# **B.Sc. COMPUTER SCIENCE** (COGNITIVE SYSTEMS)

# **CHOICE BASED CREDIT SYSTEM (CBCS)**

Curriculum and Syllabus Regular (2019 – 2020)



# **DEPARTMENT OF COMPUTER SCIENCE**

# FACULTY OF ARTS, SCIENCE AND HUMANITIES

# **KARPAGAM ACADEMY OF HIGHER EDUCATION**

(Deemed to be University) (Established Under Section 3 of UGC Act, 1956) Eachanari (Post), Coimbatore – 641 021. Tamilnadu, India Phone No. 0422-2980011 - 15 Fax No: 0422-2980022-23 E mail ID: info@karpagam.com Web: www.kahedu.edu.in

# **PROGRAM OUTCOMES:**

# The program must enable students to attain by the time of graduation

- a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
- b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- c) An ability to design, implement and evaluate a computer-based system, process, component or program to meet desired needs.
- d) An ability to function effectively on teams to accomplish a common goal
- e) An understanding of professional, ethical, legal, security and social issues and responsibilities
- f) An ability to communicate effectively with a range of audiences
- g) An ability to use current techniques, skills and tools necessary for computing practice
- h) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking and web systems and technologies
- i) An ability to effectively integrate IT-based solutions into the user environment
- j) An understanding of best practices and standards and their application

# **PROGRAM SPECIFIC OUTCOME (PSOs)**

- k) Understand analyze and develop computer programs in the areas related to Database systems and Big data Analytics, cloud computing, soft computing, IoT, Image processing, Green computing, web designing, mobile computing and networking for efficient design of computer based system of varying complexity.
- Apply standard software Engineering practices and strategies in software project development using open-source programming environment to deliver a quality for business success.
- m) Be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.
- n) An ability to produce cost effective, quality and maintainable software products and solutions (services) meeting the global standards and requirements with the knowledge acquired and using the emerging techniques, tools and software engineering

methodologies and principles and able to comprehend and write effective project reports in multidisciplinary environment in the context of changing technologies.

# **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

- PEO I : To be a working Information Technology (IT) professional with core competencies that can be used on multi-disciplinary projects
- PEO II : To understand the importance of relationship building within the IT industry
- PEO III : To understand the need for lifelong learning in the exploration and journey in IT
- PEO IV : To understand, evaluate and practice ethical behavior within the IT industry
- PEO V : To be cognizant of security issues and their impacts on industry

POs	а	b	c	d	e	f	f	h	i	j	k	1	m	n
PEO I	Х	Х	Х				Х	Х	Х				Х	
PEO II				Х	Х	Х								Х
PEO III	Х	Х						Х		Х	Х			
PEO IV			Х	Х	Х				Х			Х		
PEO V					Х					Х		Х		

**MAPPING of PEOs and POs** 

#### KARPAGAM ACADEMY OF HIGHER EDUCATION (Deemed to be University) (Established Under Section 3 of UGC Act, 1956) Coimbatore-21 Faculty of Arts, Science and Humanities Department of Computer Science UG Curriculum (CBCS)- (2019 – 2022) Batch

**Program: B.Sc Computer Science (Cognitive Systems)** 

Course code Name of the course			jectives	Inst	ruct	tion		Maximum Marks		
		a	nd out	h	ours	/	<b>s</b> )			
		C	omes	\	veek		lit(		1	
		PEOs	POs	L	Т	Р	Cred	CIA	ESE	Total
		[						40	60	100
	SEMI	ESTE	R - I	1			1		I	
19LSU101	Language –I	IV	d,e	04	-	-	4	40	60	100
19CGU101	Programming Fundamentals using C / C++	Ι	a,b,c	05	-	-	5	40	60	100
19CGU102	Operating Systems	Ι	b,c,g	04	-	-	4	40	60	100
19CGU103	Computer Fundamentals	III	h,j	04	-	-	4	40	60	100
19CGU111	Programming Fundamentals using C / C++ - Practical	Ι	a,b,c,g	-	-	04	2	40	60	100
19CGU112	Operating Systems – Practical	Ι	a,c,g	-	-	03	2	40	60	100
19CGU113	Problem solving using worksheets – Practical	III	b,h,j	-	-	03	2	40	60	100
19AEC101	Environmental Studies	IV	d,e	03	-	-	3	40	60	100
	Semester Total			20	-	10	26	320	480	800
	SEME	STE	R – II							
19LSU201	Language – II	IV	d,e	04	-	-	4	40	60	100
19ENU201	English	II	d,f	04	-	-	4	40	60	100
19CGU201	Computer Networks	Ι	c,h,i	04	-	-	4	40	60	100
19CGU202	Discrete Structures	IV	e,i	04	-	-	4	40	60	100
19CGU203	Information Technology Information Library	III	a,b	04	-	-	4	40	60	100
19CGU211	Computer Networks – Practical	Ι	a,c,h,i	-	-	04	2	40	60	100
19CGU212	Discrete Structures – Practical	IV	c,e	-	-	03	2	40	60	100
19CGU213	Web Technologies - Practical	III	a,b,j	-	-	03	2	40	60	100
	Semester Total			20	-	10	26	320	480	800
	SEME	STEF	<u> </u>	1	r —	1	· · · ·		1	
19CGU301	Data Structures	Ι	a,b,g, h	04	-	-	4	40	60	100
19CGU302	Python Programming	III	a,b,h,	04	-	-	4	40	60	100

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

2019-2020

[			1	1	1	1		1	1	
			k							
19CGU303	Virtualization and Cloud	III	a,b,j,k	04	-	-	4	40	60	100
19CGU304A	Infrastructure Management	Ι	a,b,c, m	03	_	_	3	40	60	100
19CGU304B	XML Programming	IV	c,d,e,i				-	40	60	100
19CGU311	Data Structures – Practical	Ι	a,b,g, h	-	-	04	2	40	60	100
19CGU312	Python Programming- Practical	III	a,b,h, k	-	-	04	2	40	60	100
19CGU313	Virtualization and Cloud – Practical	III	a,b,j,k	-	-	04	2	40	60	100
19CGU314A	Infrastructure Management – Practical	Ι	a,b,c, m	-	-	03	1	40	60	100
19CGU314B	XML Programming – Practical	IV	c,d,e,i	-	-	03		40	60	100
	Semester Total			15	-	15	22	320	480	800
	SEME	STEF	R – IV	•						
19CGU401	Programming in JAVA	Ι	a,b,c, m	04	-	-	4	40	60	100
19CGU402	Database Management System	IV	c,d,e,l	04	-	-	4	40	60	100
19CGU403	Cognition and Problem Solving	Ι	a,b,g, h	04	-	-	4	40	60	100
19CGU404A	Process Management	III	a,b,h,j ,k	02			2	40	(0)	100
19CGU404B	Programming in MATLAB	III	a,b,h,j ,k	03	03 -		3	40	60	100
19CGU411	Programming in JAVA – Practical	Ι	a,b,c, m	-	-	04	2	40	60	100
19CGU412	Database Management System – Practical	IV	c,d,e,l	-	-	04	2	40	60	100
19CGU413	Design and Analysis of Algorithms – Practical	Ι	a,b,g, h	-	-	04	2	40	60	100
19CGU414A	Devops tools – Practical	III	a,b,h,j ,k			03	1	40	60	100
19CGU414B	Programming in MATLAB	III	a,b,h,j ,k			05	1	-10	00	100
	Semester Total			15	-	15	22	320	480	800
	SEME	ESTE	R –V	r	r —	1				1
19CGU501A	Introduction to Digital Technology	I	b,e,m	04	-	-	Δ	40	60	100
19CGU501B	Machine Learning	III	a,b,h,j		-	-	т	40	00	100
19CGU502A	Software Testing	II	a,b,h,j	04	-	-	Λ	40	(0	100
19CGU502B	Information Security and Cyber Laws	Ι	c,g				4	40	60	100
19CGU503A	Data Mining	Ι	a,b,h	04	-	-	4	40	60	100
19CGU503B	Introduction to Data Science	II	d,e,f	1	-	-				
19CGU504A	Client Relationship Management	IV	c,e,i,l	03	-	-	3	40	60	100

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

5

# **B.ScComputer Science**

#### 2019-2020

19CGU504B	Programming in Visual	III	b,h,j,k								
1000115114	Basic/Gambas	Ŧ	1								
I9CGUSTIA	Introduction to Digital Technology –	1	b,e,m	-	-	04	2	40	60	100	
10CCU511P	Practical Mashing Learning Drastical	ш	o h h i								
19CGU511B	Software Testing - Practical		a,0,11,j	-	-						
19CGU512A	Software Testing - Flactical	T	a,0,11,j			04	2	40	60	100	
19CO0512B	Laws– Practical	1	c.g	-	-	04	2	40	00	100	
19CGU513A	Data Mining – Practical	III	a.b.h	-	-		•	4.0	60	100	
19CGU513B	Introduction to Data Science –	II	d,e,f			04	2	40	60	100	
	Practical			-	-						
19CGU514A	Client Relationship Management-	IV	c,e,i,l								
	Practical				03		1	40	60	100	
19CGU514B	Programming in Visual	III	b,h,j,k	-	-	05	1	40	00	100	
	Basic/Gambas– Practical										
	Semester Total			15	-	15	22	320	<b>480</b>	800	
	SEME	STE	R –VI	1	_	1		1	r	1	
19CGU601A	PHP Programming	III	a,b,h,j								
			,k	03	_	_	3	40	60	100	
19CGU601B	Unix/Linux Programming	IV	c,d,e	02			5		00	100	
19CGU602A	Digital Image Processing	Ι	a,c,g,							-	
			m	04							
19CGU602B	Computer Graphics	Ι	a,d,g,		-	-	4	40	60	100	
			m					40	00	100	
19CGU603A	Artificial Intelligence	V	e,j,l	04			4	40	60	100	
19CGU603B	System Programming	Ι	a,b,h,i	04	-	-	4	40	00	100	
19CGU611A	PHP Programming	III	a,b,h,j								
	– Practical		,k	-	-	03	1	40	60	100	
19CGU611B	Unix/Linux Programming– Practical	IV	c,d,e								
19CGU612A	Digital Image Processing – Practical	Ι	a,c,g,	_	_						
			m	_		04	2	40	60	100	
19CGU612B	Computer Graphics - Practical	Ι	a,d,g,	_	<b>_</b>			-10	00	100	
			m								
19CGU613A	Artificial Intelligence – Practical	V	e,j,l	_	_	04	2	40	60	100	
19CGU613B	System Programming – Practical	Ι	a,b,h,i			01	4	10	00	100	
19CGU691	Project	II	d,e,f,n	08	-	-	6	40	60	100	
	ECA / NCC / NSS / Sports / General						Go	ood			
	interest etc				-					T	
	Semester Total			15	-	15	22	280	420	700	
	Grand Total			100	-	80	140	1880	2820	4700	

Entrepreneur Oriented Courses -Green Employability Oriented Courses -Blue Skill Development Oriented Courses -Red

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

	Ability Enhancement Courses (AEC)									
Semester	<b>Course Code</b>	Name of the Course								
Ι	19LSU101	Language –I								
	19AEC101	Environmental Studies								
II	19LSU201	Language –II								
	19ENU201	English								
IV	19CGU403	Cognition and Problem Solving								
	Gen	eric Elective Courses (GE) /Allied Courses								
Semester	<b>Course Code</b>	Name of the Course								
II	19CGU202	Discrete Structures								
	19CGU212	Discrete Structures – Practical								
	Core Courses (CC)									
Semester	<b>Course Code</b>	Name of the Course								
I	19CGU101	Programming Fundamentals using C / C++								
	19CGU102	Operating Systems								
	19CGU103	Computer Fundamentals								
	19CGU111	Programming Fundamentals using C / C++ - Practical								
	19CGU112	Operating Systems – Practical								
	19CGU113	Problem solving using worksheets – Practical								
II	19CGU201	Computer Networks								
	19CGU203	Information Technology Information Library								
	19CGU211	Computer Networks – Practical								
	19CGU212	Web Technologies - Practical								
III	19CGU301	Data Structures								
	19CGU302	Python Programming								
	19CGU303	Virtualization and Cloud								
	19CGU311	Data Structures – Practical								
	19CGU312	Python Programming- Practical								
	19CGU313	Virtualization and Cloud – Practical								
IV	19CGU401	Programming in JAVA								
	19CGU402	Database Management System								
	19CGU411	Programming in JAVA – Practical								
	19CGU412	Database Management System – Practical								
	19CGU413	Design and Analysis of Algorithms – Practical								
V	19CGU501A	Introduction to Digital Technology								
	19CGU501B	Machine Learning								
	19CGU511A	Introduction to Digital Technology – Practical								
	19CGU511B	Machine Learning - Practical								
VI	19CGU603A	Artificial Intelligence								
	19CGU603B	System Programming								
	19CGU613A	Artificial Intelligence – Practical								
	19CGU613B	System Programming – Practical								
	19CGU691	Project								

		Skill Enhancement Courses(SEC)				
Semester	<b>Course Code</b>	Name of the Course				
III	19CGU304A	Infrastructure Management				
	19CGU304B	XML Programming				
	19CGU314A	Infrastructure Management – Practical				
	19CGU314B	XML Programming – Practical				
IV	19CGU404A	Process Management				
	19CGU404B	Programming in MATLAB				
	19CGU414A	Devops tools – practical				
	19CGU414B	Programming in MATLAB				
V	19CGU502A	Software Testing				
	19CGU502B	Information Security and Cyber Laws				
	19CGU512A	Software Testing - Practical				
	19CGU512B	Information Security and Cyber Laws– Practical				
VI	19CGU601A	PHP Programming				
	19CGU601B	Unix / Linux Programming				
	19CGU611A	PHP Programming –Practical				
	19CGU611B	Unix / Linux Programming – Practical				

	D	iscipline Specific Elective Courses (DSE)
Semester	<b>Course Code</b>	Name of the Course
V	19CGU503A	Data Mining
	19CGU503B	Introduction to Data Science
	19CGU504A	Client Relationship Management
	19CGU504B	Programming in Visual Basic/Gambas
V	19CGU513A	Data Mining – Practical
	19CGU513B	Introduction to Data Science – Practical
	19CGU514A	Client Relationship Management– Practical
	19CGU514B	Programming in Visual Basic/Gambas- Practical
VI	19CGU602A	Digital Image Processing
	19CGU602B	Computer Graphics
	19CGU612A	Digital Image Processing– Practical
	19CGU612B	Computer Graphics – Practical

# கற்பகம்உயாகல்விகலைக்கழகம்

# தமிழ்த்துறை

# பகுதி - டதமிழ்ப்பாடத்திட்டம் (2019 - 2020)

# முதல்பருவம்

# (இளநிலை அறிவியல் பட்டவகுப்புகளுக்குரியது)

(For I-UG Science Degree Classes) 19LSU101

பாடத்திட்டப்பொதுநோக்கம்

- கற்றல் வழி சிந்தனைத் திறனையும், கருத்து வெளிப்பாட்டுத் திறனையும், மேம்படுத்துதல்.
- ஆய்வுநோக்கைமேம்படுத்துதல்.
- இலக்கியங்கள் உணர்த்தும் வாழ்வின் நுட்பமான பகுதிகளை உணர்த்துதல்.
- மனித மனத்தினைப் பக்குவப்படுத்துதலில் இலக்கியம் தரும் பங்கினை உணர்த்துதல்.
- வளர்ந்து வரும் சமூகத்தில் அறஉணர்வு, பண்பாடு போன்றவை குறித்து அறிவூட்டல்.
- அரசுத் தேர்வுகளுக்கு மாணவர்களை ஆயத்தமாக்குதல்.

