Edition, Dreamtech Press, 2019.

REFERENCE BOOKS

1. Guido van Rossum and the Python development team, "An Introduction to Python - Revised and updated for Python 3.6.2", Shroff Publishers & Distributors Pvt.Ltd , 2017.
2. Allen B.Downey, " Think Python: How to Think Like a computer Scientist" , Second Edition, Updated for Python 3, Shroff Publishers & Distributors Pvt.Ltd , 2015.
3. Charles Dierbach, "Introduction to Computer Science using Python; A Computational Problem-Solving Focus", Wiley India Edition, 2013.

WEB RESOURCES

- https://www.python.org/about/gettingstarted/
- https://www.w3schools.com/python/python_intro.asp

PRACTICAL: PYTHON PROGRAMMING

(Course Code: 23UCAC42)

SEMESTER -IV	CORE – P4	HOURS - 3	CREDITS -3	TOTAL HOURS - 45

LIST OF PROGRAMS

1. Program using Control Structures.
2. Program using Arrays.
3. Program using Strings.
4. Program using Lists.
5. Program using Tuples.
6. Program using Dictionaries.
7. Program using class and object.
8. Program using Inheritance.
9. Program using Interfaces.
10. Program using Functions.
11. Program to perform Insert, Delete and Update operations using Database.

DATA STRUCTURES AND ALGORITHMS
(Course Code: 23UCAE42)

SEMESTER - IV	EC – T4	HOURS – 3	CREDITS – 3	TOTAL HOURS: 45

COURSE OUTCOMES:

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

CO1: Define the Data Structures. **(K1)**
CO2: Interpret Stack, Queue, List, Tree and Graph. **(K2)**
CO3: Examine the concepts of Divide and Conquer Techniques. **(K3)**
CO4: Analyze to select appropriate data structures for the problem definition. **(K4)**
CO5: Evaluate Kruskal's and Prim's Algorithms and Single source Shortest Path Algorithm.**(K5)**
CO6: Build programs for all the operations on the data structures. **(K6)**

UNIT I ARRAYS AND STACK (9 HOURS)

Arrays: The Abstract Data Type – Arrays – **Dynamically Allocated Arrays:** One Dimensional Arrays – Two Dimensional Arrays – **Polynomials:** Polynomial Representation – Polynomial Addition – Representation of Multidimensional Arrays – Stacks – Evaluation of Expressions – Evaluating Postfix Expressions – Infix to Postfix.

UNIT II QUEUES AND LINKED LISTS (9 HOURS)

Queues: Queues – Circular Queues. **Linked List:** Singly Linked Lists – Linked Stacks and Queues – List Operations.

UNIT III TREES (9 HOURS)

Trees: Terminology – Representation of Trees – **Binary Tree:** Properties of Binary Tree – Binary Tree Representation– Binary Tree Traversals – Binary Search Trees – Definition – Searching – Insertion – Deletion on Binary Search Tree.

UNIT IV GRAPHS (9 HOURS)

Graphs: Introduction – Definition – Graph Representations – Depth First Search – Breadth First Search – **Minimum Cost Spanning Trees:** Kruskal's Algorithm – Prim's Algorithm – Shortest Path Single Source/ All Destination: Nonnegative Edge Costs.

UNIT V DIVIDE AND CONQUER (9 HOURS)

Divide and Conquer: The General method – Binary Search – Finding Maximum and Minimum –Merge Sort – Quick sort – Selection Sort.

TEXT BOOKS

1. Ellis Horowitz, Sartaj Sahani, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Universities Press (India) private limited, Hyderabad.
   (Units : I, II, III & IV)
2. Ellis Horowitz and Sartaj Sahani, "Fundamentals of Computer Algorithms", Computer Science Press Inc, Galgotia Book Sources Publications, New Delhi, 2014.**(Unit : V)**

REFERENCE BOOKS

1. A.Chitra, P.T.Rajan, "Data Structures", Second Edition, Vijay Nicole Imprints Private Limited, 2016.
2. D. Samanta "Classic Data Structures", Second Edition,PHI Learning, New Delhi, 2019.

WEB RESOURCES

- https://www.geeksforgeeks.org/data-structures
- https://www.studytonight.com/data-structures

PRACTICAL: DATA STRUCTURES USING C++

(Course Code: 23UCAE42)

SEMESTER - IV	EC – P4	HOURS - 2	CREDITS – 2	TOTAL HOURS: 30

LIST OF PROGRAMS

1. Program to perform matrix operations.
2. Program to implement Stack Operations.
3. Program to implement Queue Operations.
4. Program to implement Tree traversals.
5. Program to implement Singly Linked List.
6. Program to implement Merge sort.

COMPUTER GRAPHICS
(Course Code: 23UCAE41)

SEMESTER-IV	EC – T4	HOURS - 3	CREDITS- 3	TOTAL HOURS: 45

COURSE OUTCOMES

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

CO1: Describe the line drawing algorithms.**(K1)**
CO2: Interpret the attributes of various output primitives.**(K2)**
CO3: Examine the various 2D basic transformations.**(K3)**
CO4: Analyze the different line clipping and polygon clipping algorithms.**(K4)**
CO5: Compare the visible surface detection methods. **(K5)**
CO6: Design illumination models. **(K6)**

UNIT I OUTPUT PRIMITIVES (9 HOURS)

Output Primitives: Points and Lines – Line Drawing algorithms – Loading frame Buffer – Circle Generating algorithms.

UNIT II 2D TRANSFORMATIONS (9 HOURS)

Attributes of Output Primitives: Line Attributes – Curve attributes – Color and Grayscale Levels – Areafill attributes – Character Attributes. **2D Geometric Transformations:** Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations.

UNIT III CLIPPING AND 3D CONCEPTS (9 HOURS)

2D Viewing: The Viewing Pipeline – Window-to-Viewport Co-ordinate Transformation.**Clipping Operations:**Point clipping – Line clipping – Polygon and Text clipping **–3D Geometric Modeling and Transformations:** Translation – Rotation – Scaling – Other Transformations.

UNIT IV VISIBLE SURFACE DETECTION METHODS (9 HOURS)

Visible-Surface Detection Methods: Classification of Visible-Surface algorithms – BackFace Detection – Depth-Buffer Method – A-Buffer method– Scan- Line Method – DepthSorting Method – BSP-Tree Method – Area-Subdivision Method – Octree Methods – Raycasting Methods.

UNIT V ILLUMINATION MODELS (9 HOURS)

Illumination Models: Properties of Light – Standard Primaries and the Chromaticity Diagram – Intuitive color Concepts – RGB Color Model –CMY Color Model – HSV Color Model – Conversion between HSV and RGB models – Color selection and Applications.

TEXT BOOK

Donald Hearn, M. Pauline Baker, “Computer Graphics”, Fourth Edition, PHI, 2012.

REFERENCE BOOKS

1. Roy A. Plastock, Zhigang Xiang, “Schaum’s Outlines Computer Graphics”, McGraw Hill Education, 2006.
2. Rajesh K. Maurya, “Computer Graphics with Virtual Reality System”, Third Edition, Wiley Publications, 2018.

WEB RESOURCES

- https://www.tutorialspoint.com/computer-graphics/index.asp
- https://www.edx.org/learn/computer-graphics

PRACTICAL: COMPUTER GRAPHICS

(Course Code : 23UCAE42)

SEMESTER – IV	EC – P4	HOURS - 2	CREDITS – 2	TOTAL HOURS: 30

LIST OF PROGRAMS

1. Program to implement DDA line drawing algorithm.
2. Program to implement Bresenham's line drawing algorithm.
3. Program to implement circle drawing algorithm.
4. Program to demonstrate line, curve and area fill attributes.
5. Program to implement basic 2D transformations.
6. Program to implement reflection, scaling and shearing transformation using 2D object.

WEB DESIGNING WITH HTML
(Course Code: 23UCAN41)

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

COURSE OUTCOMES:

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

CO1: Describe the basics of HTML.**(K1)**
CO2:.Explain the designs with links.**(K2)**
CO3: Use images and forms for designing web page. **(K3)**
CO4: Analyze the usage of tables.**(K4)**
CO5: Evaluate Forms.**(K5)**
CO6: Design Web pages using HTML.**(K6)**

UNIT I INTRODUCTION TO HTML (3+3 HOURS)

Internet Browsers - Introduction to HTML – Head and Body sections– Designing the Body section – Heading Printing – Horizontal Rule – Paragraph – images

UNIT II FORMATTING (3+3 HOURS)

Formatting tags – Links – Ordered and Unordered Lists.

UNIT III TABLES (3+3 HOURS)

Table Handling: Table creation – cell spanning multiple rows/columns

UNIT IV FRAMESET (3+3 HOURS)

Frames: Frameset definition – Frame definition -Nested Frame Set

UNIT V FORMS (3+3 HOURS)

Forms: Exploring the Form Element – Exploring Types of the INPUT Element – Exploring the BUTTON Element – Submitting a Form.

TEXT BOOK

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

REFERENCE BOOKS

1. Mike McGrath, "HTML5 in Easy Steps", BPB Publications, Second Edition, 2017.
2. Thomas A. Powell, "The Complete Reference – HTML& CSS", McGraw Hill Education, Fifth Edition,2017.
3. Heather Williamson, "The Complete Reference – XML", Tata McGraw Hill Edition, 2011.
4. Kogent Learning Solutions Inc., "HTML5 Black Book", Second Edition, DreamtechPress, 2016.