# பாடத்திட்டப்பயன்விளைவு

- இந்தியகுடியுரிமைப்பணிமுதலானபோட்டித்தேர்வுகளில், விருப்பப்பாடமாகஇடம்பெறுகின்ற, 'தமிழ்இலக்கியவரலாறு' குறித்தமுழுமையானஅறிமுகம்பெற்றிருத்தல்.
- கல்வெட்டியல், ஒலைச்சுவடியியல்மற்றும்தொல்லியல்சார்ந்தஆவணத்தேடலுக்குரியஆய்வுமன ப்பான்மையுடன், இலக்கியங்களைஅணுகுதல்.
- தமிழின்வளர்ச்சித்துறையாகிய, 'அறிவியல்தமிழ்' ; 'இணையதமிழ்' குறித்தபன்நோக்குஅணுகுமுறையிலானஆய்வுச்சிந்தனைமேம்பாடு.
- வேலைவாய்ப்புக்குரியசுயதிறன்மேம்பாட்டுடன், படைப்பாக்கத்திறன்மேம்பாடும்பெற்றிருத்தல்
- சமுதாயமற்றும்வாழ்வியல்மதிப்புகளைப்பேணுவதற்குக்கருவியாகஇலக்கியங்க ளைநாடுகின்றமனப்பான்மைவளர்ச்சி.
- மொழிபெயப்புத்துறைசார்ந்தவேலைவாய்புத்திறன்பெற்றிருத்தல்
- தாள்கள்வரிசையும்தேர்வுச்செயல்திட்டமும்பகுதி-၊ தமிழ்

பருவம்	தாள்	கற்பிக்கும் நேரம்/வாரம்	தேர்வு ம ணிகள்	மதிப்பெண் அக/எழுத்து	மொத்தம்	மதிப்பீடு
ஒன்று	I	4	3	40 / 60	100	4

2019-2020

பகுதி– !, தமிழ்

முதல் பருவம்

19LSU101 :

தமிழ் முதல் தாள்

4-H,4-C

(இளநிலை அறிவியல் பட்ட வகுப்புகளுக்குரியது) (For I-UG Science Degree Classes)

(10 மணிநோம்)

அலகு –	1:6	க்கால	20	க்கியம்:
--------	-----	-------	----	----------

- 1. மகாகவி பாரதியார்
- 2. புரட்சிக்கவிஞன் பாரதிதாசன்
- கவிமணி தேசிக விநாயகம் பிள்ளை
- கவிக்கோ. அப்துல்ரகுமான்
- 5. சிற்பி பாலசுப்பிரமணியன்
- 6. கவிஞர் தாமரை

அலகு – 🛛 : அற இலக்கியம்:

1. ஒளவையார் – கொன்றை வேந்தன் (1- 50 பாடல்கள்)

அன்னையும் பிதாவும் – புலையும் கொலையும் களவும் தவிர்

– காலம்.

2. வேதநாயகம்பிள்ளை - நீதிநூல் - (5 பாடல்கள்)

சின்னவோர் பொருள், <mark>கடவுளை வருந்தி, எப்பு</mark>விகளும், வைத்தவர், ஈன்றவர்

- 3. திருவள்ளுவர்- திருக்குறள்- பண்புடைமை, வினைத்திட்பம்
- முன்றுறையரையனார் பழமொழி நானூறு 5 பாடல்கள்

உணற்கு இனிய, பரந்த திறலாரை, நெடியது காண்கிலாய், இனி யாரும், உரைசான்ற

# அலகு – III : சிற்றிலக்கியம்: (8 மணிநேரம்)

 முக்கூடற் பள்ளு- 2 பாடல்கள் - சித்திரக் காலிவாலான் (நெல்வகைகள்) குற்றாலத் திரிகூட மால்வரை (மீன் வகைகள்)

 நந்தி கலம்பகம்- 5 பாடல்கள்- என்னையே புகழ்ந்தேன், பதிதொறு புயல்பொழி, இந்தப்புவியில், அடிவிளக்கும் துகில், வானுறுமதியை

3. மதுரைச் சொக்கநாதர் தமிழ்விடு தூது –தமிழின் சிறப்பு

பாடியருள பத்துப்பாட்டும்-விளம்பக்கேள்.

# (8 மணிநேரம்)

பரம்பொருள் வாழ்த்து .

தொலைந்து போனேன்.

தமிழின் இனிமை.

பாருக்குள்ளே நல்ல நாடு.

கோவில் வழிபாடு.

# அலகு – IV : சிறுகதை: (8 மணிநேரம்)

- 1. மகாமசானம்
- 2. அப்பாவின் வேஷ்டி
- 3. அந்நியர்கள்
- 4. இந்நாட்டுமன்னர்

# அலகு – V : மொழிப்பயிற்சி:

(6 மணிநேரம்)

புதுமைப்பித்தன்

ஆர். சூடாமணி

நாஞ்சில்நாடன்

பிரபஞ்சன்

- பொருத்தமான தமிழ்ச் சொற்களைப் பயன்படுத்துதல்
- 2. செய்யுள் பொருளுணர் திறன்
- 3. மொழிபெயர்ப்புப் பயிற்சிகள்
- கடிதங்கள் மற்றும் விண்ணப்பங்கள் எழுதுதல்

# பாட தூல்: கற்பகச்சோலை – தமிழ் ஏடு.

கற்பகம் உயர்கல்வி கலைக்கழகத் தமிழ்த்துறை வெளியீடு.

Semester – I

# **19CGU101 PROGRAMMING FUNDAMENTALS USING C / C++5H – 5C**

Instruction Hours / week:L: 5 T: 0 P: 0 Marks:Internal :40 External : 60 Total: 100 End Semester Exam : 3 Hours

# **Course Objectives**

- To impart adequate knowledge on the need of programming languages and problem solving techniques.
- To develop programming skills using the fundamentals and basics of C and C++ Languages
- To enable effective usage of arrays, structures, functions
- To learn effective usage of pointers and to implement the memory management concepts.
- To teach the issues in file organization and the usage of file systems.
- To learn the characteristics of an object-oriented programming language: data abstraction and information hiding, inheritance, and dynamic binding of the messages to the methods.

# **Course Outcomes (COs)**

After the completion of this course, a successful student will be able to do the following:

- 1. Develop programs using the basic elements like control statements, Arrays and Strings .
- 2. understand about the dynamic memory allocation using pointers which is essential for utilizing memory
- 3. Understand about the code reusability with the help of user defined functions.
- 4. Learn the basics of file handling mechanism that is essential for understanding the concepts in database management systems.
- 5. Use the characteristics of an object-oriented programming language in a program.
- 6. Use the basic object-oriented design principles in computer problem solving.

# Unit I - INTRODUCTION TO C AND C++

History of C and C++, Overview of Procedural Programming and Object-Orientation Programming, Using main() function, Compiling and Executing Simple Programs in C++.

# Data Types, Variables, Constants, Operators and Basic I/O:

Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise), Using Comments in programs, Character I/O (getc, getchar, putc, putcharetc), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.hetc).

# Expressions, Conditional Statements and Iterative Statements:

Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions, Conditional Statements (if construct, switch-case construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)

# **Unit II - FUNCTIONS AND ARRAYS**

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments.

Creating and Using One Dimensional Arrays (Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops), Use Various types of arrays (integer, float and character arrays / Strings) Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays.

# **Unit III - DERIVED DATA TYPES (STRUCTURES AND UNIONS)**

Understanding utility of structures and unions, Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of Structures, Individual data members as structures, Passing and returning structures from functions, Structure with union as members, Union with structures as members.

#### Pointers and References in C++:

Understanding a Pointer Variable, Simple use of Pointers (Declaring and Dereferencing Pointers to simple variables), Pointers to Pointers, Pointers to structures, Problems with Pointers, Passing pointers as function arguments, Returning a pointer from a function, using arrays as pointers, Passing arrays to functions. Pointers vs. References, Declaring and initializing references, using references as function arguments and function return values

#### Unit IV - MEMORY ALLOCATION IN C++

Differentiating between static and dynamic memory allocation, use of malloc, calloc and free functions, use of new and delete operators, storage of variables in static and dynamic memory allocation.

#### File I/O, Preprocessor Directives:

Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef), Macros.

# Unit V - USING CLASSES IN C++

Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Constructor Overloading, Function overloading in classes, Class Variables &Functions, Objects as parameters, Specifying the Protected and Private Access, Copy Constructors, Overview of Template classes and their use.

# **Overview of Function Overloading and Operator Overloading:**

Need of Overloading functions and operators, Overloading functions by number and type of arguments, Looking at an operator as a function call, Overloading Operators (including assignment operators, unary operators).

# Inheritance, Polymorphism and Exception Handling:

Introduction to Inheritance (Multi-Level Inheritance, Multiple Inheritance), Polymorphism (Virtual Functions, Pure Virtual Functions), Basics Exceptional Handling (using catch and throw, multiple catch statements), Catching all exceptions, Restricting exceptions, Rethrowing exceptions.

# SUGGESTED READINGS

- 1. HerbtzSchildt.(2003). C++: The Complete Reference (4thed.) McGraw Hill, New Delhi.
- 2. BjarneStroustrup.(2013). The C++ Programming Language(4th ed.).Addison-Wesley, New Delhi.
- 3. BjarneStroustroup.(2014). Programming, Principles and Practice using C++(2<sup>nd</sup>edAddison-Wesley, New Delhi.
- 4. Balaguruswamy, E. (2008). Object Oriented Programming with C++. Tata McGraw-Hill Education, New Delhi.
- 5. Paul Deitel., &Harvey Deitel. (2011). C++ How to Program (8th ed.). Prentice Hall, New Delhi.
- 6. John, R. Hubbard. (2000). Programming with C++-(2nd ed.). Schaum's Series.
- 7. Andrew Koeni., Barbara, E. Moo. (2000). Accelerated C++. Addison-Wesley.
- 8. Scott Meyers. (2005). Effective C++ (3rd ed.).Addison-Wesley,.
- 9. Harry, H. Chaudhary. (2014). Head First C++ Programming: The Definitive Beginner's Guide.LLC USA:First Create space Inc, O-D Publishing.
- 10. Walter Savitch.(2007) Problem Solving with C++, Pearson Education,.
- 11. Stanley, B. Lippman., JoseeLajoie., & Barbara, E. Moo.(2012). C++ Primer, 5th ed.). Addison-Wesley

#### WEB SITES

- 1. http://www.cs.cf.ac.uk/Dave/C/CE.html
- 2. http://www2.its.strath.ac.uk/courses/c/
- 3. http://www.iu.hio.no/~mark/CTutorial/CTutorial.html
- 4. http://www.cplusplus.com/doc/tutorial/
- 5. www.cplusplus.com/
- 6. www.cppreference.com/

#### 19CGU102

# **OPERATING SYTSEMS**

# Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

# **Course Objectives**

- To recognize the concepts and principles of Windows operating system.
- To provide students with the basic knowledge and skills of memory in Windows
- To provide device and Process management and techniques in Windows environment.
- To able to do server monitoring of Windows
- To able to create group policy in Windows 2012.
- Install MS Windows 2012 environment.

# **Course Outcomes (COs)**

- 1. Ability to work in Windows 7 operating system, its tools and utilities.
- 2. Install and configure Windows 2012 server and client.
- 3. Use administrative tools and backup management for Windows 2012 server.
- 4. Understand device and Process management and techniques in Windows environment.
- 5. Monitor server OS of Windows
- 6. Create group policy in Windows 2012.

# Unit I - WINDOWS

Windows-Hardware Basics, Operating System overview and Windows, Windows 7 Essential, Client OS-Windows 7-Users and Groups-IP Configuration, Client OS-Windows 7 Tools and Utilities-Client OS Windows 7- Installation-Features-Disk Management-File Systems.

# Unit II - Server OS

Server OS-Windows Server 2012 Overview-Server DNS-Zone Creation - DHCP LAB-Advanced server storage Management-server ADS concepts and FSMO-Server OS Windows Server 2012 Roles and features- Server OS Windows Server 2012 File and Print Services.

# **Unit III - OS MONITORING**

Server OS monitoring and managing Windows Server 2012-Server OS Windows Server 2012 DNS and DHCP- Server OS Windows server 2012 Administrative Tools and ADS

# Unit IV - SERVER OS

Server OS-Windows Server 2012-Storage and Backup Management-Client OS Windows 7 Devices and Printers-Server OS Windows Server 2012 Installation.

# **Unit V - GROUP POLICY MANAGEMENT**

Group Policy Management-Server Windows Server 2012- File and print services-Group Policy-Server Storage Management –Server Scenario- Server OS Windows Server 2012-DNS and DHCP -Server- ADS scenario.

Semester – I 4H – 4C

# SUGGESTED READINGS

- 1. Mitch Tulloch, "Windows 7 Essential Guidance", 2009.
- 2. William PanekTylor Wentworth, "Microsoft Windows 7 Administration", Wiley Publishing, 2010
- 3. Charles Edge, Chris Barker EhrenSchwiebert, "Beginning MacOSX Snow Leopard Server", 2010
- 4. Greg Tomsho, "Guide to Operating System", 5<sup>th</sup> Edition, 2017.

# WEB SITES

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

Semester – I

# **19CGU103 COMPUTER FUNDAMENTALS 4H – 4C**

Instruction Hours / week:L: 4 T: 0 P: 0 Marks:Internal:40 External:60 Total: 100 End Semester Exam: 3 Hours

# **Course Objectives**

- To identify types of computers, how they process information and how individual computers interact with other computing systems and devices.
- To identify the function of computer hardware components.
- To identify different types of software, general concepts relating to software categories, and the tasks to which each type of software is most suited or not suited.
- To identify fundamental concepts relating to database applications.
- To manipulate and control the Windows desktop, files and disks.
- To understand the emerging technologies and their uses.

# Course Outcomes(COs)

- 1. Understand the meaning and basic components of a computer system,
- 2. Gain knowledge about five generations and classification of computer system,
- 3. Explain the functions of a computer,
- 4. Identify and discuss the functional units of a computer system,
- 5. Identify the various input and output units and explain their purposes
- 6. Understand the emerging technologies and their uses.

# **Unit I – INTRODUCTION**

Introduction to computer system, uses, types. **Data Representation:** Number systems and character representation, binary arithmetic. **Human Computer Interface:** Types of software, Operating system as user interface, utility programs.

# **Unit II – DEVICES**

Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter.

# **Unit III – MEMORY**

Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks.

# **Unit IV - COMPUTER ORGANISATION AND ARCHITECTURE**

C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.

# **Unit V - OVERVIEW OF EMERGING TECHNOLOGIES**

Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems.

# SUGGESTED READINGS

- 1. Goel, A. (2010). Computer Fundamentals. Pearson Education, New Delhi.
- 2. Aksoy, P., &DeNardis,L. (2006).Introduction to Information Technology. Cengage Learning, New Delhi.
- 3. Sinha, P. K., & Sinha, P. (2007). Fundamentals of Computers. BPB Publishers, New Delhi.

# WEB SITES

- 1. https://www.tutorialspoint.com/computer\_fundamentals/
- 2. https://www.javatpoint.com/computer-fundamentals-tutorial

3.https://www.researchgate.net/publication/258339295\_FUNDAMENTALS\_OF\_COMPUTER\_STUDIES

4. https://www.oreilly.com/library/view/computer-fundamentals/9788131733097/

#### Semester – I

#### 19CGU111 PROGRAMMING FUNDAMENTALS USING 4H – 2C C / C++ - PRACTICAL

# Instruction Hours / week:L: 0 T: 0 P: 4Marks:Internal:40 External:60 Total: 100 End Semester Exam: 3 Hours

# **Course Objectives**

- To impart adequate knowledge on the need of programming languages and problem solving techniques.
- To develop programming skills using the fundamentals and basics of C and C++ Languages
- To enable effective usage of arrays, structures, functions
- To learn effective usage of pointers and to implement the memory management concepts.
- To teach the issues in file organization and the usage of file systems.
- To learn the characteristics of an object-oriented programming language: data abstraction and information hiding, inheritance, and dynamic binding of the messages to the methods.

# **Course Outcomes (COs)**

After the completion of this course, a successful student will be able to do the following:

- 1. Develop programs using the basic elements like control statements, Arrays and Strings .
- 2. understand about the dynamic memory allocation using pointers which is essential for utilizing memory
- 3. Understand about the code reusability with the help of user defined functions.
- 4. Learn the basics of file handling mechanism that is essential for understanding the concepts in database management systems.
- 5. Use the characteristics of an object-oriented programming language in a program.
- 6. Use the basic object-oriented design principles in computer problem solving.

# **List of Programs**

- 1. WAP to print the sum and product of digits of an integer.
- 2. WAP to reverse a number.
- 3. WAP to compute the sum of the first n terms of the following series S = 1+1/2+1/3+1/4+...
- 4. WAP to compute the sum of the first n terms of the following series S = 1-2+3-4+5...

5. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.

6. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.

7.WAP to compute the factors of a given number.

8. Write a macro that swaps two numbers. WAP to use it.

9. WAP to print a triangle of stars as follows (take number of lines from user):

\*\*\* \*\*\*\*\* \*\*\*\*

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

\*\*\*\*\*\*

10. WAP to perform following actions on an array entered by the user:

i) Print the even-valued elements

- ii) Print the odd-valued elements
- iii) Calculate and print the sum and average of the elements of array

iv) Print the maximum and minimum element of array

v) Remove the duplicates from the array

vi) Print the array in reverse order

The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.

11. WAP that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.

12. Write a program that swaps two numbers using pointers.

13. Write a program in which a function is passed address of two variables and then alter its contents.

14. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.

15. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.

16. Write a menu driven program to perform following operations on strings:

a) Show address of each character in string

b) Concatenate two strings without using streat function.

c) Concatenate two strings using streat function.

d) Compare two strings

e) Calculate length of the string (use pointers)

f) Convert all lowercase characters to uppercase

g) Convert all uppercase characters to lowercase

h) Calculate number of vowels

i) Reverse the string

17. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.

18. WAP to display Fibonacci series (i)using recursion, (ii) using iteration

19. WAP to calculate Factorial of a number (i)using recursion, (ii) using iteration

20. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.

21. Create Matrix class using templates. Write a menu-driven program to perform following Matrix operations (2-D array implementation):

a) Sum b) Difference c) Product d) Transpose

22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).

23. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.

24. Create a class Box containing length, breath and height. Include following methods in it:

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

a) Calculate surface Area

b) Calculate Volume

c) Increment, Overload ++ operator (both prefix & postfix)

d) Decrement, Overload -- operator (both prefix & postfix)

e) Overload operator == (to check equality of two boxes), as a friend function

f) Overload Assignment operator

g) Check if it is a Cube or cuboid

Write a program which takes input from the user for length, breath and height to test the above class.

25. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.

26. Write a program to retrieve the student information from file created in previous question and print it in following format:

Roll No. Name Marks

27. Copy the contents of one text file to another file, after removing all whitespaces.

28. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void.

29. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descending order.

#### 19CGU112

#### Semester – I OPERATING SYSTEMS- PRACTICAL 3H – 2C

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

# **Course Objectives**

- To recognize the concepts and principles of Windows operating system.
- To provide students with the basic knowledge and skills of memory in Windows
- To provide device and Process management and techniques in Windows environment.
- To able to do server monitoring of Windows
- To able to create group policy in Windows 2012.
- Install MS Windows 2012 environment.

# Course Outcomes (COs)

- 1. Ability to work in Windows 7 operating system, its tools and utilities.
- 2. Install and configure Windows 2012 server and client.
- 3. Use administrative tools and backup management for Windows 2012 server.
- 4. Understand device and Process management and techniques in Windows environment.
- 5. Monitor server OS of Windows
- 6. Create group policy in Windows 2012.

# List of programs

- 1. Installation of client and server OS
- 2. Create server and play roles
- 3. Zone creation and DHCP
- 4. File and print services
- 5. Devices and printers
- 6. Group policy
- 7. Server storage management
- 8. Server scenario
- 9. ADS Scenario based
- 10. DNS and DHCP

#### Semester – I

# **19CGU113 PROBLEM SOLVING USING WORKSHEETS – PRACTICAL3H – 2C**

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

#### **Course Objectives**

- Write functions in Microsoft Excel to perform basic calculations and to convert number to text and text to number.
- Create applications using VBA code in Excel
- Construct formulas, including the use of built-in functions, and relative and absolute references.
- To be able to develop macros.
- To be able to Format worksheets.
- To create an interactive worksheet.

#### •

# **Course Outcomes (COs)**

- 1. Create and design a spreadsheet for general office use.
- 2. Demonstrate the basic mechanics and navigation of an Excel spreadsheet.
- 3. Demonstrate the use of basic functions and formulas
- 4. Create applications using VBA code in Excel
- 5. Ability to develop macros.
- 6. Creating interactive worksheets

# List of programs

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

#### 19AEC101

# **ENVIRONMENTAL STUDIES**

#### Semester – I 3H – 3C

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

# **Course Objectives**

- To create the awareness about environmental problems among people.
- To develop an attitude of concern for the environment.
- To motivate public to participate in environment protection and improvement.
- To understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
- To apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
- To reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

# Course Outcomes (COs)

- 1. Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- 2. Master core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- 3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- 4. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
- 5. Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
- 6. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

# **Unit I – INTRODUCTION - ENVIRONMENTAL STUDIES & ECOSYSTEMS**

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

# Unit II - NATURAL RESOURCES - RENEWABLE AND NON-RENEWABLE RESOURCES

Natural resources - Renewable and Non – Renewable resources. Land resources and land use change, Land degradation, soil erosion and desertification. Forest resources -Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water resources- Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water.Use of alternate energy sources, growing energy needs, case

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

studies. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

# Unit III - BIODIVERSITY AND ITS CONSERVATION

Levels of biological diversity - genetic, species and ecosystem diversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value. Bio-geographical classification of India. Biodiversity patterns (global, National and local levels). Hot-spots of biodiversity. India as a mega-diversity nation. Endangered and endemic species of India. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

# **Unit IV - ENVIRONMENTAL POLLUTION**

Definition, causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution.Nuclear hazards and human health risks. Solid waste management and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Case studies.

# **Unit V - SOCIAL ISSUES AND THE ENVIRONMENT**

Concept of sustainability and sustainable development. Water conservation -Rain water harvesting, watershed management. Climate change, global warming, ozone layer depletion, acid rain and its impacts on human communities and agriculture. Environment Laws (Environment Protection Act, Air Act, Water Act, Wildlife Protection Act, Forest Conservation Act). International agreements (Montreal and Kyoto protocols).Resettlement and rehabilitation of project affected persons. Disaster management (floods, earthquake, cyclones and landslides). Environmental Movements (Chipko, Silent valley, Bishnois of Rajasthan). Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi). Human population growth: Impacts on environment, human health and welfare.

# Suggested Readings

- 1. Anonymous. 2004. A text book for Environmental Studies, University Grants Commission and Bharat Vidypeeth Institute of Environmental Education Research, New Delhi.
- 2. AnubhaKaushik., and Kaushik, C.P. 2004. Perspectives in Environmental Studies. New Age International Pvt. Ltd. Publications, New Delhi.
- 3. Arvind Kumar. 2004. A Textbook of Environmental Science. APH Publishing Corporation, New Delhi.
- 4. Daniel, B. Botkin., and Edward, A. Keller. 1995. Environmental Science John Wiley and Sons, Inc., New York.
- 5. Mishra, D.D. 2010. Fundamental Concepts in Environmental Studies. S.Chand& CompanyPvt. Ltd., New Delhi.
- 6. Odum, E.P., Odum, H.T. and Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
- 7. Rajagopalan, R. 2016. Environmental Studies: From Crisis to Cure, Oxford University Press.

- 8. Sing, J.S., Sing. S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand & Publishing Company, New Delhi.
- 9. Singh, M.P., Singh, B.S., and Soma, S. Dey. 2004. Conservation of Biodiversity and Natural Resources.Daya Publishing House, New Delhi.
- 10. Tripathy. S.N., andSunakar Panda. (2004). Fundamentals of Environmental Studies (2<sup>nd</sup> ed.). Vrianda Publications Private Ltd, New Delhi.
- 11. Verma, P.S., and Agarwal V.K. 2001. Environmental Biology (Principles of Ecology).S.Chand and Company Ltd, New Delhi.
- 12. Uberoi, N.K. 2005. Environmental Studies. Excel Books Publications, New Delhi.

# கற்பகம்\_\_\_\_\_\_

# தமிழ்த்துறை

# பகுதி - | தமிழ்ப்பாடத்திட்டம் (2019 - 2020)

# (இளநிலைஅறிவியல்பட்டவகுப்புகளுக்குரியது)

(For I-UG Science Degree Classes) 19LSU201

# \_\_\_\_\_**ப\_\_\_\_\_ப\_\_\_\_பொதுநோக்கம்**

- கற்றல்வழிசிந்தனைத்திறனையும்,
   கருத்துவெளிப்பாட்டுத்திறனையும், மேம்படுத்துத

   .
- \_\_\_\_\_மேம்படுத்துத\_\_\_\_
- இலக்கியங்கள்உணர்த்தும்வாழ்வின்நுட்பமானபகுதிகளைஉணர்த்து தல்.
- மனிதமனத்தினைப்பக்குவப்படுத்துதலில்இலக்கியம்தரும்பங்கினை உணர்த்துதல்.
- வளர்ந்துவரும்சமூகத்தில் அறஉணர்வு, பண்பாடுபோன்றவைகுறித்து அறிவூட்டல்.
- அரசுத்தேர்வுகளுக்குமாணவர்களை ஆயத்தமாக்குதல்.

# 

- •
- •

# தாள்கள்வரிசையும்தேர்வுச்செயல்திட்டமும்பகுதி-၊ தமிழ்

பருவ	தா	கற்பிக்கும்	தேர்வு	மதிப்பெ	மொத்த	மதிப்பீ
ம்	ள்	நேரம்/வார	மணி	ண்	ம்	டு
		ف	கள்	அக/எழுத் கு		

B.ScComputer Science

2019-2020

இரண்	II	4	3	40 / 60	100	4
Յ						

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

# பகுதி - | தமிழ்ப் பாடத்திட்டம் (2019-2020)

பகுதி – 1. தமிழ்

இசனாடாம் பகுவம் 19LSU201

4-H,4-C

தமிழ் இரண்டாம் தாள் (இளறிலை அறிவியல் பட்ட வகுப்புகளுக்குரியது) (For I-UG Science Degree Classes)

# அலகு – 1 : பக்தி இலக்கியம் (7 மணிதோம்)

சைவ, வைணவ இலக்கியங்கள் - தோற்றம் ,வளர்ச்சி, வரலாறு.

- 1. சைவம் (15 பாடல்கள்) பெரியபுராணம் திருமூலநாயனார் புராணம் -அந்தி இனம்பிறைக் கண்ணி, மற்று அவர்தாம் அணிமா, காவிரி நீர் பெருத்தீர்த்தம், அந்நிலைமைத் தானத்தை, அந்தணர்தம் சாத்தனூர், மற்று.அதன் தன் உடம்பினை, இவன் உயிர்பெற் றெழில், பாய்த்திய பின் திருமூலராய், வெய்ய கடர் கதிரவனும், அங்கவளும், பித்து உற்ற மையல் அன்று, இந்த நிலைமையில், ஆவடு தண்துறை, ஊன்உடம்பில், முன்னிய அப்பொருள்.
- வைனைம் ஆண்டான் நாச்சியார் திருப்பாவை: (11 பாடல்கள்): மார்கழித்திங்கள், வையத்து வாழ்வீர்கான், ஓங்கி உலகளந்த, ஆழி மழைக்கண்ணா, மாயனை மன்னுவட மதுரை, சிற்றம் சிறுகாலே, ஒருத்தி மகனாய், மாலே மணிவண்ணா, கூடாரை வெல்லும், கறவைகள் பின்சென்று, வங்கக்கடல் கடைந்த.