WEB RESOURCES

- https://www.w3schools.com/html/
- https://www.javatpoint.com/html-tutorial
- https://www.tutorialspoint.com/html/index.htm

PRACTICAL LIST

1. Designing a simple web page.
2. Designing web page using Lists.
3. Designing web page using Hyperlinks.
4. Designing web page using Tables.
5. Designing web page using Forms.
6. Designing Web page with Frames

SOFTWARE ENGINEERING
(Course Code: 23UCAS42)

SEMESTER – IV SEC - 7 HOURS - 2 CREDITS – 3 TOTAL HOURS : 30

COURSE OUTCOMES:

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

CO1: Describe the Professional Software Development & Software Process Models.**(K1)**
CO2: Summarize theSoftware Requirement Analysis and Specifications.**(K2)**
CO3: Illustrate Different Software Testing Methodologies.**(K3)**
CO4: Analyze the Function Oriented & Object Oriented Software Design. **(K4)**
CO5: Decide the Benefits and Problems of reusing software when developing systems. **(K5)**
CO6: Design the Basic Project Management Practices inreal life projects. **(K6)**

UNIT I INTRODUCTION (5 HOURS)

Evolution – Software Development Projects – Exploratory Style of Software Development – Emergence of Software Engineering – **SOFTWARE LIFE CYCLE MODELS** – Waterfall Model and its Extensions – Rapid Application Development (RAD) – Agile Development Models – Spiral Model.

UNIT II REQUIREMENT ANALYSIS AND SPECIFICATION (5 HOURS)

Requirement Gathering and Analysis – Software Requirement Specification – Formal System Specification **SOFTWARE DESIGN** – Overview of the Design Process – Cohesion and Coupling – Layered Arrangement of Modules – Approaches to Software Design.

UNIT III FUNCTION ORIENTED AND OBJECT ORIENTED SOFTWARE DESIGN (5 HOURS)

Overview of SA/SD Methodology – Structured Analysis – Developing the DFD Model of a System – Structures Design – **OBJECT ORIENTED SOFTWARE DEVELOPMENT** – Introduction to Patterns – Common Design Patterns **USER INTERFACE DESIGN** – Characteristics of Good Interface – Basic Concepts – Types of User Interface – Fundamentals of Component based GUI – A User Interface Design Methodology.

UNIT IV CODING AND TESTING (5 HOURS)

Coding – Code Review – Software Documentation – Testing – Unit Testing – Black-Box Testing – White-Box Testing – Debugging – Program Analysis Tools – Integration Testing – System Testing – General Issues Associated with Testing.

UNIT V SOFTWARE PROJECT MANAGEMENT (5 HOURS)

Software Project Management Complexities – Responsibilities of a Software Project Manager – Project Planning – Metrics for Project Size Estimation – Project Estimation Techniques – Empirical Estimation Techniques – COCOMO – Heuristic Estimation Technique – Risk Management – Software Configuration Management -**SOFTWARE MAINTENANCE** – Characteristics of Software Maintenance – Software Reverse Engineering – Software Maintenance Process Models – **SOFTWARE RESUSE** – A Reuse Approach – Reuse at Organization Level.

TEXT BOOK

Rajib Mall, “Fundamentals of Software Engineering”, Fifth Edition, PHI Learning Private Ltd, 2018.

REFERENCE BOOKS

1. Roger Pressman S., “Software Engineering: A Practitioner's Approach”, Eighth Edition, McGraw Hill, 2019.
2. Ian Sommerville, “Software Engineering”, Tenth Edition, Pearson Publication, 2016.

WEB RESOURCES

1. Software Engineering: What It is, Definition, Tutorial - javatpoint
2. https**://**www**.**geeksforgeeks**.**org**/**software**-**engineering**/**

E-COMMERCE
(Course Code: 23UCAS42)

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

COURSE OUTCOMES:

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

CO1: Outline the scope of E-Commerce. **(K4)**
CO2: Develop the concept of electronic market and market place. **(K6)**
CO3: Describe the business models. **(K1)**
CO4: Discuss about the business standards. **(K2)**
CO5: Illustrate the legal and security issues. **(K3)**
CO6: Influence the different technologies in Online shopping. **(K5)**

UNIT I INTRODUCTION (5 HOURS)

Main Activities of E-Commerce – Broad Goals of E-Commerce– E-Commerce technical Components – Functions of E-Commerce – Prospectus of E-Commerce – Lessons from E-Commerce Evolution– Scope of E-Commerce.

UNIT II E-COMMERCE ARCHITECTURE (5 HOURS)

E-Commerce Technical Architecture– E-Commerce Strategies– E-Commerce Essentials– E-Commerce applications– Foundation of E-Commerce – Growth of E-Commerce – Advantages of E-Commerce – Disadvantages of E-Commerce – Progress of E-Commerce in India.

UNIT III MATRIX OF E-COMMERCE (5 HOURS)

Driving the E-Commerce Revolution – E-Commerce Activities– Matrix of E-Commerce models– B2C – B2B – B2B Boom– E-Commerce opportunity Framework– Developing an E-Commerce Strategy– International E-Commerce – International Strategy Development– Dotcom Companies.

UNIT IV ELECTRONIC MARKET (5 HOURS)

Electronic Market:Online Shopping– Online Purchasing– Electronic Market– Three models of Electronic Market– Markets category– International Marketing – One-to-one Marketing– Permission Marketing– Pull and Push technologies– B2B Hubs– B2B market places– B2B exchange.

UNIT V E-BUSINESS (5 HOURS)

Electronic Business applications Emerging applications– Electronic Business Architecture– AMR Model for Electronic Business– Evolution of Electronic Business Application– Dotcom companies – The Indian scenario for E-Business–Electronic business implementations– B2B E-Commerce – B2C E-Commerce – B2B Market Place.

TEXT BOOK

C.S.V Murthy, "E-Commerce Concepts. Models, Strategies", Second Edition, Himalaya Publishing House, 2019.

REFERENCE BOOKS

1. David Whiteley, "E-Commerce: Strategy, Technologies and Applications", McGraw Hill Education, 2018.
2. Chaffey, "E-Business and E-Commerce Management: Strategy, Implementation and Practice",Sixth Edition,Pearson Education India, 2018.

WEB RESOURCES

- https://www.tutorialspoint.com/e_commerce/
- https://www.geeksforgeeks.org/e-commerce/

NET PROGRAMMING USING C#

(Course Code: 23UCAC51)

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

COURSE OUTCOMES

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

CO1: Describe Decision making and Looping statements.**(K1)**
CO2: Interpret the concepts of classes and objects and Inheritance. **(K2)**
CO3: Apply the process of defining and invoking methods.**(K3)**
CO4: Analyze about interfaces and operator overloading.**(K4)**
CO5: Evaluate the various String Methods. **(K5)**
CO6: Create Windows Applications and Web-based Applications.**(K6)**

UNIT I INTRODUCTION (15 HOURS)

Introduction: Evolution of C# – Characteristics of C# – Applications of C# – Origin of .NET Technology – Benefits of the .NET Approach – Simple C# Program – Literals, Variables and Data Types – Decision Making and Branching Statements – Looping Statements.

UNIT II METHODS, HANDLING ARRAYS AND STRINGS (15 HOURS)

Methods in C# – Declaring Methods – Invoking Methods – Nesting of Methods –Method Overloading – One-Dimensional Arrays –Two-Dimensional Arrays – Array List Class – Manipulating Strings – Creating Strings – String Methods – Inserting strings – Comparing Strings – Finding Substrings – Array of Strings.

UNIT III CLASSES AND OBJECTS AND INHERITANCE (15 HOURS)

Classes and Objects – Defining a Class – Adding variables and methods – Creating objects – Constructors – Member Initialization – this Reference – Nesting of Classes –Classical Inheritance – Containment Inheritance – Defining a subclass – Defining Subclass Constructors – Multilevel Inheritance – Hierarchical Inheritance.

UNIT IV INTERFACES AND OPERATOR OVERLOADING (15 HOURS)

Overriding Methods – Defining an interface – Implementing interfaces – Explicit interface implementation –Need for Operator overloading – Defining Operator Overloading – Overloading Binary Operators – Overloading Comparison Operators.

UNIT V EXCEPTIONS AND WEB-BASED APPLICATIONS (15 HOURS)

Exceptions – Types of errors – Multiple Catch Statements – Exception Hierarchy – General Catch Handler –Building windows application–creating our own window forms with events and controls–Menu creation–MDI application – Dialog Box (Modal and Modeless)–accessing data with ADO.NET– Creating Web-based Application on .NET.

TEXT BOOK

E. Balagurusamy, “Programming in C#”, Fourth Edition, Tata McGraw Hill Education, 2017.

REFERENCE BOOKS

1. John Sharp, “Microsoft Visual C# Step by Step”, Eighth Edition, PHI Publications, 2016.
2. Herbert Schildt, “C# - The Complete Reference”, First Edition, McGraw Hill Education, 2017.
3. Bill Wagner, “Effective C#”, Third Edition, Pearson Education, 2017.