# அலகு – II : சங்க இலக்கியம் 🛛 (14 மணிநேரம்)

சங்க இலக்கியங்கள் - அறிமுகம்

a). at OsGaras

**தற்றினை:** கொண்டல் மாமழை – குறிஞ்சி – தலைவன் - 140 **குறற்தொகை:** வாரார் ஆயினும், வரினும் –முல்லை– தலைவி - 110 **ஐங்குறமூரை:** மருதம் –தோழி -வேட்கைப்பத்து: வாழிஆதன் வாழி அவனி - 6 **பதிற்றப்பத்து :** சிதைந்தது மன்ற - 27

**பரிபாடல்:** பரிபாடல் திரட்டு-வையை –10: மலைவரை மாலை- கரை நண்ணி 10:1-25, ஆங்க அணிநிலை மாடத்து- நீ கானும் போன்ம் 10: 41-55, இலம்படு புலவர் - ஏத்தினர் தொழுவே 10: 126-130.

```
கலித்தொகை ; பாலைக்கல்- செலில் – எறித்தரு கதிர்தாங்கி9
அதைவதாலா : அன்னை அறியிலும் அறிசு – தோழி - தெய்தல் - 110
பூறதாலூ : யாதும் வைரே யாலருல் கேளிர் –பொதுவியல் - 192
ஆ). பத்துப்பாட்டு: நெடுதல்களமை – கார்காலச் திறப்பு : லையகம் பளிப்ப -1-70
அலகு – III : காப்பியம் (6 மணிதோம்)
(அ). கலப்பதினால்:
மகலை வாழ்த்துப் பாடல்: (21-29)- நாக நீல் நகரோடு-கண்ணலி என்பாண் மன்னோ .
வழக்குரை காதை, (48-66) - தீர்வார் கண்ணை-புகா சென்பதிலே .
(து) கன்துகை மாதைக்குற் வரசர் – மன்னை ரேதென்,
வாழ்த்துக்காதை; (9) - என்னேவிக் தென்னே – மீவிகம்பிற் நோன்றமால்.
(இ). பனியேகனை:
பசிபின் வொடுமை: பாத்திரம் பெற்ற காதை:
"போதி நீழல் - பெருகியதன்றோ", "ஆற்றதர்க்களிப்போர்" - "நல்லறம் கண்டனை" (73-96).
```

AngéGeri டம் அறச்சோட்டமாக்கிய காதை: மாவண் கிள்ளிக்கு காவலன் உரைத்தவை:

'பைஞ்சேறு வெழுகாப் பகம்பொன் மண்டபத்து -

.graarte estalara green august (118-163).

# awg-N:ac@mrad

# (8 மணிதோம்)

- 1. BIGON BUARD CUTT. K. Gastenerartrant
- 2. patient.dear Corr. a. s.i. aradikaant
- கலைச்சிறப்பு முத்தமிழ்க் காவலர் கி.அ.பெ. விகவதாதம்
- 4. கானத்திவேடலும் கங்கையே அம் -சொல்லின்செல்வர் ரா.பி.சேதுப்பின்னை
- 5. எட்டில் இல்லாத இலக்கியம் ஒனவை தரைசாமி

# அலகு- V : மொழிப்பயிற்கி

#### (5 மணிதோம்)

#### (ຈີນກອບເຫລີອູ່ທີ & ບອບບົນແກ່ສະບັບໜຶ່ງທີ)

படைப்பிலக்கியப் பயிற்சிகள். (கதை, கவிதை, கட்டுரை, உரைநடை எழுதுதல், நேர்காணல்) மொழிபெயர்ப்பு

#### பாட தால்: சற்பக/சோலை- தமிழ் ஏடு.

கற்பகம் உயர்கல்வி கலைக்கழகத் தமிழ்த்துறை வெளியீடு.

Part I TAMIL 2019. Science Karpagam Academy of Higher Education, Colmbetore - 21.

#### 19ENU201

#### Semester – II 4H – 4C

# Instruction Hours / week:L: 4 T: 0 P: 0 Marks:Internal :40 External : 60 Total: 100 End Semester Exam : 3 Hours

# **Course Objectives:**

- To train students to acquire proficiency in English.
- To explore different genres of literature and learning grammar.

**ENGLISH** 

- To provide aesthetic pleasure through literature.
- To inculcate moral values through literature.
- To develop ethical values.
- To give basic grammar knowledge.

# **Course Outcome:**

- 1. Develop the knowledge of interpersonal skills.
- 2. Establish and maintain social relationships.
- 3. Genres of literature will give moral values of life.
- 4. Develop communication skills in business environment
- 5. Communication skills will get developed.
- 6. Develop to have language competence.

#### UNIT - I : PROSE

- 1. Morals in the Indian Context Francis Nicholas Chelliah
- 2. How Comic Books help us to relive our Childhood Benoit Peeters
- 3. Let's Do What India Needs From Us -Dr.A.P.J. Abdul Kalam

# UNIT - II : POEM

- 1. The Stolen Boat William Wordsworth
- 2. Telephone Conversation- Wole Soyinka
- 3. A River A.K. Ramanujan

# UNIT - III : SHORT STORIES

- 1. Rapunzel Brothers Grimm
- 2. The Ant and The Grasshopper- W. Somerset Maugham
- 3. The Nightingale and the Rose Oscar Wilde.

# UNIT - IV: Drama

- 1. The Merchant of Venice- Act 4-Scence 1
- 2. The Death Trap- Saki

# **UNIT - V: Grammar and Composition**

GRAMMAR :

- 1. Tenses
- 2. Articles

#### Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

3. Auxiliaries (Primary and Modal)

4. Tag Questions

Composition:

1. Reading to Comprehend

- 2. Letter Writing
- 3. Resume Writing
- 4. General Essay

# Prescribed Text:

Reminisce, Published by the Department of English,,KarpagamAcademy of Higher Education.

# Suggested Reading:

Hewings Martin,1999 Advanced English Grammar, Cambridge University Press

# Semester – II S 4H – 4C

#### **19CGU201 COMPUTER NETWORKS**

# Instruction Hours / week:L: 4 T: 0 P: 0 Marks:Internal:40 External:60 Total: 100 End Semester Exam: 3 Hours

# **Course Objectives**

- To master the fundamentals of data communications networks by gaining a working knowledge of data transmission concepts.
- To study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
- To read the fundamentals and basics concepts of Physical layer with real time examples
- To study data link layer concepts, design issues, and protocols.
- To learn the functions of network layer and the various routing protocols.
- To familiarize the functions and protocols of the Transport layer and Application layer.

# **Course Outcomes (COs)**

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

- 1. Understand the functions of each layer in OSI and TCP/IP model.
- 2. Explain the multiplexing, switching concept and types of transmission media with real time examples.
- 3. Understand the error detection and correction methods and can implement the data link layer protocols
- 4. Understand channel error detection and correction, MAC protocols, Ethernet and WLAN.
- 5. Learn different medium access method to avoid collision and to learn about routing table.
- 6. Learn basic functionalities of transport layer and application layer.

# **Unit I- INTRODUCTION**

Introduction - Applications – LAN – WAN – MAN - Network Hardware - Network Software: Protocol Hierarchies – Connection-oriented and connectionless services. Reference Models: OSI Reference Model – TCP/IP Reference Model – Comparison of OSI and TCP/IP.

# **Unit II- NETWORK BASICS**

Network Basics - Protocols, Topology - Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. Wireless Transmission: Electromagnetic Spectrum – Radio Transmission – Microwave Transmission – Communication Satellites: Geostationary, Medium-Earth Orbit, Low Earth-orbit Satellites.

# **Unit III - IP ADDRESSING**

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

# **Unit IV - ROUTING ALGORITHMS**

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

# **Unit V - MONITORING**

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

# SUGGESTED READINGS

- 1. David J.Wetherall, Andrew S.Tanenbaum, "Computer Networks", 5<sup>th</sup> Edition, Pearson Education, 2012.
- 2. Behrouz A. Forouzan, "Data Communication and Networking", 4<sup>th</sup> Edition, Tata McGraw Hill, 2007.
- 3. SilviuAngelescu, "CCNA Certification All-In-One for Dummies", Wiley Publishing. Inc.

# WEB SITES

- 1. https://www.geeksforgeeks.org/basics-computer-networking/
- 2. https://www.cisco.com/c/en\_in/solutions/small-business/resourcecenter/networking/networking-basics.html
- 3. http://ecomputernotes.com/computernetworkingnotes/communication-networks/describe-the-different-transmission-media
- 4. https://www.tutorialspoint.com/ipv4/ipv4\_addressing.htm
- 5. https://en.wikipedia.org/wiki/IPv6\_address
- 6. https://en.wikipedia.org/wiki/Cisco\_IOS

Semester – II

# **19CGU202 DISCRETE STRUCTURES**

#### 4H – 4C

Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

# **Course Objectives**

This course enables the students to

- To learn the basic concepts of sets, types of sets, functions and relations
- To understand about Pigeonhole principle, Permutation and Combination, Mathematical Induction
- To solve the problems using Recurrence relations and generating functions.
- To know the basic concepts of Logical Connectives, Graphs and Trees.
- To express ideas using mathematical notation
- To solve problems with the help of tools of mathematical analysis.

#### **Course Outcomes**

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

- 1. Familiar with elementary algebraic set theory.
- 2. Acquire a fundamental understanding of the core concepts in growth of functions.
- 3. Describe the method of recurrence relations.
- 4. Get wide knowledge about graphs and trees
- 5. Initiate to knowledge from inference theory
- 6. Solve problems with the help of tools of mathematical analysis.

#### UNIT I

**Sets:** Introduction, Sets, finite and infinite sets, uncountably infinite sets, functions, relations, properties of binary relations, closure, partial ordering relations.

#### UNIT II

Pigeonholeprinciple, Permutationand Combination, Mathematical Induction, Principle of inclusion and Exclusion.

#### UNIT III

Recurrences: Recurrence relations, generating functions, linear recurrence relations with constant coefficients and their solution.

# UNIT IV

Graph Theory: Basic terminology, models and types, multigraphs and weighted graphs, graph representation, graph isomorphism, connectivity, Euler and Hamiltonian Paths and circuits, Planar graphs, graph coloring, trees, basic terminology and properties of trees, introduction toSpanning trees

#### UNIT V

PrepositionalLogic: Logical Connectives, Well-formed Formulas, Tautologies, Equivalences, Inference Theory.

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

# SUGGESTED READINGS

1. Kenneth Rosen.(2011). Discrete Mathematics and Its Applications (7<sup>th</sup>ed.), McGraw HillCompany,New Delhi.

2. Tremblay ,J .P., and Manohar R., (2001).Discrete Mathematical Structures with Applications to Computer Science(1<sup>st</sup> ed.), McGraw-Hill Book Company,New Delhi.

3. Coremen, T.H., Leiserson C.E., &R. L. Rivest. (2009). Introduction to algorithms, (3<sup>rd</sup> ed.), Prentice Hall on India, New Delhi.

4. Albertson, M.O.,&Hutchinson,J.P., (1988). Discrete Mathematics with Algorithms, John Wiley Publication, New Delhi.

5. Hein,J.L., (2010). Discrete Structures, Logic, and Computability ( 3<sup>rd</sup> ed.), Jones and Bartlett Publishers,New Delhi.

6. Hunter, D.J. (2016). Essentials of Discrete Mathematics (3<sup>rd</sup> ed.). Jones and BartlettPublishers, New Delhi.
#### INFORMATION TECHNOLOGY INFORMATION LIBRARY

Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

19CGU203

- To be able to design a knowledge based system.
- To understand Service lifecycle model
- To know the Key Principles Models and Concepts of service management
- To understand the process management and risk management
- To know the Challenges in providing IT Infrastructure Services
- To understand the event management concepts.

#### **Course Outcomes (COs)**

- 1. Design a knowledge based system.
- 2. Understand service lifecycle model
- 3. Know the key principles models and concepts of service management
- 4. Understand the process management and risk management
- 5. Know the challenges in providing IT infrastructure services
- 6. Understand the event management concepts.

#### Unit I

Introduction ITIL - Service Life Cycle Model - What is ITIL - Components and Phases of a Service Life Cycle - Main concept of Service life cycle - Service management as a Practice - IT today and IT opportunity

#### Unit II

What is a Service - What is Service management - what comprises value - the 4 Ps of Service Design - Key It service management roles - Key Principles Models and Concepts

#### Unit III

Process - Functions - Specific Roles - RACI - Risk Management - Business Case - Life Cycle Phases - Service Strategy - Service Design - Service Transition - Service operation - CSI

#### Unit IV

Automation - Evolution of IT Infrastructure Services - Challenges in providing IT Infrastructure Services - The future state of IT Infrastructure Services - Automation and Analytics - the approach of the future

#### Unit V

SNOC - Event Management - Objectives of Event Management - Scope of event management - Value to the organization - Draw IT Infrastructure facilities for Hospital Management System, e - governance and Banking Sector

Semester – II 4H – 4C

## SUGGESTED READINGS

- 1. Service Support (CCTA): Part 15 (IT Infrastructure Library)
- 2. IT Infrastructure Risk & Vulnerability Library: A Consolidated Register of Operational & Technology Infrastructure Vulnerabilities for IT Assurance Professionals
- 3. IT Infrastructure Risk and Vulnerability Library: A Consolidated Register of Operational and Technology Infrastructure Vulnerabilities for IT Assurance Professionals (Japanese Edition)

## **19CGU211 COMPUTER NETWORKS- PRACTICAL**

Semester – II 4H – 2C

## Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

- To analyze and differentiate networking protocols used in TCP/IP protocol suite.
- To understand about subnets using IP classes
- To understand the key features and functions of TCP
- To understand how basic routing works including the use of routing protocols.
- To understand about DNS and its applications
- To understand the concepts of Remote Login and VPN

#### Course Outcomes(COs)

At the completion of the course, students will:

- 1. Have the ability to analyze and differentiate networking protocols used in TCP/IP protocol suite.
- 2. Understand IP Addressing Fundamentals
- 3. Understand IPv4 forwarding and routing.
- 4. Learn about host name resolution and the Domain Name System (DNS).
- 5. Learn about services and operations of DHCP Servers and Domain Name Servers
- 6. To compare and contrast IP routing protocols

#### **Requirements:**

#### **Cisco packet tracer software (Freeware)**

- 1. Switch basic VLAN
- 2. Routing Static
- 3. Switch basic commands
- 4. Switch basic STP
- 5. Dynamic Routing protocols OSPF, RIP, EIGRP

#### Semester – II

## **19CGU212DISCRETE STRUCTURES - PRACTICAL 3H – 2C**

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

#### **Course Objectives**

This course enables the students to

- To learn the basic concepts of sets, types of sets, functions and relations
- To understand about Pigeonhole principle, Permutation and Combination, Mathematical Induction
- To solve the problems using Recurrence relations and generating functions.
- To know the basic concepts of Logical Connectives, Graphs and Trees.
- To express ideas using mathematical notation
- To solve problems with the help of tools of mathematical analysis.

#### **Course Outcomes**

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

- 1. Familiar with elementary algebraic set theory.
- 2. Acquire a fundamental understanding of the core concepts in growth of functions.
- 3. Describe the method of recurrence relations.
- 4. Get wide knowledge about graphs and trees
- 5. Initiate to knowledge from inference theory
- 6. Solve problems with the help of tools of mathematical analysis.