WEB RESOURCES

- https://www.w3schools.com/cs/index.php
- https://www.tutorialspoint.com/csharp/index.htm
- https://www.javatpoint.com/c-sharp-tutorial

PHP PROGRAMMING
(Course. Code: 23UCAC52)

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

COURSE OUTCOMES:

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

CO1: Describe the basics of Programming Fundamentals. **(K1)**
CO2: Explain the Control Structures, arrays and Functions. **(K2)**
CO3: Discuss the Object Oriented Programming Concepts. **(K2)**
CO4: Determine the Various Categories of Functions. **(K3)**
CO5: Illustrate Web Form Handling, Cookies and Sessions. **(K4)**
CO6: Evaluate the SQL statements and Executing the queries. **(K5)**
CO7: Develop Web Applications in PHP. **(K6)**

UNIT I INTRODUCTION TO PHP (15 HOURS)

PHP History – Unique feature – Writing and running the script – Mixing PHP with HTML – Variables and Operators – Assigning Values to Variable – Destroying and inspecting Variable Content – PHP Data Types – Manipulating Variable with Operators. **Learning php language:** Basic Building Blocks: Variable – Data Type – Operators & Expression – Constant. Control Structures: if – if else, if else if..else – for, foreach – do- while – while – break – continue – switch.

UNIT II ARRAY, FUNCTIONS, DATE– TIME (15 HOURS)

Arrays: Anatomy of an Array: indexed and Associative Array – Creating Arrays – Accessing Array Elements – Looping through Array – Multidimensional Array – and Manipulating Array using array functions. **Functions:** What and why function – User– Defined Function – Function Arguments– Returning values – Calling Function – Variable Function, and Recursive Function – String – Creating & Accessing String – String Manipulation using string functions. **DATE–TIME:** Understanding Timestamp – Getting current date & time – Extracting date time values – format character for date – Formatting Date String.

UNIT III JAVA SCRIPT (15 HOURS)

Introduction to JavaScript – Syntax –Statements – Syntax – Comments – Variables –Operators - Data Types – Functions- Events – Strings – Numbers – Dates – Control statements - Reserved Words

UNIT IV WEB FORM HANDLING , COOKIES & SESSION (15 HOURS)

Capturing form Data with PHP – Dealing with Multi-value Fields – Validating Form Input – Generating Web Forms – Storing Variable in Forms – Working with Multipage Forms – Creating File – Upload Forms – Redirecting form submission.**PRESERVING STATE IN PHP:** Understanding cookies – Session & Query String – Saving State with Query String – Working with cookies – PHP Session to store data.

UNIT V DATABASE CONNECTIVITY & SQL (15 HOURS)

Database – Records – Primary and Foreign Key – SQL statements – Creating Database – Adding Tables – Adding Records – Executing Queries – Modifying and removing Records – Retrieving Data – Returning data as array and object.

TEXT BOOK

VikramVaswani, "PHP A beginner's Guide", First Edition, Tata McGraw Hill, 2008.

REFERENCE BOOKS

1. Steven Holzner , "The Complete Reference PHP 5.2" , McGraw Hill Education, 2017.
2. Luke Welling , "PHP and MySQL Web Development", Fifth Edition, Addison-Wesley, 2016.

WEB RESOURCES

- https://www.w3schools.com/php/default.asp
- https://www.php.net/

PRACTICAL: .NET PROGRAMMING USING C#

(Course Code: 23UCAC53)

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

LIST OF PROGRAMS

1. Programs on Data Types & Operators
2. Program using Decision Making Statements.
3. Program using Iteration Statements.
4. Program using Method Overloading.
5. Program using Two-Dimensional Arrays.
6. Program using Strings.
7. Program using Classes and Objects.
8. Program using Inheritance.
9. Program using Interface.
10. Program using Binary Operator Overloading.
11. Program using exception handling with multiple catch statements.
12. Designing a Windows Application using Window Forms.
13. Designing a Windows Application using databases.
14. Designing a Web-based Application.
15. Designing Applications with Validator controls

PRACTICAL: PHP PROGRAMMING
(Course Code : 23UCAC54)

SEMESTER - VI	CORE - P6	HOURS - 5	CREDITS – 3	TOTAL HOURS -75

LIST OF PROGRAMS

1. Program to display the sum of the given number using function.
2. Program for demonstration of string functions.
3. Program that will use the concept form.
4. Program to read the employee details using form component.
5. Program for demonstrating an Array.
6. Program to prepare student Mark sheet using switch statement.
7. Program for create and write the contents into the file.
8. Program for uploading the file.
9. Program to Make a Simple Calculator using JavaScript.
10. Program to Sort Words in Alphabetical Order using JavaScript
11. Program to count the number of visitors using session.
12. Program using database.

OPERATING SYSTEMS AND LINUX
(Course Code: 23UCAE51)

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

COURSE OUTCOMES:

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

CO1: Define the basic concepts of the operating system. **(K1)**
CO2: Describe about the process concepts and scheduling. **(K2)**
CO3: Describe the LINUX Concepts and Applications. **(K2)**
CO4: Demonstrate the LINUX Shell Programming Scripts. **(K3)**
CO5: Categorize the methods of handling deadlocks in operating system. **(K4)**
CO6: Evaluate about the LINUX file systems. **(K5)**

UNIT I OPERATING SYSTEM INTRODUCTION (12 HOURS)

Introduction: Operating System – Computer System Organization – Operating System Structure – Operations – Process Management – Memory Management – Storage Management – Protection and Security **System structures**: Operating System Services – User Operating System Interface – System Calls – Types of System Calls – System Programs – Operating System Structure.

UNIT II PROCESS MANAGEMENT (12 HOURS)

Process Concept: Process Scheduling – Operations on Processes – Inter Process Communication **Process Scheduling:** Basic concepts – Scheduling Criteria – Scheduling Algorithms **Synchronization:** Background – Critical Section Problem – Mutex locks – Semaphores – Classic problems of synchronization.

UNIT III DEAD LOCKS (12 HOURS)

Deadlocks: System Model – Deadlock Characterization – Methods of Handling Deadlocks – Deadlock prevention – Deadlock Avoidance **Memory Management Strategies**: Background – Swapping – Contiguous Memory allocation – Segmentation – Paging Virtual Memory Management: Background – Demand Paging – Page replacement.

UNIT IV LEARNING THE SHELL (12 HOURS)

What is the Shell – Navigation – Understanding the File System Tree – Exploring the System – Manipulating Files and Directories – Working with Commands – Redirection – Redirecting Standard Output - Redirecting Standard Input – Pipelines – Filters - Permissions – Processes – **Configuration and the environment** – A Gentle Introduction to Vi – Customizing the Prompt – Regular Expressions.

UNIT V SHELL SCRIPTING (12 HOURS)

Writing Shell Scripts – Script File Format – Executable Permissions – Variables and Constants – Shell Functions – Local Variables – FLOW CONTROL – Branching with IF – Looping with While/Until – Branching with CASE – Looping with FOR.

TEXT BOOKS

1. Abraham Silber Schatz, Peter Baer Galvin, Greg Gagne, "Operating System Concepts", Ninth Edition, Wiley India, 2018.
2. William Shotts, "The Linux Command Line", Second Edition, William Pollock Publisher, 2019.

REFERENCE BOOKS

1. Gary J.Nutt,"Operating Systems", Second Edition, Pearson Education Asia, 2013.
2. H.M.Deital, "Operating Systems", Second Edition, Addison-Wesley Publishing Company, 2011.
3. Richard Blum, Christine Bresnahan, "Linux Command Line and Shell Scripting Bible", Third Edition, Wiley, 2015.

WEB RESOURCES

- https://www.studytonight.com/operating-system/
- https://www.javatpoint.com/operating-system
- https://www.geeksforgeeks.org/linux-tutorial/

DATA ANALYTICS USING R PROGRAMMING
(COURSE CODE: 23UCAE51)

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

COURSE OUTCOMES

On successful completion of the course, the learners 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: Implementing Genric Functions Using S Class. **(K6)**

UNIT I INTRODUCTION (12 HOURS)

Evolution of Big Data - Best Practices for Big Data Analytics - Big Data Characteristics - Validating - The Promotion of the Value of Big Data - Big Data Use Cases - Characteristics of Big Data Applications - Perception and Quantification of Value - Understanding Big Data Storage - A General Overview of High-Performance Architecture - HDFS - MapReduce and YARN - MapReduce Programming Model.

UNIT II CONTROL STRUCTURES AND VECTORS (12 HOURS)

Control structures, functions, scoping rules, dates and times, Introduction to Functions, preview of Some Important R Data Structures, Vectors, Character Strings, Matrices, Lists, DataFrames, Classes Vectors: Generating sequences, Vectors and subscripts, Extracting elements of a vector using subscripts, Working with logical subscripts, Scalars, Vectors, Arrays, and Matrices, Adding and Deleting Vector Elements, Obtaining the Length of a Vector, Matrices and Arrays as Vectors Vector Arithmetic and Logical Operations, Vector Indexing, Common Vector Operations

UNIT III LISTS (12 HOURS)

Lists: Creating Lists, General List Operations, List Indexing Adding and Deleting List Elements, Getting the Size of a List, **Extended Example:** Text Concordance Accessing List Components and Values Applying Functions to Lists, DataFrames, Creating Data Frames, Accessing Data Frames, Other Matrix-Like Operations

UNIT IV FACTORS AND TABLES (12 HOURS)

Factors and Levels, Common Functions Used with Factors, Working with Tables, Matrix/Array-Like Operations on Tables, Extracting a Sub table, Finding the Largest Cells in a Table, Math Functions, Calculating a Probability, Cumulative Sums and Products, Minima and Maxima, Calculus, Functions for Statistical Distributions R PROGRAMMING.

UNIT V OBJECT-ORIENTED PROGRAMMING (12 HOURS)

S Classes, Generic Functions, Writing S Classes, Using Inheritance, S Classes, Writing S Classes, Implementing a Generic Function on an S Class, visualization, Simulation, code profiling, Statistical Analysis with R, data manipulation

TEXT BOOKS

1. Roger D. Peng, "R Programming for Data Science", 2012
2. Norman Matloff, "The Art of R Programming - A Tour of Statistical Software Design", 2011

REFERENCE BOOKS

1. Garrett Grolemund, Hadley Wickham, "Hands-On Programming with R: Write Your Own Functions and Simulations", 1st Edition, 2014
2. Venables, W.N., and Ripley, "S Programming", Springer, 2000.

WEB RESOURCES

- https://www.simplilearn.com
- https://www.tutorialspoint.com/data-analytics-using-r-programming/index.asp
- https://www.javatpoint.com/r-tutorial

PRACTICAL: LINUX
(Course Code: 23UCAE52)

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

LIST OF PROGRAMS

1. Execution of various file/directory handling commands.
2. Simple shell script for basic arithmetic and logical calculations.
3. Shell scripts to check various attributes of files and directories.
4. Shell script using Else-if statement.
5. Shell script using While / Until Loop.
6. Shell script using For Loop.
7. Shell script using CASE.

PRACTICAL: R PROGRAMMING

(Course Code: 23UCAE52)

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

LIST OF PROGRAMS

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending on user's choice.
2. Program, to find the area of rectangle, square, circle, and triangle by accepting suitable input parameters from the user.
3. Write a program to find a list of even numbers from 1 to n using R-Loops.
4. Create a function to print squares of numbers in sequence.
5. Write a program to join columns and rows in a data frame using cbind() and rbind() in R.
6. Implement different String Manipulation functions in R.
7. Implement different data structures in R (Vectors, Lists, DataFrames).
8. Write a program to read a csv file and analyze the data in the file in R.
9. Create pie chart and bar chart using R.
10. Create a data set and do statistical analysis on the data using R.
11. Program to find factorial of the given number using recursive function.
12. Write an R program to count the number of even and odd numbers from an array of N numbers.

INTERNSHIP

Semester : IV **Sub. Code: 23UCAI51** **Credits: 2**

- All UG students will undergo internship during the summer holidays of the second year after completing IV semester.
- Two credits will be given for internship.
- Minimum Days: 21
- Minimum working time per day: 3 Hrs. & Maximum working Time: 5 Hrs.
- The places of internship can be government offices, Panchayats, MP, MLA offices, private institutions, companies, production units etc.
- The HoD of the departments will give a letter of introduction to each student.
- The students will identify the company / institution for internship.
- The students will be divided equally based on the number of professors available in the departments. Each professor will serve as a guide to the assigned students.
- The students will finalize the institutions / companies for the internship in consultation with the guides.
- The students shall maintain a work diary which will be countersigned by the managers / authorities of the company in which the students do the internship on daily basis.
- The work diary, Work completion certificate obtained from the company and a comprehensive report on the learning outcomes will be submitted to the guides at the end of the internship.
- Viva will be conducted based on the experience of the internship in the month of August. The guide will be the internal examiner and another faculty from the same department will serve as the external examiner.

ANDROID PROGRAMMING
(Course Code: 23UCAC61)

SEMESTER – VI	CORE – T7	HOURS – 4	CREDITS – 4	TOTAL HOURS: 60

COURSE OUTCOMES:

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

CO1: Recite the Basics of Android. **(K1)**

CO2: Differentiate Various Resources. **(K2)**

CO3: Examine Various features in Android Application Development. **(K3)**

CO4: Infer SQLite Database. **(K4)**

CO5: Evaluate and debug the Android Applications. **(K5)**

CO6: Build new Innovative Android Applications. **(K6)**

UNIT 1 INTRODUCTION TO ANDROID (12 HOURS)

Introduction to Android -The Android Debug Bridge- Android Project Files- Creating Android Virtual Devices - Launching Android Applications on a Handset - Role of the Android Manifest File- Understanding Activities -Understanding the Android Activity Life Cycle - Creating and Starting an Activity -Displaying Messages Through Toast.

UNIT II DEBUGGING AND VIEWS (12 HOURS)

Using the Debugging Tool - Debugging Applications using break points - Using the EditText Control - Attributes Used to Configure the EditText Control - Adding an Event Listener to the EditText Control- Choosing Options with CheckBox- Choosing Mutually Exclusive Items Using RadioButtons – Buttons - Event Handling: Creating an Anonymous Inner Class- Activity Implementing the OnClickListener Interface.

UNIT III LAYOUTS AND RESOURCES (12 HOURS)

Introduction to Layouts: LinearLayout - RelativeLayout - FrameLayout - TableLayout - GridLayout - Adapting to Screen Orientation: Anchoring Controls - Resources: Types of Resources - Creating Values Resources - Color Resources -Styles and Themes - Applying Themes – Arrays- Using Drawable Resources.

UNIT IV MENU AND OTHER CONTROLS (12 HOURS)

Menus and Their Types- Creating Menus Through XML - Creating an Options Menu - Adding Submenus - Creating Menu through Coding - Using ListView- Using the Spinner Control - Populating a Spinner Through ArrayAdapter - AlertDialog - Methods of the AlertDialog.Builder Subclass

UNIT V WEB PAGES AND DATABASE (12 HOURS)

Displaying Web Pages - Adding Permission for Internet Access - Using the WebViewClient Class - Switching States with Toggle Buttons - Using Databases: Using the SQLiteOpenHelper Class - Fetching the Desired Rows from Tables -Using Cursors- Displaying Table Rows Via ListView

TEXTBOOK

B.M..Harwani, “Android Programming Unleashed”, Pearson Education, Inc., First edition 2013

REFERENCE BOOKS

1. J.F. DiMarzio, “Beginning Android Programming with Android Studio”, Fourth Edition, John Wiley & Sons Inc., 2017.
2. Dawn Griffiths and David Griffiths, “Head First Android Development”, Second Edition, Shroff/O’Reilly, 2018.
3. John Horton, “Android Programming for Beginners”, Second Edition, Packt Publishing Limited, 2018.
4. M. M. Sharma, Rashmi Aggarwal, “Android Programming for Beginners”, First Edition, BPB Publications, 2018.
5. Ian F. Darwin, Android Cookbook: Problems and Solutions for Android Developers, Second Edition, O’Reilly Media, Inc., 2017.

WEB RESOURCES

- https://www.javatpoint.com/android-tutorial
- https://www.tutorialspoint.com/android/index.htm
- https://www.geeksforgeeks.org/android-tutorial/
- https://www.tutlane.com/tutorial/android

J2EE
(COURSE CODE: 23UCAC62)

SEMESTER – VI	CORE – T8	HOURS – 4	CREDITS – 4	TOTAL HOURS: 60

COURSE OUTCOMES:

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

CO1: Describe J2EE Multi-Tier Architecture. (K1)

CO2: Gain theoretical and practical knowledge about servlets and JSP (K1).

CO3: Demonstrate and improve knowledge about distributed systems and web services (K1).

CO4: Develop the ability to create applications based on servlets and JSP (K2, K3).

CO5: Create servlet programs using HTTPRequest and HTTPResponse objects. (K6)

CO6: Cultivate the skill to solve real-world problems using concepts like JDBC (K3).

UNIT I J2EE MULTI-TIER ARCHITECTURE (12 HOURS)

J2EE Multi-Tier Architecture – Client Tier Implementation – Web Tier Implementation – Enterprise JavaBeans Tier Implementation – Enterprise Information Systems Tier Implémentation.

UNIT II SERVLETS (12 HOURS)

Java Servlets: Benefits of using a Servlet – A simple Java Servlet. Reading Data from a Client – Sending data to a Client – Working with Cookies – Tracking Sessions.

UNIT III JSP (12 HOURS)

JSP Basics – JSP scripting elements and Directives –Declarations – Expressions – Directives – Scriplets – Comments – Actions – Implicit JSP Objects – error Pages using JavaBean in JSP – Creating a Login using JavaBean - embedded control flow statements .

UNIT IV RMI (12 HOURS)

RMI: Remote Method Invocation Concept – Remote Interface – Passing Objects – The RMI Process – Server Side – Client Side.

UNIT V JAVA DATABASE CONNECTIVITY (12 HOURS)

JDBC: Types of Drivers – Steps to establish connectivity – Example of connectivity-JDBC Driver types – creating first JDBC program – retrieving data – database error processing – processing result sets –preparedstatement class – callablestatement class

TEXT BOOKS

1. Jim Keogh, “The Complete Reference J2EE”, Tata McGraw Hill Edition, 2017.
2. Damon, Hougland, Aaron Tavistock, “Core JSP”, Prentice Hall, 2001.
3. Dr. K. Somasundaram, “Programming in Java 2”, Jaico Publishing House, 2005. (Unit-V)

REFERENCE BOOKS

1. Santosh Kumar. K, “JDBC, Servlet 3.1 and JSP 2.3 Black Book”, Second Edition, Dreamtech Press, 2016.
2. Recommended by CDAC, ”Core and Advanced Java Black Book”, First Edition, Dreamtech Press, 2018.