#### List of programs

- 1. Write a C Program to find the number of subsets of a set contains n elements.
- 2. Write a C Program to find transitive closure of a relation.
- 3. Write a C Program to prove
- $1/(1*2) + 1/(2*3) \dots + 1/(n(n+1)) = n/(n+1)$
- 4. Write a C Program to perform the sum = 1 + (1+2) + (1+2+3) + ... + (1+2...+n)
- 5. Write a C program to print Fibonacci series till N<sup>th</sup> term using recursion
- 6. Write a Cprogram in c to calculate factorial of a number using recursion
- 7. Write a C Program to find a minimum spanning tree using Prim's algorithm
- 8. Write a C program to find the shortest path with the lower cost in a graph using Dijkstra's algorithm
- 9. Write a C Program to construct the truth table for the following formula.

(i)  $P \land Q \land R$  (ii)  $P \land Q \land R$  (iii)  $P \land Q \land R$ 

10. Write a C Program to prove De – Morgan's law.

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

#### 19CGU213

# WEB TECHNOLOGIES- PRACTICAL

#### Semester – II 3H – 2C

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

## **Course Objectives**

- To understand the principles of creating an effective web page.
- To learn the language of HTML, DHTML, XML and JavaScript .
- To understand the principles XML documents.
- To Create tables and frames
- To insert a graphic and links within a web page.
- To insert ordered and unordered lists within a web page.

## **Course Outcomes (COs)**

- 1. Analyze a web page and identify its elements and attributes.
- 2. Create a HTML page with formatting text tags, tables and lists.
- 3. Creating a HTML file with Frames.
- 4. Create web pages using XHTML and Cascading Styles sheets.
- 5. Build dynamic web pages using JavaScript (client side programming).
- 6. Create XML documents.

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

#### 19CGU301

## DATA STRUCTURES

## Semester – III 4H – 4C

## Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objectives**

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

#### Course Outcomes (COs)

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

- 1. Implement abstract data types for linear data structures.
- 2. Apply the different linear and non-linear data structures to problem solutions.
- 3. Analyze the applications of tree.
- 4. Implement graph theory over various data structures.
- 5. Critically analyze the various sorting algorithms.
- 6. Apply searching algorithms over various data structures.

## Unit I - ARRAYS

Single and Multi-dimensional Arrays, Sparse Matrices (Array and Linked Representation).Stacks Implementing single / multiple stack/s in an Array; Prefix, Infix and Postfix expressions, Utility and conversion of these expressions from one to another; Applications of stack; Limitations of Array representation of stack

#### Unit II- LINKED LISTS

Singly, Doubly and Circular Lists (Array and Linked representation); Normal and Circular, representation of Stack in Lists; Self Organizing Lists; Skip Lists Queues, Array and Linked representation of Queue, De-queue, Priority Queues

#### Unit III - TREES

Introduction to Tree as a data structure; Binary Trees (Insertion, Deletion, Recursive and Iterative Traversals on Binary Search Trees); Threaded Binary Trees (Insertion, Deletion, Traversals); Height-Balanced Trees (Various operations on AVL Trees).

#### **Unit IV - SEARCHING AND SORTING**

Linear Search, Binary Search, Comparison of Linear and Binary Search, Selection Sort, Insertion Sort, Insertion Sort, Shell Sort, Comparison of Sorting Techniques

#### **Unit V - HASHING**

Introduction to Hashing, Deleting from Hash Table, Efficiency of Rehash Methods, Hash Table Reordering, Resolving collusion by Open Addressing, Coalesced Hashing, Separate Chaining, Dynamic and Extendible Hashing, Choosing a Hash Function, Perfect Hashing, Function

## SUGGESTED READINGS

- 1. Adam Drozdek. (2012). Data Structures and algorithm in C++(3rded.). New Delhi: Cengage Learning.
- 2. SartajSahni.(2011). Data Structures, Algorithms and applications in C++(2nded.). New Delhi: Universities Press.
- 3. Aaron, M. Tenenbaum., Moshe, J. Augenstein., &YedidyahLangsam.(2009). Data Structures Using C and C++(2nd ed.). New Delhi: PHI.
- 4. Robert, L. Kruse.(1999). Data Structures and Program Design in C++. New Delhi: Pearson.
- 5. Malik, D.S.(2010). Data Structure using C++(2nd ed.). New Delhi: Cengage Learning,.
- 6. Mark Allen Weiss.(2011). Data Structures and Algorithms Analysis in Java (3rd ed.). New Delhi:Pearson Education.
- 7. Aaron, M. Tenenbaum., Moshe, J. Augenstein.,&YedidyahLangsam.(2003). Data Structures Using Java.New Delhi: PHI.
- 8. Robert Lafore.(2003). Data Structures and Algorithms in Java(2<sup>nd</sup> ed.). New Delhi: Pearson/ Macmillan Computer Pub.
- 9. John Hubbard.(2009). Data Structures with JAVA(2nd ed.). New Delhi: McGraw Hill Education (India) Private Limited.
- 10. Goodrich, M., &Tamassia, R.(2013). Data Structures and Algorithms Analysis in Java(4th ed.). New Delhi: Wiley.
- 11. Herbert Schildt.(2014).Java The Complete Reference (English)(9th ed.). New Delhi: Tata McGraw Hill.
- 12. Malik, D. S., &Nair, P.S. (2003).Data Structures Using Java. New Delhi: Course Technology.

- 1. http://en.wikipedia.org/wiki/Data\_structure
- 2. http://www.cs.sunysb.edu/~skiena/214/lectures/
- 3. www.amazon.com/Teach-Yourself-Structures-Algorithms

19CGU302

## PYTHON PROGRAMMING

Semester – III 4H – 4C

Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objectives**

- To Learn Syntax and Semantics of Python
- To create Functions in Python.
- To Understand the basic logic statements in Python
- To Handle Strings in Python.
- To Understand Lists, Dictionaries in Python.
- To Build GUI applications

#### **Course Outcomes (COs)**

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

- 1. Develop algorithmic solutions to simple computational problems
- 2. Structure simple Python programs for solving problems.
- 3. Learn to use logical constructs in Python
- 4. Decompose a Python program into functions.
- 5. Represent compound data using Python lists, tuples, dictionaries.
- 6. Read and write data from/to files in Python Programs.

#### **Unit I - ALGORITHMIC PROBLEM SOLVING**

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

#### **Unit II - DATA, EXPRESSIONS, STATEMENTS**

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

## Unit III -CONTROL FLOW, FUNCTIONS: CONDITIONALS

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

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

## Unit IV -LISTS, TUPLES, DICTIONARIES

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

## Unit V - FILES, MODULES, PACKAGES

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

## SUGGESTED READINGS

- 1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2<sup>nd</sup> edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016.
- 2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python Revised andupdated for Python 3.2, Network Theory Ltd., 2011.
- 3. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.
- 4. John V Guttag, "Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press, 2013

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

## 19CGU303VIRTUALIZATION AND CLOUD

## Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objectives**

The objective of this course is

- To understand basic concepts of distributed computing,
- To Provide a good understanding of the concepts, standards in Cloud computing
- To make the student understand about the cloud service providers and their usage.
- To learn how to secure the data in cloud depending.
- To understand the various service level agreements.
- Understand the basic principles of Cloud Computing, Virtualization and Data centers

## Course Outcomes(COs)

After successfully completing the course the students should be able to

- 1. Understand what is Cloud Computing.
- 2. Know the architecture of the cloud and the usage of clouds.
- 3. Secure their data from the security issues.
- 4. Understand What is Virtualization.
- 5. Understand Cloud Types and Cloud Service Deployment Models (IaaS\*, PaaS\*, SaaS\*).
- 6. Learn How to Create Virtual Machines (VM) using vSphere.

#### **Unit I - DISTRIBUTED SYSTEMS**

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

#### **Unit II - CLOUD CONCEPTS**

Introduction Cloud Computing - Advantages of Cloud - Public Cloud - five essential characteristics - three service models - Four deployment models - Benefits of Cloud Computing - Cloud Vendors - Traditional Infrastructure setup and Challenges – AWS.

#### Unit III - VIRTUALIZATION

Introduction to vSphere and the Software - Defined Data Center Creating Virtual Machines - VCenter Server - Configuring and Managing - Virtual Networks Configuring and Managing Virtual Storage - Virtual Machine Management - Resource Management and Monitoring.

## **Unit IV - VIRTUAL MACHINES**

vSphere HA - vSphere Fault Tolerance - Protecting Data vSphere DRS - Network Scalability - vSphere Update Manager and Host Maintenance - Storage Scalability - Securing Virtual Machines.

#### Semester – III 4H – 4C

## **Unit V - DATACENTER**

Data center overview -Components - Provisions - Need of Data Center - Data Center Architecture - Different Racks - Data center architecture for cloud computing - role of data center in cloud computing.

## SUGGESTED READINGS

- 1. Jean Dollimore formerly of Queen Mary, Tim Kindberg, "Distributed Systems Concepts and Design", 5<sup>th</sup> Edition Cambridge University, University of London
- 2. VenkataJosyula , Malcolm Orr , Greg Page, "Cloud Computing: Automating the Virtualized Data Center", 1st Edition.
- **3.** Brian J.S. Chee, Curtis Franklin Jr., "Cloud Computing: Technologies and Strategies of the Ubiquitous Data Center", 1st Edition.

- 1. https://www.ibm.com/support/knowledgecenter/en/SSAL2T\_8.2.0/com.ibm.cics.tx.doc/c oncepts/c\_wht\_is\_distd\_comptg.html
- 2. https://www.w3schools.in/cloud-computing/cloud-virtualization/
- 3. http://www.vmwarearena.com/what-is-vmware-vsphere-beginners-guide-to-vmware-virtualization/
- 4. https://aws.amazon.com/getting-started/tutorials/

#### 19CGU304A

## INFRASTRUCTURE MANAGEMENT

## Semester – III 3H – 3C

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

## **Course Objectives**

The objective of this course is to

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

## **Course Outcomes (COs)**

After successfully completing the course the students should be able to

- 1. Install a new System Center 2012 Operations Manager Management Group
- 2. Design and provision custom views to relevant support teams.
- 3. Understand how to deploy agents
- 4. Work with management packs
- 5. Create dashboards and custom visualizations
- 6. Tune, optimize, maintain and troubleshoot System Center Operations Manager

## **Unit I - INTRODUCING WINDOWS 10**

Overview of Deploying Windows 10- Configure Devices and Drivers- Perform Post installation Configuration Task- Managing Apps in Window.

#### Unit II- MS SCCM Basics

Overview of System Center 2012 R2 Configuration Manager-Planning and Deploying a Stand-Alone Primary Site- Planning and Configuring Role-Based Administration- Planning and Deploying a Multiple-Site Hierarchy- Replicating Data and Managing Content in Configuration Manager 2012-Planning Resource Discovery and Client Deployment- Configuring Internet and Cloud-Based Client Management- Maintaining and Monitoring System Center 2012 Configuration Manager.

#### **Unit III - OVERVIEW OF SYSTEM CENTER 2012 R2 OPERATIONS MANAGER**

Operations Manager Introduction and Basic Concepts- Reason to use Operations Manager-What's New in 2012 R2 Operations Manager- System Requirements- Operations Manager Components. Planning & Installation: Deployment Scenarios-Order of Installation- Installation Process- SQL Server Configuration- Operations Console- Web Console.

## **Unit IV - ADMINISTRATION**

Agent Deployment- Security of manual agent- Agent and Agent less managed systems-Role Based Security- Reporting server- Object Discovery. Management Packs: Management Pack Overview- Pre-Installed Management Packs- Importing Management Packs- Overrides.

## **Unit V - MONITORING OVERVIEW**

Overriding of MPs- Creating Rules and Monitors- Agentless Monitoring- Demo on Role Based Security- Creating Groups- Configuring Notifications. Operations Manager Reporting: Installing SQL Reporting Services- Installing Operations Manager Reporting- Creating, Viewing and Customizing Reports- Dashboard- Considerations for High Availability and Disaster Recovery.

## SUGGESTED READINGS

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

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

19CGU304B

# XML PROGRAMMING

## Semester – III 3H – 3C

## Instruction Hours / week:L: 3 T: 0 P: 0

#### Marks: Internal: 40 External: 60Total:100 End Semester Exam: 3 Hours

## **Course Objective**

- To learn rules and techniques to create well-formed XML documents, learning to use XML namespaces correctly.
- To Construct Document Type Definitions and XML Schema documents that can be used to validate XML documents (structure, content).
- To develop dynamic web pages using XSL, applying XSLT transformations and formatting to XML documents (XSL, XPath).
- To create valid HTML webpages and Cascading Style Sheets, based on the specifications of W3C.
- To learn to display XML documents using CSS.
- To construct of complex queries over XML documents using XPath and XQuery.

## Course Outcomes(COs)

- 1. Learning rules and techniques to create well-formed XML documents, learning to use XML namespaces correctly.
- 2. Constructing Document Type Definitions and XML Schema documents that can be used to validate XML documents (structure, content).
- 3. Developing dynamic web pages using XSL, applying XSLT transformations and formatting to XML documents (XSL, XPath).
- 4. Creating valid HTML webpages and Cascading Style Sheets, based on the specifications of W3C.
- 5. Learning to display XML documents using CSS.
- 6. Construction of complex queries over XML documents using XPath and XQuery.

## **Unit I – INTRODUCTION**

Understanding Mark-up Languages, Introduction to XML and its Goals.

## **Unit II - XML BASICS**

XML Structure and Syntax, Document classes and Rules.

## **Unit III - OTHER XML CONCEPTS**

Scripting XML

## Unit IV - Other XML Concepts

XML as Data, Linking with XML

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

## **Unit V -XML WITH STYLE**

XSL – Style Sheet Basics, XSL basics, XSL style sheets.

#### **SUGGESTED READINGS**

- 1. William, J. Pardi. (2012). XML in action web technology. Microsoft Press.
- 2. Michael, J. Young. (2014). Step by Step XML. Microsoft Press.

- 1. https://epdf.tips/xml-step-by-step.html
- 2. https://trove.nla.gov.au/work/34083699
- 3. https://store.testing.jaga-me.com/xml\_step\_by\_step\_dv\_dlt\_fundamentals.pdf

# **19CGU311 DATA STRUCTURES - PRACTICAL**

Semester – III 4H – 2C

## Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

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

#### **Course Outcomes (COs)**

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

- 1. Implement abstract data types for linear data structures.
- 2. Apply the different linear and non-linear data structures to problem solutions.
- 3. Analyze the applications of tree.
- 4. Implement graph theory over various data structures.
- 5. Critically analyze the various sorting algorithms.
- 6. Apply searching algorithms over various data structures.