WEB RESOURCES

- https://mindmajix.com/j2ee-tutorial
- https://www.javatpoint.com/java-ee
- https://www.java4coding.com/contents/servlet/jee-tutorial

PRACTICAL: ANDROID PROGRAMMING

(Course Code: 23UCAC63)

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

LIST OF PROGRAMS

1. Program to display a message using Toast
2. Program to check Login credentials
3. Application using different Layouts
4. Program to implement Activity Life Cycle
5. Program using Themes and Styles
6. Program using Check Boxes and Radio Buttons
7. Program using Spinner
8. Program for Menu Creation
9. Program to display an image in ImageView
10. Program to load a Web Page in a WebView
11. Program using Android Resources.
12. Program to draw a circle using Canvas and Paint classes

PRACTICAL: J2EE

(Course Code: 23UCAC64)

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

LIST OF PROGRAMS

1. Simple Servlet Program.
2. Program for Login Page using HttpServlet
3. Program to implement Session tracking in Servlet
4. Program to implement Cookies in Servlet
5. Program for JDBC to insert, update delete and display records to and from database using Servlet
6. Program for voting eligibility using JSP
7. Program using Scriptlets of JSP
8. Program using embedded control flow statement
9. Program to implement implicit objects of JSP.
10. Program for JDBC to insert, update, delete, display records to and from database using JSP.

PROJECT

Semester: VI Hrs: 6 Sub. Code: 23UCAC65 Credits: 4

Structure of the Project Report

1. Cover Page
2. Certificate
3. Declaration
4. Acknowledgement
5. Chapter-I Introduction
6. Chapter-II
7. Chapter-III
8. Chapter-IV
9. Chapter-V Conclusion and Scope for further research

Assessment

Internal : 100 Marks

External : 100 Marks

COMPUTER NETWORKS
(Course Code : 23UCAE61)

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

COURSE OUTCOMES:

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

CO1: List down the Network models and protocol suite. **(K1)**

CO2: Explain various transmission media. **(K2**)

CO3: Illustrate digital and analog signals. **(K3)**

CO4: Analyze the flow of transmission and recovery methods. **(K4)**

CO5: Evaluate various multiple access methods**. (K5)**

CO6: Generate solutions for congestion issues and formulate the ideas about DNS. **(K6)**

UNIT I NETWORK MODELS, TRANSMISSION MEDIA (12 HOURS)

Introduction: Data Communications – Networks-Internet Protocols and standards. **Network Models:** Layered Tasks - The OSI Model - Layers in the OSI Model - TCP/IP Protocol Suite - Addressing. **Transmission media:** Guided Media - Unguided media.

UNIT II DIGITAL AND ANALOG TRANSMISSION (12 HOURS)

Digital Transmission: Analog–To-Digital conversion - Transmission modes. **Analog Transmission:** Digital-To-Analog conversion. **Bandwidth Utilization:** Multiplexing – spread spectrum.

UNIT III SWITCHING, DATA LINK CONTROL (12 HOURS)

Switching: Circuit Switched Networks - Datagram Networks - Virtual-circuit Networks. **Error Detection and Correction:** Introduction - Block Coding – Linear Block Codes. **Data Link control:** Framing - Flow and Error Control - Noiseless Channel - Noisy Channel.

UNIT IV MULTIPLE ACCESS, WIRELESS LAN (12 HOURS)

Multiple Access: Random Access - ALOHA – CSMA – CSMA/CD – CSMA/CA - Controlled Access – Reservation - Polling - Token Passing – Channelization – FDMA - TDMA - CDMA.

Wireless LAN: Bluetooth - Architecture - Bluetooth Layers - Radio Layer - Baseband Layer - L2CAP - Other Upper Layers.

UNIT V NETWORK LAYER, CONGESTION CONTROL AND DNS (12 HOURS)

Network Layer: Delivery – Forwarding - Unicast Routing and Multicast routing. **Congestion Control:** Open Loop congestion control and Closed Loop congestion control. **Domain Name System:** Namespace - Domain Name space.

TEXT BOOK

Behrouz A Forouzan, "Data Communications and Networking", Fifth Edition, McGrawHill Higher Education, 2013.

REFERENCE BOOKS

1. Andrew S Tanenbaum, “Computer Networks”, Pearson Publications, Fifth Edition, 2011.
2. Achyut and Godbole, “Data Communications and Computer Networks”, Tata McGraw Hill Edition,2006.

WEB RESOURCES

- https://www.javatpoint.com/computer-network-tutorial
- https://www.tutorialspoint.com/data_communication_computer_network/index.htm

INTRODUCTION TO ARTIFICIAL INTELLIGENCE
(Course Code : 23UCAE61)

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

COURSE OUTCOMES:

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

CO1: Define the Artificial Intelligence Concepts and AI Applications. **(K1)**

CO2: Interpret the Types of Heuristic Search Techniques, Local Search Algorithms and Optimization Problems. **(K3)**

CO3: Examine the Knowledge Representation, Categories, Objects, Events. **(K4)**

CO4: Analyze the Advanced Knowledge Representation Techniques. **(K5)**

CO5: Evaluate the Architecture for Intelligent Agent, Agent communication Techniques. **(K6)**

CO6: Perform data analysis Perception, ML Model, NLP. **(K6)**

UNIT I INTRODUCTION (12 HOURS)

Introduction–Definition – Future of Artificial Intelligence – Characteristics of Intelligent Agents– Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.

UNIT II PROBLEM SOLVING METHODS (12 HOURS)

Problem solving Methods – Search Strategies- Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems -Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games

UNIT III KNOWLEDGE REPRESENTATION (12 HOURS)

Knowledge Representation First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering-Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories -Reasoning with Default Information

UNIT IV SOFTWARE AGENTS (12 HOURS)

Software Agents Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent systems.

UNIT V APPLICATIONS OF AI (12 HOURS)

Applications AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving

TEXT BOOKS

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach, Prentice Hall, Third Edition, 2009.

2. Artificial Intelligence: A Modern Approach, 4th Edition, Stuart Russell, peter Norvig University of California at Berkeley, Pearson education, 2020.

3. I. Bratko, ―Prolog: Programming for Artificial Intelligence, Fourth Edition, Addison-Wesley Educational Publishers Inc., 2011.

REFERENCE BOOKS

1. S. Russel and P. Norvig, “Artificial Intelligence – A Modern Approach”, Second Edition, Pearson Education

2. J. Nilsson, “Artificial Intelligence: A new Synthesis”, Elsevier Publishers.

WEB RESOURCES

- https://www.tutorialspoint.com/artificial_intelligence/
- https://www.javatpoint.com/artificial-intelligence-ai

PROFESSIONAL COMPETENCY SKILL
(Course Code: 23UCAS61)

SEMESTER - VI	SEC - 8	HOURS - 2	CREDITS – 2	TOTAL HOURS: 30

COURSE OUTCOMES:

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

CO1: Define their own ability to improve their own competence in using the language **(K1)**

CO2: Explain the importance of reading for life. **(K2)**

CO3: Use language for speaking with confidence in an intelligible and acceptable manner. **(K3)**

CO4: Illustrate unfamiliar texts with comprehension. **(K4)**

CO5: Evaluate the importance of writing in academic life. **(K5)**

CO6: Create simple sentences without committing error of spelling or grammar. **(K6)**

UNIT I COMMUNICATION (6 HOURS)

Listening: Listening to audio text and answering questions – Speaking: Pair work and small group work – Reading: Comprehension passages – Writing: Developing a story with pictures.

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UNIT II DESCRIPTION (6 HOURS)

Listening: Listening to process description – Drawing a flow chart – Speaking: Role play (formal context) – Reading: Skimming/Scanning – Reading passages on products and gadgets – Writing: Process Description – Sentence Definition and Extended Definition – Free writing.

UNIT III NEGOTIATION STRATEGIES (6 HOURS)

Listening: Listening to interviews of inventors in fields (Subject specific) – Speaking: Brain Storming (Mind mapping) – Reading: Longer Reading text – Writing: Essay writing (250 words).

UNIT IV PRESENTATION SKILLS (6 HOURS)

Listening: Listening to lectures – Speaking: Short talk – Reading: Comprehension passages – Writing: Writing Recommendations – Interpreting Visual inputs.

UNIT V CRITICAL THINKING SKILLS (6 HOURS)

Listening: Listening for information – Speaking: Making presentations with Powerpoint – Reading: Comprehension passages – Note making Motivational article on Professional Competence, Professional Ethics and Life Skills – Writing: Creative writing – Summary writing.

TEXT BOOK

Contents from Study Material provided by Tamil Nadu State Council for Higher Education (TANSCHE) – Professional English for B.Sc. Physical Sciences.

ADD ON COURSES

MICROSOFT WORD
(Course Code: 23UCAA01)

SEMESTER - I	CREDITS – 2	TOTAL HOURS - 30

COURSE OUTCOMES:

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

CO1: Define basic functions and new formatting features in Word 2010.**(K1)**
CO2: Describe theHeader and Footer content and update page numbers and dates.**(K2)**
CO3: Examine the various features of Word. **(K3)**
CO4: Analyze the formatting techniques.**(K4)**
CO5: Evaluate the process of adding pictures, wordart and animations.**(K5)**
CO6: Design various tables and lists. **(K6)**

UNIT I INTRODUCTION (6 HOURS)

Create and Manage Documents - Open a PDF in Word for editing - Insert text from a file or external source - Navigate Through a Document - Insert hyperlinks - Search for text - Create bookmarks - Move to a specific location or object in a document - Format a Document – Spell check.

UNIT II PAGE SETUP (6 HOURS)

Modify page setup - Apply document themes - Apply document style sets - Insert headers and footers - Insert page numbers - Format page background elements - Customize Options and Views for Documents - Change document views – Bullets & Numbering.

UNIT III FORMATTING TEXT (6 HOURS)

Format Text, Paragraphs, and Sections - Insert Text and Paragraphs - Find and replace text - Cut, copy and paste text - Replace text by using AutoCorrect - Insert special characters - Format Text and Paragraphs - Apply font formatting - Apply formatting by using Format Painter - Set line and paragraph spacing and indentation - Clear formatting – Headers & Footers - Apply built-in styles to text.

UNIT IV FORMATTING PAGE (6 HOURS)

Change text to WordArt - Order and Group Text and Paragraphs - Format text in multiple columns - Insert page, section, or column breaks - Change page setup options for a section - Create Tables and Lists - Create a Table - Convert text to tables - Convert tables to text - Create a table by specifying rows and columns - Apply table styles - Modify a Table - Sort table data - Configure cell margins and spacing - Merge and split cells - Resize tables, rows, and columns - Split tables

UNIT V FORMAT GRAPHIC ELEMENTS (6 HOURS)

Insert Images and table captions – Charts &Cliparts- Create and Manage Simple References Insert shapes - Insert pictures - Insert a screen shot or screen clipping - Insert text boxes Format Graphic Elements - Apply artistic effects - Apply picture effects - Remove picture backgrounds -Format objects - Apply a picture style - Wrap text

TEXT BOOK

Tom Bunzel, "Easy Microsoft Office 2010",Que Publishing, First Edition, 2010.

REFERENCE BOOKS

Gary B. Shelly, Misty E. Vermaat,"Microsoft Office 2010: Introductory",Cengage Learning, First Edition 2012.

WEB RESOURCES

- https://www.javatpoint.com/ms-word-tutorial
- https://www.tutorialspoint.com/word/index.html

WEB DESIGNING

(Course Code: 23UCAAO2)

SEMESTER - II	CREDITS - 2	HOURS - 30

COURSE OUTCOMES:

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

CO1: Describe the basics ofHTML, CSS and XML. **(K1)**
CO2: Explain the designs with links and tables.**(K2)**
CO3: Use images and forms for designing web page. **(K3)**
CO4: Analyze the usage of CSS.**(K4)**
CO5: Evaluate XML and its components.**(K5)**
CO6: Design Web pages using web design languages.**(K6)**

UNIT I INTRODUCTION TO HTML (6 HOURS)

Fundamentals of HTML: Understanding Elements – Understanding Line Breaks – Understanding a Paragraph – Formatting Text with HTML Elements

UNIT II WORKING WITH LINKS, TABLES AND IMAGES (6 HOURS)

Exploring the Hyperlinks–Understanding Tables – Describing the TABLE Elements –Inserting Images in a Webpage.

UNIT III WORKING WITH FORMS (6 HOURS)

Exploring the FORM Element – Exploring Types of the INPUT Element **–** Exploring the BUTTON Element – Exploring the Multiple–Choice Elements– Submitting a Form.

UNIT IV OVERVIEW OF CSS (6 HOURS)

Understanding the Syntax of CSS **–** Inserting CSS in an HTML Document – Internal style sheet – external style sheet –inline style sheet - Properties – background – color – font and text styles.

UNIT V XML (6 HOURS)

XML Basics: Creating Well – Formed XML – XML elements – XML Attributes – XML tree – XML comments

TEXT BOOK

Kogent Learning Solutions Inc., "HTML5 Black Book", Second Edition, DreamtechPress, 2016.

REFERENCE BOOKS

1. Mike McGrath, "HTML5 in Easy Steps", BPB Publications, Second Edition, 2017.
2. Thomas A. Powell, "The Complete Reference – HTML& CSS", McGraw Hill Education, Fifth Edition,2017.
3. Heather Williamson, "The Complete Reference – XML", Tata McGraw Hill Edition, 2011.

WEB RESOURCES

1. https://www.w3schools.com/html/
2. https://www.w3schools.com/css/
3. https://www.w3schools.com/xml/

PRACTICAL LIST

1. Designing a web page using lists.
2. Designing a web page using hyperlinks.
3. Designing a web page using tables.
4. Designing a web page using forms.
5. Designing a web page using CSS.
6. Designing a web page using XML.

VALUE ADDED COURSES
C PROGRAMMING
(Course Code :23UCAVA1)

SEMESTER : III	CREDITS : 2	HOURS - 30

COURSE OUTCOMES:

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

CO1: Describe types of operators and decision making statements. **(K1)**

CO2: Interpret conditional statements. **(K2)**

CO3: Discuss the problem-solving and programming skills. **(K3)**

CO4: Analyze branching and looping. **(K4)**

CO5: Evaluate arrays and strings. **(K5)**

CO6: Examine the various categories of functions. **(K6)**

UNIT I INTRODUCTION AND OPERATORS (6 HOURS)

Introduction: History of C - Importance of C – Character set – C Tokens - Keywords and Identifiers – Constants – Variables – Data types – Declaration of variables – Assigning values to variables – Defining symbolic constants – declaring variable as constant. **Operators:** Arithmetic operators – Relational operators – Logical operators – Assignment operators – Increment and Decrement operators – Conditional operator.

UNIT II EXPRESSIONS, INPUT AND OUTPUT (6 HOURS)

Expressions: Arithmetic expressions – Evaluation of expressions – precedence of arithmetic operators – type conversions in expressions – operator precedence and associativity. Managing Input and Output Operations: Introduction – Reading a character – Writing a character – Formatted Input – Formatted Output.

UNIT III BRANCHING AND LOOPING (6 HOURS)

Branching Statements: Introduction – Simple IF statement – IF Else statement – Nesting of IF Else statement – Else If ladder – Switch statement - ?: operator – GOTO statement. **Looping Statements:** while Loop – do .. while Loop – for Loop – Jumps in Loops.

UNIT IV ARRAYS AND STRINGS (6 HOURS)

One Dimensional Array: Declaration of One Dimensional Array - Initialization of One Dimensional Array. **Two Dimensional Array:** Initialization of two Dimensional Array - Multidimensional Arrays. **Strings**: Reading and Writing Strings – String Handling Functions.

UNIT V FUNCTIONS (6 HOURS)

User-Defined Functions: Need for User-Defined Functions – Elements of Functions – Definition of Function – Return values and its types – Function calls - Function Declaration – Category of Functions: No argument and No return value - Argument and No return value - Argument with return value - No argument but return value.

TEXT BOOK

1. E. Balagurusamy, “Programming in ANSI C”, Eighth Edition, McGrawHill Education (India) Private Limited, 2019.

REFERENCE BOOKS

1. Dr. Ashish Sasankar, Prof. Prachi A. Sasankar, “Programming in C - A Practical Approach”, First Edition, Global Education, 2020.
2. Byron S. Gottfried, “Programming with C - Schaum’s Outlines”, Fourth Edition, McGrawHill Education, 2018.
3. Herbert Schildt, “C: The Complete Reference”, Fourth Edition, McGrawHill Education, 2017.

WEB RESOURCES

- https://www.w3schools.com/c/c_intro.php
- https://www.programiz.com/c-programmin

PRACTICAL LIST

1. Write a program to design the Calculator Functions such as addition, subtraction and multiplication.
2. Write a program to Swap Two Numbers.
3. Write a program to check whether a given number is odd or even.
4. Write a program to find the biggest among three numbers.
5. Write a program to check whether a given number is Armstrong or not.
6. Write a program to generate the Fibonacci Series
7. Write a program to find the Factorial of a number
8. Write a program to check whether a given string is palindrome or not.

RED HAT CERTIFIED SYSTEM ADMINISTRATION – RHEL V9
(Course Code: 23UCAVA2)

SEMESTER: IV	CREDITS: 2	HOURS: 6

COURSE OUTCOMES:

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

CO1: Identify the need of an Linux Operating system. **(K1)**
CO2: Know the Process management functions of an Linux Operating system. **(K2)**
CO3: Understand the need of Users and Group Management in Linux Operating system. **(K3)**
CO4: Find the significance of Software repositories and management. **(K4)**
CO5: Recognize the essentials of File Management part of an Linux Operating system **(K5)**
CO6: Recognize the essentials of File Management part of an Linux Operating system **(K5)**

UNIT I INTRODUCTION TO FILE SYSTEMS (6 HOURS)

Introduction: RH 199 Class Explanation - Introduction to Red Hat Enterprise Linux - 9.x - Explain RHEl - 9 Installation Procedure - **Accessing Systems and Obtaining Support:** Edit Text Files from the Shell Prompt - Configuring SSH Key-based Authentication - Getting Help from Red Hat Customer Portal.

Navigating File Systems: Managing Files Using Command-line Tools - Making Links Between Files - **Managing Local Users and Groups:** Describing User and Group Concepts - Gaining Superuser Access - Managing Local User Accounts - Managing Local Group Accounts - Managing User Passwords.

UNIT II SELINUX SECURITY (6 HOURS)

Controlling Access to Files: Managing File System Permissions from the Command Line - Managing Default Permissions and File Access - **Managing SELinux Security:** Changing the SELinux Enforcement Mode SELinux - modes, Boolean - Controlling SELinux File Contexts.

Managing SELinux Security – Context: Adjusting SELinux Policy with Booleans Investigating and Resolving SELinux Issues - **Tuning System Performance:** Killing Processes - Monitoring Process Activity - **Tuning System Performance – Tuning:** Adjusting Tuning Profiles - Influencing Process Scheduling.