#### List of programs

1. Write a program to search an element from a list. Give user the option to perform Linear or Binary search. Use Template functions.

2. WAP using templates to sort a list of elements. Give user the option to perform sorting using Insertion sort, Bubble sort or Selection sort.

3. Implement Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list and concatenate two linked lists (include a function and also overload operator +).

4. Implement Doubly Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.

5. Implement Circular Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.

- 6. Perform Stack operations using Linked List implementation.
- 7. Perform Stack operations using Array implementation. Use Templates.
- 8. Perform Queues operations using Circular Array implementation. Use Templates.

9. Create and perform different operations on Double-ended Queues using Linked List implementation.

10. WAP to scan a polynomial using linked list and add two polynomial.

11. WAP to calculate factorial and to compute the factors of a given no. (i)using recursion, (ii) using iteration

12. (ii) WAP to display Fibonacci series (i)using recursion, (ii) using iteration

13. WAP to calculate GCD of 2 number (i) with recursion (ii) without recursion

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

14. WAP to create a Binary Search Tree and include following operations in tree: (a) Insertion (Recursive and Iterative Implementation)

- (b) Deletion by copying
- (c) Deletion by Merging
- (d) Search a no. in BST
- (e) Display its preorder, postorder and inorder traversals Recursively
- (f) Display its preorder, postorder and inorder traversals Iteratively
- (g) Display its level-by-level traversals
- (h) Count the non-leaf nodes and leaf nodes
- (i) Display height of tree
- (j) Create a mirror image of tree
- (k) Check whether two BSTs are equal or not
- 15. WAP to convert the Sparse Matrix into non-zero form and vice-versa.
- 16. WAP to reverse the order of the elements in the stack using additional stack.
- 17. WAP to reverse the order of the elements in the stack using additional Queue.
- 18. WAP to implement Diagonal Matrix using one-dimensional array.
- 19. WAP to implement Lower Triangular Matrix using one-dimensional array.
- 20. WAP to implement Upper Triangular Matrix using one-dimensional array.
- 21. WAP to implement Symmetric Matrix using one-dimensional array.
- 22. WAP to create a Threaded Binary Tree as per inorder traversal, and implement operations
- like finding the successor / predecessor of an element, insert an element, inorder traversal.
- 23. WAP to implement various operations on AVL Tree.

# 19CGU312PYTHON PROGRAMMING- PRACTICAL

#### Semester – III 4H – 2C

Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objectives**

- To Learn Syntax and Semantics of Python
- To create Functions in Python.
- To Understand the basic logic statements in Python
- To Handle Strings in Python.
- To Understand Lists, Dictionaries in Python.
- To Build GUI applications

## **Course Outcomes (COs)**

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

- 1. Develop algorithmic solutions to simple computational problems
- 2. Structure simple Python programs for solving problems.
- 3. Learn to use logical constructs in Python
- 4. Decompose a Python program into functions.
- 5. Represent compound data using Python lists, tuples, dictionaries.
- 6. Read and write data from/to files in Python Programs.

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

#### Semester – III 19CGU313 VIRTUALIZATION AND CLOUD - PRACTICAL 4H – 2C

## Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objectives**

The objective of this course is

- To understand basic concepts of distributed computing,
- To Provide a good understanding of the concepts, standards in Cloud computing
- To make the student understand about the cloud service providers and their usage.
- To learn how to secure the data in cloud depending.
- To understand the various service level agreements.
- Understand the basic principles of Cloud Computing, Virtualization and Data centers

#### **Course Outcomes(COs)**

After successfully completing the course the students should be able to

- 1. Understand what is Cloud Computing.
- 2. Know the architecture of the cloud and the usage of clouds.
- 3. Secure their data from the security issues.
- 4. Understand What is Virtualization.
- 5. Understand Cloud Types and Cloud Service Deployment Models (IaaS\*, PaaS\*, SaaS\*).
- 6. Learn How to Create Virtual Machines (VM) using vSphere.

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

## Semester – III 19CGU314A INFRASTRUCTURE MANAGEMENT – PRACTICAL 3H – 1C

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

#### **Course Objectives**

The objective of this course is to

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

## **Course Outcomes (COs)**

After successfully completing the course the students should be able to

- 1. Install a new System Center 2012 Operations Manager Management Group
- 2. Design and provision custom views to relevant support teams.
- 3. Understand how to deploy agents
- 4. Work with management packs
- 5. Create dashboards and custom visualizations
- 6. Tune, optimize, maintain and troubleshoot System Center Operations Manager

- 1. Working with SCCM
- 2. Working with SCOM

# 19CGU314B XML PROGRAMMING - PRACTICAL

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

## **Course Objective**

- To learn rules and techniques to create well-formed XML documents, learning to use XML namespaces correctly.
- To Construct Document Type Definitions and XML Schema documents that can be used to validate XML documents (structure, content).
- To develop dynamic web pages using XSL, applying XSLT transformations and formatting to XML documents (XSL, XPath).
- To create valid HTML webpages and Cascading Style Sheets, based on the specifications of W3C.
- To learn to display XML documents using CSS.
- To construct of complex queries over XML documents using XPath and XQuery.

## Course Outcomes(COs)

- 1. Learning rules and techniques to create well-formed XML documents, learning to use XML namespaces correctly.
- 2. Constructing Document Type Definitions and XML Schema documents that can be used to validate XML documents (structure, content).
- 3. Developing dynamic web pages using XSL, applying XSLT transformations and formatting to XML documents (XSL, XPath).
- 4. Creating valid HTML webpages and Cascading Style Sheets, based on the specifications of W3C.
- 5. Learning to display XML documents using CSS.
- 6. Construction of complex queries over XML documents using XPath and XQuery.

#### List of Programs

#### Exercise #1 – Information Structure

In this exercise, student will practice identifying the structure of an information object. For the sample document provided below: Label the information structures you see, including containing structures. 1. Draw a tree representation of the structure.



Exercise 2# Deconstructing an XML Document

Semester – III 3H – 1C In this exercise, student will practice identifying the explicit structure within an XML document. In a sense, this is the reverse of what you did in Exercise #1. For the sample XML markup below, create a document-like representation (or a simple drawing) for the content contained within the XML tags:

<book> <coverInfo> <title>The XML Handbook</title> <author>Charles F. Goldfarb</author> <author>Paul Prescod</author> <edition>Second</edition> <description>The definitive XML resource: applications, products, and technologies. Revised and expanded—over 600 new pages.</description> </coverInfo></book>

**Exercise #3** – Creating XML Markup

In this exercise, create some XML markup based on the tree representation from Exercise #1 above, and the content from the original sample document.

**Exercise #4** – Well-Formedness

This exercise checks your understanding of the constraints for well-formedness. Are the following document instances well-formed? Explain any NO answers. </ti></t

<item>An item</item><item>Another item</item>

<para>Bathing a cat is a <emph>relatively</emph> easy task as long as the cat is
willing.</para>

<br/>
<bibl><title>How to Bathe a Cat<author></title>Merlin Bauer<author></bibl>

#### **Exercise #5-**Well Formedness

This exercise is a bit more challenging than the previous example. Here is a fragment of an XML document instance. Identify all the places where it fails to match the constraints for well-formedness.

<PROCEDURE><TITLE>How to Bathe a Cat</TITLE>

<OVERVIEW> This procedure tells you how to bathe a cat. <WARNING></OVERVIEW>Cats don't like to take baths. You could get hurt doing this. Be sure to obtain all the required protective gear before you start. </WARNING><EQUIPEMENT><ITEM>Hockey Mask <ITEM>Padded Full-body Kevlar Armor</ITEM><ITEM>Tub full of warm water</ITEM><ITEM>Towels </ITEM><ITEM>TitEM>Cat Shampoo</ITEM><EQUIPMENT><INSTRUCTIONS><STEP> Locate the cat, who by now is hiding under the bed.</STEP><STEP>Place the cat in the tub of water.</STEP><ITEM>Using the First Aid kit, repair the damage to your head and arms.

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

19CGU401

## **PROGRAMMING IN JAVA**

## Semester – IV 4H – 4C

## Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objectives**

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

## **Course Outcomes (COs)**

- 1. Student will obtain knowledge of the structure and model of the Java programming language.
- 2. How to use the Java programming language for various programming technologies (understanding)
- 3. Develop software in the Java programming language (application)
- 4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)
- 5. Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis)
- 6. Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems. (evaluation)

## **Unit I - INTRODUCTION TO JAVA**

Java Architecture and Features, Understanding the semantic and syntax differences between C++ and Java, Compiling and Executing a Java Program, Variables, Constants, Keywords Data Types, Operators (Arithmetic, Logical and Bitwise) and Expressions, Comments, Doing Basic Program Output, Decision Making Constructs (conditional statements and loops) and Nesting, Java Methods (Defining, Scope, Passing and Returning Arguments, Type Conversion and Type and Checking, Built-in Java Class Methods)

## Unit II - ARRAYS, STRINGS AND I/O

Creating & Using Arrays (One Dimension and Multi-dimensional), Referencing Arrays Dynamically, Java Strings: The Java String class, Creating & Using String Objects,

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

# Unit III - INHERITANCE

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

## Unit IV - EXCEPTION HANDLING AND DATABASE CONNECTIVITY

Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions; Multi-threading: The Thread class and Runnable interface, creating single and multiple threads, Thread prioritization, synchronization and communication, suspending/resuming threads. Using java.net package, Overview of TCP/IP and Datagram programming. Accessing and manipulating databases using JDBC.

## **Unit V - JAVA APPLETS**

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

#### SUGGESTED READINGS

- 1. 1. Ken Arnold., James Gosling., & David Homes. (2005). The Java Programming Language (4th ed.).
- 2. James Gosling., Bill Joy., Guy, L. Steele Jr., GiladBracha.,& Alex Buckley. (2014). The Java Language Specification, Java SE (8 ed.). Addison Wesley.
- 3. Joshua Bloch. (2008). Effective Java (2nd ed.). Addison-Wesley.
- 4. Cay, S. Horstmann, GaryCornell. (2012). Core Java 2 Volume 1 (9th ed.). . Prentice Hall, New Delhi.
- 5. Cay, S. Horstmann., Gary Cornell.(2013). Core Java 2 Volume 2 Advanced Features(9th ed.).PrinticeHall,New Delhi.
- 6. Bruce Eckel.(2002). Thinking in Java (3rd ed.). PHI,New Delhi
- 7. Balaguruswamy, E. (2009). Programming with Java (4th ed.). McGraw Hill, New Delhi.
- 8. Paul Deitel., & Harvey Deitel. (2011). Java: How to Program (10th ed.). Prentice Hall, New Delhi.
- 9. David, J. Eck. (2009). Introduction to Programming Using Java. CreateSpaceIndependent Publishing Platform, New Delhi.

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

10. John ,R. Hubbard. (2004). Programming with JAVA, Schaum's Series, (2nd ed.).

- 1. https://www.oracle.com/in/java
- 2. https://www.java.com/
- 3. https://www.javatpoint.com/java-tutorial
- 4. https://www.w3schools.com/java/

19CGU402

# DATABASE MANAGEMENT SYSTEM

## Semester – IV 4H – 4C

Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objectives**

- To understand the role and nature of relational database management systems (RDBMS) in today's IT environment.
- To understand need for normalization.
- To convert conceptual data models into relational database schemas using the SQL Data Definition Language (DDL).
- Query and manipulate databases using the SQL Data Manipulation Language (DML).
- To acquire Programming and Software Engineering skills and techniques using SQL and PL/SQL.
- To create PL/SQL applications.

## **Course Outcomes(COs)**

- 1. Enhance the knowledge and understanding of Database analysis and design.
- 2. Enhance the knowledge of the processes of Database Development and Administration using SQL and PL/SQL.
- 3. Enhance Programming and Software Engineering skills and techniques using SQL and PL/SQL.
- 4. Use the PL/SQL code constructs of IF-THEN-ELSE and LOOP types as well as syntax and command functions.
- 5. Solve Database problems using Oracle SQL and PL/SQL.
- 6. Effectiveuse of Procedures, Functions, Packages, and Triggers.

# Unit I- DATABASE CONCEPTS-A RELATIONAL APPROACH

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

## UnitII -STRUCTURED QUERY LANGUAGE (SQL)

Introduction – DDL - Naming rulesandconventions - Data types-Constraints-Creatingatable- Displaying table information - Altering an existing table – Dropping, renaming, and truncating table - Table types

## **Unit III -WORKING WITH TABLES**

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

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

## Unit IV- PL/SQL

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

#### **Unit V-PL/SQL CURSORS AND EXCEPTIONS**

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

#### **SUGGESTED READINGS:**

1. Nilesh Shah, "Database Systems Using ORACLE", PHI, 2<sup>nd</sup> Edition, 2011

- 1. https://www.datanamic.com/support/lt-dez005-introduction-db-modeling.html
- 2. https://docs.oracle.com/cd/B12037\_01/server.101/b10759/statements\_1001.htm
- 3. https://www.geeksforgeeks.org/sql-ddl-dml-dcl-tcl-commands/
- 4. https://www.javatpoint.com/oracle-create-table
- 5. https://www.tutorialspoint.com/plsql/

# 19CGU403 COGNITION AND PROBLEM SOLVING

Semester – IV 4H – 4C

#### Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

- To understand critical thought and its interaction with knowledge
- To understand problem solving and how it uses critical thought to develop solutions to problems
- To explore project based learning as a specific method of problem solving
- To examine design thinking as a sub-set of project based learning and its scaffold process for learning
- To define argumentation and how it employs a critical though process
- To examine specific methodologies and instruments of application for argumentation

## **Course Outcomes(COs)**

- 1. The student has basic knowledge of cognitive psychology.
- 2. The student has knowledge of how human cognition works from attention, sensation, perception, action, language processes, problem solving and thinking to learning and memory.
- 3. Understand Critical Thought and its interaction with knowledge
- 4. Understand Problem Solving and how it uses Critical Thought to develop solutions to problems
- 5. The student has developed a scientific attitude comprising the ability of reflection and logic reasoning.
- 6. The student has developed an ability of critical thinking including respect for scientific data and ethical values.

## **Unit I-INTRODUCTION TO COGNITION**

Meaning cognitive processes, Development of cognitive psychology: Structuralism, Functionalism, Behaviourism, Memory Research, Gestalt Psychology, Emergence of cognitive psychology, Information Processing, Connectionism, Alternate approaches to cognitive psychology, Research Methods in Cognitive Psychology.

#### **Unit II-PERCEPTUAL PROCESSES**

Object Recognition- theories of object recognition, Bottom-Up and Top-Down Processing, Face Perception, Change Blindness. Attention: Divided attention, Selective Attentkon, Visual attention and Auditory attention. Consciousness: Varieties, Subliminal Perception. Visual Perception "Perceptual Organizational Processes, Multisensory interaction and Integration – Synesthesia, Comparing the senses, Perception and Action.

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

## **Unit III-MEMORY**

Working Memory: Research on Working Memory, Factors affecting the capacity of working Memory, Baddeley's Working Memory Approach. Long Term Memory: Encoding and Retrieval in Long Term Memory, Autobiographical Memory. MemoryStrategies: Practice, Mnemonics using Imagery, Mnemonics using organization, The Multimodal Approach, Improving Prospective Memory. Metacognition :Metamemory, TOT, Metacomprehension.

## Unit IV-PROBLEM SOLVING, REASONING AND DECISION MAKING

VUCA World Problem Solving – Types of problem, Understanding the problem, Problem-Solving Approaches, Factors that influence Problem Solving.crativity.Reasoning – Inductive and Deductive Reasoning Decision Making – Heuristics in decision making – representativeness, availability and Anchoring and adjustment.The framing effect, Overconfidence in decisions, The Hindsight Bias.

## Unit V-FUTURE SKILLS

Critical thinking, Adaptive thinking, Cognitive Load Management, Design thinking, Virtual Collaboration and Cultural Sensitivity

## SUGGESTED READINGS

- 1. Matlin M.W. (2003) 'Cognition' 5<sup>th</sup> Edition, Wiley Publication.
- Riegler, B.R., Reigler, G.L. (2008), Cognitive Psychology Applying the Science of Mind. 2<sup>nd</sup> Edition, Pearson Education.
- 3. Benjafield J G (2007). 'Cognition' 3<sup>rd</sup> Edition. Oxford University Press.
- 4. Goldstein B.E. (2008) 'Cognitive Psychology' 2<sup>nd</sup> Edition, Wadsworth.

- 1. https://nptel.ac.in/courses/109103134/23
- 2. https://lockwoodresource.com/problem-solving-in-a-vuca-world-what-kind-of-problem-are-you-solving-by-lisa-solomon/
- 3. https://www.instructionaldesign.org/theories/cognitive-load/

19CGU404A **PROCESS MANAGEMENT** 

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

## **Course Objectives**

- To provide students with a theoretical as well as practical understanding of software development practices and process models
- To understand Agile development and testing in Scrum.
- To acquire knowledge about Devops principles
- To learn to use Lean UX.
- To learn the basics of Sprint
- To understand Design Thinking principles

## **Course Outcomes (COs)**

After successfully completing the course the students should be able to

- Have practical understanding of software development practices and process models
- Understand Agile development and testing in Scrum.
- Understand about Devops principles
- Learn to use Lean UX, Sprint
- Differentiate Devops and Agile principles
- Usage of Scrum and design thinking principles for software development

## **Unit I - SOFTWARE AND SOFTWARE ENGINEERING**

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

#### **Unit II - AGILE**

Agile Methodology-Manifesto-Principles of Agile-Agile Methodologies-Challenges with Agile. Scrum: Overview of Scrum-Scrum Roles-Scrum Ceremonies-Scrum Artifacts-Extreme programming vs Scrum.

#### **Unit III - DEVOPS**

Introduction to Devops-Principles-Automation-Performance Measurement through KPIS and Metrics-Agile and Devops-Agile Infrastructure-Velocity-Lean Startup UPS.

## **Unit IV - LEAN UX AND AGILE ANTI-PATTERNS**

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

#### Semester – IV 3H - 3C

Sprint -Staggered sprints -Sprint zero and design sprints- Dual-track Agile- Listening to Scrum's rhythms- Listening to Scrum's rhythms- Participation- Design is a team sport- Coordinating multiple Lean UX teams- Managing up and out – Agile anti-patterns.

Unit V - Design Thinking

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

#### SUGGESTED READINGS

- 1. Roger S Pressman, "Software Engineering A Practioners Approach", 7<sup>th</sup> Edition 2010
- 2. KalloriVikraman, "Introduction to Devops", 1<sup>st</sup> Edition, 2016.
- 3. Stephen Haunts, "Essential of Scrum" Addison-Wesley Professional; 1<sup>st</sup> Edition, 2012
- 4. Jeff Gothelf, Josh Seiden, "Lean UX", 2nd Edition, 2016.
- 5. Jonny Schneider, "Understanding Design Thinking, Lean, and Agile" O'Reilly Media 2017.
- 6. Jeff Gothelf, "Lean vs. Agile vs. Design Thinking", Sense and Respond Press, 2017.

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

PROGRAMMING IN MATLAB

Semester – IV 3H – 3C

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

## **Course Objectives**

**19CGU404B** 

- To understand the need for simulation/implementation for the verification of mathematical functions.
- To understand the main features of the MATLAB program development environment to enable their usage in the higher learning.
- To implement simple mathematical functions/equations in numerical computing environment such as MATLAB.
- To interpret and visualize simple mathematical functions and operations thereon using plots/display.
- To analyze the program for correctness and determine/estimate/predict the output and verify it under simulation environment using MATLAB tools.
- To apply MATLAB tools for implementation/simulation and visualization of basic mathematical functions

#### **Course Outcomes (Cos)**

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

- 1. Understand the need for simulation/implementation for the verification of mathematical functions.
- 2. Understand the main features of the MATLAB program development environment to enable their usage in the higher learning.
- 3. Implement simple mathematical functions/equations in numerical computing environment such as MATLAB.
- 4. Interpret and visualize simple mathematical functions and operations thereon using plots/display.
- 5. Analyze the program for correctness and determine/estimate/predict the output and verify it under simulation environment using MATLAB tools.
- 6. Apply MATLAB tools for implementation/simulation and visualization of basic mathematical functions

## **UnitI- INTRODUCTION TO PROGRAMMING**

Components of a computer, working with numbers, Machine code, Software hierarchy.

## **UnitII- PROGRAMMING ENVIRONMENT**

MATLAB Windows, A First Program, Expressions, Constants, Variables and assignment statement, Arrays.

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

#### **UnitIII- GRAPH PLOTS**

Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save. Procedures and Functions: Arguments and return values, M-files, Formatted console inputoutput, String handling,

## **UnitIV- CONTROL STATEMENTS**

Conditional statements: If, Else, Else-if, Repetition statements: While, for loop

#### **UnitV- MANIPULATING TEXT**

Writing to a text file, Reading from a text file, Randomisingandsorting a list, searching a list.**GUI Interface**: Attaching buttons to actions, Getting Input, Setting Output

#### SUGGESTED READINGS

1. Amos Gilat. MATLAB: An Introduction with Applications(2nd ed). New Delhi: Wiley. 2. Moler, C.B. (2004). Numerical Computing with MATLAB.NewDelhi:SIAM.

- 1. https://www.mathworks.in/help/matlab/
- 2. https://www.tutorialspoint.com/matlab/
- 3. http://www.matrixlab-examples.com/matlab-tutorial.html

# **19CGU411 PROGRAMMING IN JAVA - PRACTICAL**

#### Semester – IV 4H – 2C

# Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objectives**

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

## **Course Outcomes (COs)**

- 1. Student will obtain knowledge of the structure and model of the Java programming language.
- 2. How to use the Java programming language for various programming technologies (understanding)
- 3. Develop software in the Java programming language (application)
- 4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)
- 5. Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis)
- 6. Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems. (evaluation)

- 1. To find the sum of any number of integers entered as command line arguments
- 2. To find the factorial of a given number
- 3. To learn use of single dimensional array by defining the array dynamically.
- 4. To learn use of length in case of a two dimensional array
- 5. To convert a decimal to binary number
- 6. To check if a number is prime or not, by taking the number as input from the keyboard
- 7. To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument
- 8. Write a program that show working of different functions of String and StringBufferclasss like setCharAt(, setLength(), append(), insert(), concat()and equals().
- 9. Write a program to create a —distance class with methods where distance is computed in terms of feet and inches, how to create objects of a class and to see the use of this pointer

- 10. Modify the —distancel class by creating constructor for assigning values (feet and inches) to the distance object. Create another object and assign second object as reference variable to another object reference variable. Further create a third object which is a clone of the first object.
- 11. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions(from lower to higher data type)
- 12. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword
- 13. Write a program to show the use of static functions and to pass variable length arguments in a function.
- 14. Write a program to demonstrate the concept of boxing and unboxing.
- 15. Create a multi-file program where in one file a string message is taken as input from the user and the function to display the message on the screen is given in another file (make use of Scanner package in this program).
- 16. Write a program to create a multilevel package and also creates a reusable class to generate Fibonacci series, where the function to generate Fibonacci series is given in a different file belonging to the same package.
- 17. Write a program that creates illustrates different levels of protection in classes/subclasses belonging to same package or different packages
- 18. Write a program —DivideByZerol that takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a message when the denominator is zero.
- 19. Write a program to show the use of nested try statements that emphasizes the sequence of checking for catch handler statements.
- 20. Write a program to create your own exception types to handle situation specific to your application (Hint: Define a subclass of Exception which itself is a subclass of Throwable).
- 21. Write a program to demonstrate priorities among multiple threads.
- 22. Write a program to demonstrate multithread communication by implementing synchronization among threads (Hint: you can implement a simple producer and consumer problem).
- 23. Write a program to create URL object, create a URLConnection using the openConnection() method and then use it examine the different components of the URLand content.
- 24. Write a program to implement a simple datagram client and server in which a message that is typed into the server window is sent to the client side where it is displayed.
- 25. Write a program that creates a Banner and then creates a thread to scrolls the message in the banner from left to right across the applet's window.
- 26. Write a program to get the URL/location of code (i.e. java code) and document (i.e. html file).
- 27. Write a program to demonstrate different mouse handling events like mouseClicked(), mouseEntered(), mouseExited(), mousePressed, mouseReleased() and mouseDragged().
- 28. Write a program to demonstrate different keyboard handling events.
- 29. Write a program to generate a window without an applet window using main() function.
- 30. Write a program to demonstrate the use of push buttons.

# Semester – IV

## **19CGU412 DATABASE MANAGEMENT SYSTEM - PRACTICAL 4H – 2C**

Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objectives**

- To understand the role and nature of relational database management systems (RDBMS) in today's IT environment.
- To understand need for normalization.
- To convert conceptual data models into relational database schemas using the SQL Data Definition Language (DDL).
- Query and manipulate databases using the SQL Data Manipulation Language (DML).
- To acquire Programming and Software Engineering skills and techniques using SQL and PL/SQL.
- To create PL/SQL applications.

#### **Course Outcomes(COs)**

- 1. Enhance the knowledge and understanding of Database analysis and design.
- 2. Enhance the knowledge of the processes of Database Development and Administration using SQL and PL/SQL.
- 3. Enhance Programming and Software Engineering skills and techniques using SQL and PL/SQL.
- 4. Use the PL/SQL code constructs of IF-THEN-ELSE and LOOP types as well as syntax and command functions.
- 5. Solve Database problems using Oracle SQL and PL/SQL.
- 6. Effectiveuse of Procedures, Functions, Packages, and Triggers.

- 1. Using Differentoperators
- 2. using ControlStructures
- 3. implement Built-infunctions
- 4. implement update and Altertable
- 5. implementing PL/SQLBlock
- 6. implement PL/SQL table and record
- 7. using Functions
- 8. using Cursors
- 9. using Triggers
#### Semester – IV

# 19CGU413DESIGN AND ANALYSIS OF ALGORITHMS - PRACTICAL 4H – 2C

#### Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

# **Course Objectives**

- To learn mathematical background for analysis of algorithm
- To learn various advanced data structures.
- To understand the concept of designing an algorithm.
- To learn dynamic programming and greedy method.
- To understand the concept of pattern matching
- To learn advanced tree and graph applications

# Course Outcomes(COs)

- 1. Learn to choose appropriate advanced data structure for given problem
- 2. Knowledge to calculate complexity.
- 3. Select appropriate design techniques to solve real world problems.
- 4. Apply the dynamic programming technique to solve the problems.
- 5. Apply the greedy programming technique to solve the problems.
- 6. Select a proper pattern matching algorithm for given problem

#### **List of Programs**

- 1. Implement Insertion Sort (The program should report the number of comparisons)
- 2. Implement Merge Sort (The program should report the number of comparisons)
- 3. Implement Heap Sort (The program should report the number of comparisons)
- 4. Implement Randomized Quick sort (The program should report the number of comparisons)
- 5. Implement Radix Sort
- 6. Create a Red-Black Tree and perform following operations on it:
  - i. Insert a node
  - ii. Delete a node
  - iii. Search for a number & also report the color of the node containing this number.
- 7. Write a program to determine the LCS of two given sequences
- 8. Implement Breadth-First Search in a graph
- 9. Implement Depth-First Search in a graph
- 10. Write a program to determine the minimum spanning tree of a graph

For the algorithms at S.No 1 to 3 test run the algorithm on 100 different inputs of sizes varying from 30 to 1000. Count the number of comparisons and draw the graph. Compare it with a graph of nlogn.

#### Semester – IV 3H – 1C

## 19CGU414ADEVOPS TOOLS- PRACTICAL

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

#### **Course Objectives**

- To provide students with a theoretical as well as practical understanding of software development practices and process models
- To learn to use Apache Maven.
- To acquire knowledge about Nexus Artifacts
- To build and test your software projects with Jenkins
- To setup LAMP
- To learn to use Docker.

#### **Course Outcomes (COs)**

After successfully completing the course the students should be able to

- 1. practical understanding of software development practices and process models
- 2. Device revision control systems using Apache Maven
- 3. To build and test your software projects with Jenkins, Nexus Artifacts
- 4. Setup LAMP in Linux environment
- 5. Setup and use Docker
- 6. Monitoring the system

#### List of programs

Introduction to DevOps – Tools and settings

- 1. Revision Controls System
- 2. Configuration Management
- 3. Build Automation -Introduction with Maven
- 4. Nexus Artifacts/Proxy Tool
- 5. Jenkins Framework
- 6. LAMP Setup
- 7. Working with Docker
- 8. System Monitoring

# **19CGU414B PROGRAMMING IN MATLAB - PRACTICAL**

#### Semester – IV 3H – 1C

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

## **Course Objectives**

- To understand the need for simulation/implementation for the verification of mathematical functions.
- To understand the main features of the MATLAB program development environment to enable their usage in the higher learning.
- To implement simple mathematical functions/equations in numerical computing environment such as MATLAB.
- To interpret and visualize simple mathematical functions and operations thereon using plots/display.
- To analyze the program for correctness and determine/estimate/predict the output and verify it under simulation environment using MATLAB tools.
- To apply MATLAB tools for implementation/simulation and visualization of basic mathematical functions

# **Course Outcomes (Cos)**

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

- 1. Understand the need for simulation/implementation for the verification of mathematical functions.
- 2. Understand the main features of the MATLAB program development environment to enable their usage in the higher learning.
- 3. Implement simple mathematical functions/equations in numerical computing environment such as MATLAB.
- 4. Interpret and visualize simple mathematical functions and operations thereon using plots/display.
- 5. Analyze the program for correctness and determine/estimate/predict the output and verify it under simulation environment using MATLAB tools.
- 6. Apply MATLAB tools for implementation/simulation and visualization of basic mathematical functions

#### List of programs

1. Write a program to assign the following expressions to a variable A and then to print out the value of A.

a. (3+4)/(5+6)

- b.  $2\Pi^2$
- c. √2

d. (0.0000123 + 5.67×10-3) × 0.4567×10-4

2. Celsius temperatures can be converted to Fahrenheit by multiplying by 9, dividing by 5, and adding 32. Assign a variable called C the value 37, and implement this formula to assign a variable F the Fahrenheit equivalent of 37 Celsius.