UNIT III MANAGING STORAGE (6 HOURS)

Scheduling Future Tasks: Scheduling Recurring System Jobs - Managing Temporary Files **Installing and Updating Software Packages:** Installing and Updating Software Packages with DNF - Enabling DNF Software Repositories.

Managing Basic Storage: Managing Package Module Streams - Adding Partitions, File Systems, and Persistent Mounts - Managing Swap Space - **Manage the Storage Stacks:** Creating Logical Volumes - Extending Logical Volumes - Managing Layered Storage with Stratis.

UNIT IV CONTROLLING SERVICES (6 HOURS)

Controlling Services and the Boot Process: Identifying Automatically Started System Processes- Controlling System Services - **Controlling Services and the Boot Process - Root Password Break:** Selecting the Boot Target root password break, boot repairing - Resetting the Root Password - Repairing File System Issues at Boot.

Analyzing and Storing Logs: Reviewing Syslog Files - Reviewing System Journal Entries - Preserving the System Journal - Maintaining Accurate Time.

UNIT V MANAGING NETWORK (6 HOURS)

Managing Networking: Validating Network Configuration -Configuring Networking from the Command Line - Editing Network Configuration Files - Configuring Host Names and Name Resolution - **Accessing Network-Attached Storage:** Managing Network-Attached Storage with NFS - Automounting Network-Attached Storage.

Managing Network Security: Managing Server Firewalls **Running containers:** Deploy Containers - **Running containers - As a System Service:** Manage Container Storage and Network - Manage Container Storage and Network Resources - Managing Containers as System Services.

EXTRA CREDIT COURSES
FUNDAMENTALS OF COMPUTERS
(Course Code : 23UCAEC1)

SEMESTER - I	**ECC**	**CREDITS – 2**

COURSE OUTCOMES:

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

CO1: Identify and analyze computer hardware, software, and network components**.(K1)**
CO2: Explain the needs of hardware and software required for a computation task. **(K2)**
CO3: Demonstrate the building up of Sequential and combinational logic from basic gates. **(K3)**
CO4: Analyze compression techniques and file formats to determine effective ways of securing, managing, and transferring data. **(K4)**
CO5: Make intelligent computer purchase decisions. **(K5)**
CO6: Integrating hardware and software. **(K6)**

UNIT I EVOLUTION OF COMPUTERS

Evolution of Computers:Generations – Types of computers –Computer system characteristics – Basic components of a Digital Computer – Control unit – ALU – Input/Output functions and memory – Memory addressing capability of a CPU – Word length of a computer – Processing speed of a computer – Computer Classification.

UNIT II INPUT AND OUTPUT UNITS

Input / Output Units: Keyboard – Mouse – Trackball – Joystick –Digitizing tablet –Scanners – Digital Camera – MICR – OCR – OMR - Bar-code Reader - Voice Recognition –Light pen – Touch Screen - Monitors and types of monitor – Digital – Analog – Size –Resolution – Refresh Rate –Dot Pitch – Video Standard – VGA – SVGA – XGA etc.– Printers&types –Daisy wheel – Dot Matrix – Inkjet – Laser – Line Printer – Plotter – Sound Card and Speakers.

UNIT III MEMORY

Memory: RAM – ROM – EPROM - PROM and other types of memory – Storage fundamentals – Primary vs. Secondary Data Storage – Various Storage Devices –Magnetic Tape –Magnetic Disks – Cartridge Tape – Hard Disk Drives –Floppy Disks (Winchester Disk) – Optical Disks – CD – VCD – CD-R – CD-RW – Zip Drive – Flash drives Video Disk –Blue Ray Disc – SD/MMC Memory cards – Physical structure of floppy & hard disk – Drive Naming Conventionsin PC– DVD– DVD-RW– USB Pen drive.

UNIT IV SOFTWARE AND ITS TYPES

Software and its Need: Types of Software – System software – Application software – System Software – Operating System – Utility Program – Algorithms –Flow Charts – Symbols – Rules for making Flow chart – Programming languages – Assemblers – Compilers and Interpreter – Computer Applications in various fields.

UNIT V INTERNET CONCEPTS

Internet Concepts: Introduction to Internet – Connecting to the Internet Hardware –Software & ISPs – Search Engines – Web Portals–Online Shopping – Email – Types of Email – Compose and send a message – Reply to a message – Working with emails – Surfing in the Internet.

TEXT BOOKS

P.K. Sinha, "Computer Fundamentals", New Age International Publishers, 2014.
https://www.edutechlearners.com/computer-fundamentals-p-k-sinha-free-pdf

REFERENCE BOOKS

1. S.K.Basandra, "Computers Today", Galgotia Publications.
2. Shree SaiPrakashan, "PC Software", Meerut.

WEB RESOURCES

- https://www.geeksforgeeks.org/computer-fundamentals-tutorial/
- https://www.freecodecamp.org/news/computer-basics-for-absolute-beginners/

CLOUD COMPUTING
(Course Code :23UCAEC2)

SEMESTER : II	ECC	CREDITS : 2

COURSE OUTCOMES

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

CO1: Describe fundamental concepts and Technologies of Cloud Computing. **(K1)**
CO2: Demonstrate various cloud service types and their uses and pitfalls. **(K2)**
CO3: Describe about Cloud Architecture and Application design. **(K3)**
CO4: Examine To know the various aspects of application design, benchmarking and security on the Cloud. **(K4)**
CO5: Implement various Case Studies in Cloud Computing. **(K5)**

UNIT I INTRODUCTION TO CLOUD COMPUTING

Introduction to Cloud Computing: Definition of Cloud Computing – Characteristics of Cloud Computing – Cloud Models – Cloud Service Examples – Cloud-based Services and Applications. Cloud Concepts and Technologies: Virtualization – Load balancing – Scalability and Elasticity – Deployment – Replication – Monitoring – Software Defined Networking – Network Function Virtualization – MapReduce – Identity and Access Management – Service Level Agreements – Billing.

UNIT II CLOUD SERVICES

Compute Services: Amazon Elastic Computer Cloud - Google Compute Engine - Windows Azure Virtual Machines Storage Services: Amazon Simple Storage Service - Google Cloud Storage - Windows Azure Storage. Database Services: Amazon Relational Data Store - Amazon Dynamo DB - Google Cloud SQL - Google Cloud Data Store - Windows Azure SQL Database - Windows Azure Table Service Application Services: Application Runtimes and Frameworks - Queuing Services - Email Services - Notifiction Services - Media Services.

UNIT III CLOUD APPLICATION DESIGN

Introduction – Design Consideration for Cloud Applications – Scalability – Reliability and Availability – Security – Maintenance and Upgradation – Performance – Reference Architectures for Cloud Applications – Cloud Application Design Methodologies: Service Oriented Architecture (SOA), Cloud Component Model, IaaS, PaaS and SaaS Services for Cloud Applications, Model View Controller (MVC), RESTful Web Services – Data Storage Approaches: Relational Approach (SQL), Non-Relational Approach (NoSQL).

UNIT IV CLOUD APPLICATION BENCHMARKING AND TUNING

Introduction to Benchmarking – Steps in Benchmarking – Workload Characteristics – Application Performance Metrics – Design Consideration for Benchmarking Methodology – Benchmarking Tools and Types of Tests – Deployment Prototyping. **Cloud Security:** Introduction – CSA Cloud Security Architecture – Authentication (SSO) – Authorization – Identity and Access Management – Data Security : Securing data at rest, securing data in motion – Key Management – Auditing.

UNIT IV CASE STUDIES

Cloud Computing for Healthcare – Cloud Computing for Energy Systems - Cloud Computing for Transportation Systems - Cloud Computing for Manufacturing Industry - Cloud Computing for Education.

TEXT BOOK

1. ArshdeepBahga, Vijay Madisetti, *Cloud Computing – A Hands On Approach*, Universities Press (India) Pvt. Ltd., 2018.

REFERENCE BOOKS

1. David Crookes, Cloud Computing in Easy Steps, Tata McGraw Hill, 2012
2. Anthony T Velte, Toby J Velte, Robert Elsenpeter, Cloud Computing: A Practical Approach, Tata McGraw-Hill, 2013.

WEB RESOURCES

- https://www.javatpoint.com/cloud-computing
- https://www.geeksforgeeks.org/cloud-computing-tutorial

DATA MINING
(Course Code: 23UCAEC3)

SEMESTER - III	ECC	CREDITS - 2

COURSE OUTCOMES:

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

CO1: Define the Data mining Techniques and preprocessing methods for any given raw data. **(K1)**

CO2: Interpret the Data warehouse Design and Implementation. **(K2)**

CO3: Examine the useful patterns and associations in huge amount of data. **(K3)**

CO4: Categorize the interesting patterns from large amounts of data to analyze and extract patterns to solve problems, make predictions of outcomes. **(K4)**

CO5: Evaluate and implement a wide range of emerging and newly – adopted methodologies and technologies to facilitate the knowledge discovery. **(K5)**

CO6: Generate frequent set of items using Association Rule Mining. **(K6)**

UNIT I DATA MINING AND DATA PREPROCESSING

Introduction to Data Mining – Fundamentals of Data Mining – Data Mining Functionalities – Data and Attribute types – Statistical Description of Data – Data Preprocessing: Data Cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization.

UNIT II DATA WAREHOUSING

Data Warehousing: Basic Concepts – Data Ware House Modelling Data Cube and OLAP – Data Warehouse Design and Implementation.

UNIT III MINING FREQUENT PATTERN AND ASSOCIATIONS

Mining Frequent Patterns and Associations: Basic Methods – Frequent Item Set Mining Methods Any Two Algorithms – Pattern Evaluation Methods.

UNIT IV CLASSIFICATION

Classification: Basic Concepts – Decision Tree Induction – Bayes Classification – Any Two Advanced Methods – Model Evaluation.

UNIT V CLUSTER ANALYSIS

Cluster Analysis: Basic Concepts – Clustering Structures – Major Clustering Approaches – Partitioning Methods – Hierarchical Method – Density Based Methods – The Expectation Maximization Method – Cluster Based Outlier Detection Essential Reading.

TEXTBOOK

Jiawei Han, Micheline Kamber and Jian Pei, "Data Mining: Concepts and Techniques", Third Edition, Morgan Kaufmann, 2012.

REFERENCE BOOKS

1. G.K. Gupta, "Introduction to Data mining with case studies", Third Edition, PHI Learning Private limited, New Delhi, 2014.
2. Charu C. Aggarwal, "Data Mining", Springer, 2015.

WEB RESOURCES

- https://www.javatpoint.com/data-mining
- https://www.geeksforgeeks.org/data-mining

WIRELESS TECHNOLOGY
(Course Code: 23UCAEC4)

SEMESTER - IV	ECC	CREDITS - 2

COURSE OUTCOMES:

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

CO1: Describe the basics of Wireless Transmission. **(K1)**

CO2: Differentiate the frequencies of Spread Spectrum and Modulation. **(K2)**

CO3: Demonstrate GSM. **(K3)**

CO4: Illustrate GPRS. **(K4)**

CO5: Evaluate MAC techniques**. (K5)**

CO6: Summarize Satellite Communication. **(K6)**

UNIT I

Wireless Transmission-I : Frequencies for communication– Frequencies for mobile communication – Frequencies and regulations – Signals (physical representation of data, function of time and location) – Fourier representation of periodic signals – Different representations of signals (w.r.t.freq and amp) – Antennas (isotropic radiator, simple dipoles, directed and sectorized) – MIMO – Signal propagation ranges – Signal propagation – shadowing, reflection, refraction, scattering, diffraction) – Multipath propagation – Effects of mobility.

UNIT II

Wireless Transmission-II: Modulation– Digital – Analog – Spread spectrum technology – DSS – FHSS – Cell structure – Frequency planning– Cell breathing.

UNIT III

Wireless Telecommunication Systems: GSM: Overview –Performance characteristics of GSM (wrt. analog sys.) **–GSM:** Mobile Services– Architecture of the GSM system– System Architecture – GSM – TDMA/FDMA – GSM hierarchy of frames – GSM protocol layers for signaling – Mobile Originated Call – Mobile Originated Call – 4 types of handover – Handover decision – Handover procedure – Data services in GSM – GPRS quality of service – GPRS architecture and interfaces – GPRS protocol architecture.

UNIT IV

3G-The Universal Mobile Telecommunication System (UMTS):UMTS Network Architecture –Release 99, UMTS Interfaces, UMTS Network Evolution –UMTS Release 5 – UMTS FDD and TDD – UMTS Channels –Logical Channels – UMTS downlink transport and physical channels – UMTS uplink transport and physical channels – UMTS Time Slots – UMTS Network Protocol – Architecture – Mobility Management for UMTS Network.

UNIT V

Medium Access Control: Motivation for a specialized MAC – SDMA – FDMA – TDMA – CDMA –Wireless LANs – Characteristics of wireless LANs – Comparison: Infrared vs. radio transmission – Comparison – Infrastructure vs. ad-hoc networks – 802.11 – Architecture of an infrastructure network – 802.11 – Architecture of an ad-hoc network – Basics of Satellite communication.

TEXT BOOKS

1. William Stallings, “Wireless Communications and Networks”, Pearson/Prentice Hall of India, 2019.
2. Maral. G and Bosquet. M, “Satellite Communications Systems Techniques and Technologies”, John Wiley & Sons, Fifth Edition, 2011.

REFERENCE BOOKS

1. Dharma Prakash, Agrawal and Qing-An Zeng, “Introduction to Wireless Mobile Systems” Thomson India, 2015.
2. Vijay K Garg, “Wireless Communication and Networking”, Morgan Kaufmann Publishers, 2010.
3. Siva Ram Murthy C and Manoj B S, “Ad Hoc Wireless Networks: Architectures and Protocols”, Prentice Hall, 2004.

WEB RESOURCES

- https://www.tutorialspoint.com/wireless_communication/index.htm
- https://www.javatpoint.com/applications-of-wireless-communication

INTERNET OF THINGS
(Course Code :23UCAEC5)

SEMESTER - V	ECC	CREDITS - 2

COURSE OUTCOMES:

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

CO1: Describe the characteristics, physical and logical design of IoT. **(K1)**
CO2: Classify the various domain specific IoTs**(K4)**
CO3: Differentiate IoT and M2M. **(K2)**
CO4: Illustratethe IoT design methodology. **(K3)**
CO5: Examine the various case studies illustrating IoTs. **(K5)**
CO6: Summarize the role of Cloud in IoT. **(K5)**

UNIT I INTRODUCTION AND DOMAIN SPECIFIC IoTs

Introduction – Definition and Characteristics of IoT – Physical design of IoT – Logical Design of IoT – IoT enabling technologies – IoT levels and Deployment templates – Domain Specific IoTs: Home Automation – Cities – Environment – Energy – Retail – Logistics – Agriculture – Industry – Health and Lifestyle.

UNIT II IoT SYSTEM MANAGEMENT AND DESIGN METHODOLOGY

IoT and M2M: Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Networking – Network Function Virtualization – Need for IoT System Management SNMP – Network operator requirements – NETCONF – YANG – IoT System Management with NETCONF-YANG – IoT Design methodology.

UNIT III IoT SYSTEMS LOGICAL DESIGN AND PHYSICAL DEVICES

IoT Systems – Python packages for IoT – IoT Physical devices and endpoints: Basic building blocks of IoT devices – Exemplary device: Raspberry Pi – Linux on Raspberry Pi – Raspberry Pi Interfaces – Programming Raspberry Pi with Python.

UNIT IV IoT PHYSICAL SERVERS, CLOUD OFFERINGS AND CASE STUDIES

Introduction to Cloud storage models and Communication APIs – Xively Cloud for IoT – Python Web Application Framework - DJANGO – Designing a RESTful Web API – Amazon Web Services for IoT – Amazon EC2 – Amazon Autoscaling – Amazon S3 – AmazonRDS – Case studies illustrating IoT – Smart Lighting – Home Intrusion System – IoT printer.

UNIT V DATA ANALYTICS AND TOOLS FOR IoT

Introduction – Apache Hadoop – Mapreduce Programming Model – Hadoop Mapreduce Job Execution – Mapreduce Job Execution Workflow – Hadoop Cluster Setup – Tools for IoT – Chef – Setting up Chef – Chef Case studies.

TEXT BOOK

Arshdeep Bahga, Vijay Madisetti, "Internet of Things: A Hands-on Approach" , Second Edition, Universities Press, 2019.

REFERENCE BOOKS

1. Ammar Rayes, Samere Salam,"Internet of Things – From Hype to Reality", Second Edition, Springer Publishers, 2019.
2. S. Misra, A. Mukherjee, and A. Roy, "Introduction to IoT", First Edition,Cambridge University Press, 2022.

WEB RESOURCES

- https://link.springer.com/chapter/10.1007/978-3-030-41110-7_1
- https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT

SOCIAL NETWORKS

(Course Code :23UCAEC6)

SEMESTER - VI	ECC	CREDITS - 2

COURSE OUTCOMES:

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

CO1: Describe the basic concepts of Graph Theory. **(K1)**

CO2: Interpret the Power Law and Emergent Properties.**(K2)**

CO3: Analyze the Online Social Network Datasets. **(K3)**

CO4: Examine Homophily and Structural balance.**(K4)**

CO5: Evaluate Link Analysis and Link Prediction.**(K5)**

CO6: Assess the diffusion behavior in Networks.**(K5)**

UNIT I INTRODUCTION

Introduction to Graph Theory and Python – Analyzing Online Social Network Datasets.

UNIT II POWER LAW

Power Law and Emergent Properties – Strength of Weak Ties.

UNIT III HOMOPHILY

Homophily and Social Influence – Structural Balance.

UNIT IV LINK ANALYSIS AND PREDICTION

The Structure of the web – Link analysis and Web Search – Link Prediction.

UNIT V DIFFUSION BEHAVIOR IN NETWORKS

Information Cascades – Diffusion Behavior in Networks – The Small World Phenomenon.

TEXT BOOK

David Easley and Jon Kleinberg, "Networks, Crowds and Markets", Cambridge University Press, 2010. (available for free download).

REFERENCE BOOKS

1. Matthew O. Jackson, "Social and Economic Networks", Princeton University Press, 2010.
2. D. Rajagopal, "Social Networks", First Edition, Notion Press, 2019.

WEB RESOURCES

- https://onlinecourses.nptel.ac.in/noc24_cs56/preview
  (SWAYAM/NPTEL Online Course videos by Dr. S. R. SudharshanIyengar and Dr. Yayati Gupta, IIT, Ropar).
- https://www.techtarget.com/whatis/definition/social-networking