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

3. Set up a vector called N with five elements having the values: 1, 2, 3, 4, 5. Using N, create assignment statements for a vector X which will result in X having these values:

a. 2, 4, 6, 8, 10 b. 1/2, 1, 3/2, 2, 5/2 c. 1, 1/2, 1/3, 1/4, 1/5

d. 1, 1/4, 1/9, 1/16, 1/25

a. 1, 1/4, 1/9, 1/16, 1/25

4. A supermarket conveyor belt holds an array of groceries. The price of each product (in pounds) is [0.6, 1.2, 0.5, 1.3]; while the numbers of each product are [3, 2, 1, 5]. Use MATLAB to calculate the total bill.

5. The sortrows(x) function will sort a vector or matrix X into increasing row order. Use this function to sort a list of names into alphabetical order.

6. The —identity matrix is a square matrix that has ones on the diagonal and zeros elsewhere. You can generate one with the eye() function in MATLAB. Use MATLAB to find a matrix B, such that when multiplied by matrix A=[ 1 2; -1 0 ] the identity matrix I=[ 1 0; 0 1 ] is generated. That is A\*B=I.

7. Create an array of N numbers. Now find a single MATLAB statement that picks out from that array the  $1,4,9,16,\ldots,\sqrt{N}$  th entries, i.e. those numbers which have indices that are square numbers.

8. Draw a graph that joins the points (0,1), (4,3), (2,0) and (5,-2).

9. The seeds on a sunflower are distributed according to the formula below. Plot a small circle at each of the first 1000 co-ordinates :

 $r_n = \sqrt{n}$  $\theta_n = \frac{137.51}{180}\pi n$ 

10. Calculate 10 approximate points from the function y=2x by using the formulae:

i. xn = n

ii. yn = 2n + rand - 0.5

Fit a line of best fit to these points using the function polyfit() with degree=1, and generate coordinates from the line of best fit using polyval(). Use the on-line help to find out how to use these functions. Plot the raw data and the line of best fit.

11. Calculate and replay 1 second of a sinewave at 500Hz with a sampling rate of 11025Hz. Save the sound to a file called ex35.wav. Plot the first 100 samples.

12. Calculate and replay a 2 second chirp. That is, a sinusoid that steadily increases in frequency with time, from say 250Hz at the start to 1000Hz at the end.

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

B.ScCom	puter	Science
---------	-------	---------

13. Build a square wave by adding together 10 odd harmonics: 1f, 3f, 5f, etc. The amplitude of the nth harmonic should be 1/n. Display a graph of one cycle of the result superimposed on the individual harmonics.

14. Write a function called FtoC (ftoc.m) to convert Fahrenheit temperatures into Celsius. Make sure the program has a title comment and a help page. Test from the command window with: i. FtoC(96)

ii. lookfor Fahrenheit

iii. helpFtoC

15. Write a program to input 2 strings from the user and to print out (i) the concatenation of the two strings with a space between them, (ii) a line of asterisks the same length as the concatenated strings, and (iii) the reversed concatenation. For example:

- i. Enter string 1: Mark
- ii. Enter string 2: Huckvale
- iii. Mark Huckvale
- iv. \*\*\*\*\*\*\*\*\*\*

v. elavkcuH kraM

# **19CGU501A** INTRODUCTION TO DIGITAL TECHNOLOGY

#### Semester – V 4H – 4C

Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

- To understand the fundamental concepts of digital technology
- To introduce the concept s of cloud, big data, digital marketing
- To introduce the principles of Artificial Intelligence, Block chain technology
- To recognize the use of Digital technology in various Industries
- To understand the principles of Automatix, Automation Anywhere
- To understand and create Bots

#### **Course Outcomes (COs)**

A student who successfully completes this course should be able to

- 1. Understand the fundamental concepts of digital technology
- 2. Comprehend the concept s of cloud, big data, digital marketing
- 3. Familiarize the principles of Artificial Intelligence, Block chain technology
- 4. Recognize the use of Digital technology in various Industries
- 5. Understand the principles of Automatix, Automation Anywhere
- 6. Create bots and understand its various types

#### Unit I - DIGITAL PRIMER

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

# **Unit II- DIGITAL FOR INDUSTRIES**

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

#### Unit III - AUTOMATIX

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

#### **Unit IV - AUTOMATION ANYWHERE**

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

Unit V - Knowing the Bots

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

# SUGGESTED READINGS

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

#### **WEBSITES**

- 1. https://en.wikipedia.org/wiki/Robotic\_process\_automation
- 2. https://en.wikipedia.org/wiki/Automatix\_(software)
- 3. https://www.automationanywhereuniversity.com/
- 4. https://www.automationanywhere.com/in/products/iq-bot

#### 19CGU501B

# MACHINE LEARNING

#### 4H – 4C

#### Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

- To introduce students to the basic concepts and techniques of Machine Learning.
- To develop skills of using recent machine learning software for solving practical problems.
- To gain experience of doing independent study and research.
- To recognize the characteristics of machine learning that make it useful to real-world problems.
- To characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.
- To effectively use machine learning toolboxes.

# Course Outcomes(COs)

On successful completion of the course the student should be

- 1. Remember the basic concepts and techniques of Machine Learning.
- 2. Develop skills of using recent machine learning software for solving practical problems.
- 3. of doing independent study and research.
- 4. To recognize the characteristics of machine learning that make it useful to real-world problems.
- 5. To characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.
- 6. To effectively use machine learning toolboxes.

# **Unit I - INTRODUCTION**

Concept of Machine Learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised vs. Unsupervised Learning, Statistical Learning: Bayesian Method, The Naive Bayes Classifier

# Unit II - SOFTWARES FOR MACHINE LEARNING AND LINEAR ALGEBRA OVERVIEW

Plotting of Data, Vectorization, Matrices and Vectors: Addition, Multiplication, Transpose and Inverse using available tool such as MATLAB.

#### **Unit III - LINEAR REGRESSION**

Prediction using Linear Regression, Gradient Descent, Linear Regression with one variable, Linear Regression with multiple variables, Polynomial Regression, Feature Scaling/Selection. Logistic Regression: Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one variable and with multiple variables.

#### Unit IV - REGULARIZATION

Regularization and its utility: The problem of Overfitting, Application of Regularization in Linear and Logistic Regression, Regularization and Bias/Variance.

#### **Unit V - NEURAL NETWORKS**

Introduction, Model Representation, Gradient Descent vs. Perceptron Training, Stochastic Gradient Descent, Multilayer Perceptrons, Multiclass Representation, Backpropagation Algorithm.

#### SUGGESTED READINGS

1. SantanuChattopadhyaya. (2011). Systems Programming. New Delhi: PHI.

- 2.Alfred, V. Aho., Monica, S. Lam., RaviSethi., & Jeffrey, D. Ullman. (2006). Compilers: Principles, Techniques, and Tools (2nd ed.). New Delhi: Prentice Hall.
- 3. Dhamdhere, D. M. (2011). Systems Programming. New Delhi: Tata McGraw Hill.
- 4. Leland Beck., &Manjula, D. (2008). System Software: An Introduction to System Programming(3<sup>rd</sup> ed.). New Delhi: Pearson Education.
- 5. Grune, D., Van Reeuwijk, K., Bal, H. E., Jacobs, C. J. H., & Langendoen, K. (2012). ModernCompiler Design (2nd ed.). Springer.

#### WEBSITES

- 1. https://skymind.ai/wiki/machine-learning-algorithms
- 2. https://www.analyticsvidhya.com/blog/2017/09/common-machine-learning-algorithms/
- 3. https://machinelearningmastery.com/a-tour-of-machine-learning-algorithms/

19CGU502A

# SOFTWARE TESTING

# Semester – V 4H – 4C

# Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objectives**

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

# **Course Outcomes (COs)**

- 1. Understand Selenium Architecture and its components
- 2. Work with Selenium RC
- 3. Understand Selenium WebDriver
- 4. Use WebDriver advanced features e.g. taking screenshots, handling cookies and managing exceptions
- 5. Create Data driven, Keyword driven and Hybrid test framework
- 6. Record and importing tests with Selenium IDE and Write Test cases using TestNG

#### **Unit I - INTRODUCTION TO AUTOMATION**

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

#### **Unit II - USING SELENIUM IDE**

Managing User Interface Controls - Basics of Java- Creating First Selenium Web Driver Script.

#### **Unit III- SELENIUM METHODS**

Common Selenium Web Driver Methods - Verification Point in Selenium - Exploring the Features of Web Driver.

# **Unit IV- HANDLING POP-UP DIALOGS AND MULTIPLE WINDOWS**

Working with Dynamic UI Objects- Data driven testing using TestNG - Selenium Functions, Common Questions and Tips.

# **Unit V - REPORTING IN SELENIUM**

Batch Execution- Automation Frameworks - Understanding Selenium Grid.

#### SUGGESTED READINGS

- 1. AdithyaGarg, Ashish Mishra "A Practitioner's Guide to Test Automation Using Selenium", Tata McGraw Hill Education, 2015.
- 2. NavneeshGarg, "Test Automation Using Selenium WebDriver with Java", AdactIn Group Pvt Ltd. 2014.
- 3. SatyaAvasarala, "Selenium Web Driver Practical Guide", Packt Publishing, 2014.
- 4. Rex Allen Jones II, "Selenium Web Driver for Functional Automation Testing", Test 4 Success, LLC. 2016.
- 5. David Burns," Selenium 1.0 Testing Tools", Packt Publishing, 2010.

#### WEBSITES

- 1. https://www.seleniumhq.org/docs/
- 2. https://www.javatpoint.com/selenium-tutorial
- 3. https://www.softwaretestingmaterial.com/selenium-tutorial/

# Semester – V

# 19CGU502BINFORMATION SECURITY AND CYBER LAWS 4H – 4C

Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

- To provides an overview of Information Security and Assurance.
- To provide an exposure to the spectrum of security activities methods methodologies and procedures with emphasis on practical aspects of Information Security.
- To explain concepts related to applied cryptography including the four techniques for crypto-analysis symmetric and asymmetric cryptography, digital signature, message authentication code, hash functions and modes of encryption operations.
- To explain common vulnerabilities in computer programs including buffer overflowVulnerabilities time-of-check to time-of-use flaws incomplete mediation.
- To understand the concepts of cryptographic utilities and authentication mechanisms to design secure applications
- To understand the various Cyber laws and its sections with case studies.

# Course Outcomes(COs)

A student who successfully completes this course should at a minimum be able to:

- 1. Explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, and public key algorithms
- 2. State the basic concepts in information security
- 3. Explain concepts related to applied cryptography including the four techniques for crypto-analysis symmetric and asymmetric cryptography, digital signature, message authentication code, hash functions and modes of encryption operations.
- 4. Explain common vulnerabilities in computer programs including buffer overflowVulnerabilities time-of-check to time-of-use flaws incomplete mediation.
- 5. Understand the concepts of cryptographic utilities and authentication mechanisms to design secure applications
- 6. Understand the various Cyber laws and its sections with case studies.

# **Unit I- COURSE INTRODUCTION**

Computer network as a threat, hardware vulnerability, software vulnerability, importance of data security.

Digital Crime: Overview of digital crime, criminology of computer crime.

# **Unit II- INFORMATION GATHERING TECHNIQUES**

Tools of the attacker, information and cyberwarfare, scanning and spoofing, password cracking, malicious software, sessionhijacking

# Unit III- RISK ANALYSIS AND THREAT

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

Risk analysis, process, key principles of conventionalcomputer security, security policies, authentication, data protection, access control, internal vs external threat, security assurance, passwords, authentication, and accesscontrol, computer forensics and incident response

# **Unit IV- INTRODUCTION TO CRYPTOGRAPHY AND APPLICATIONS**

Important terms, Threat, Flaw, Vulnerability, Exploit, Attack, Ciphers, Codes, Caeser Cipher, Rail-Fence Cipher, Public key cryptography (Definitions only), Private key cryptography (Definition and Example)

Safety Tools and Issues : Firewalls, logging and intrusion detection systems, Windows andwindows XP / NT security, Unix/Linux security, ethics of hacking and cracking

# Unit V- CYBER LAWS

CYBER LAWSto be covered as per IT 2008:

- Chapter 1: Definitions88
- Chapter 2: Digital Signature And Electronic Signature
- [Section 43] Penalty and Compensation for damage to computer, computersystem, etc.
- [Section 65] Tampering with Computer Source Documents
- [Section 66 A] Punishment for sending offensive messages through communication service, etc.
- [Section 66 B] Punishments for dishonestly receiving stolen computer resource or communication device
- [Section 66C] Punishment for identity theft
- [Section 66D] Punishment for cheating by personation by using computerresource
- [Section 66E] Punishment for violation of privacy
- [Section 66F] Punishment for cyber terrorism
- [Section 67] Punishment for publishing or transmitting obscene material inelectronic form
- [Section 67A] Punishment for publishing or transmitting of material containing sexually explicit act, etc. in electronic form[Section 67B] Punishmentfor publishing or transmitting of material depicting children in sexually explicitact, etc. in electronic form

• [Section 72] Breach of confidentiality and privacy

#### SUGGESTED READINGS

- 1. M. Merkow, J. Breithaupt. 2005. Information Security Principles and Practices.Pearson Education.2005.
- 2. G.R.F. Snyder, T. Pardoe. 2010. Network Security. Cengage Learning.
- 3. A. Basta, W.Halton. 2008. Computer Security: Concepts, Issues and Implementation. Cengage Learning India.

#### WEB SITES

- 1. http://www.csc.ncsu.edu/faculty/ning
- 2. csrc.nist.gov/publications/nistpubs/800-12/handbook.pdf
- 3. www2.warwick.ac.uk/fac/sci/dcs/teaching/modules/cs134/

Semester – V

#### 19CGU503A DATA MINING

## 4H – 4C

#### Instruction Hours / week:L: 4 T: 0 P: 0 Marks:Int :40 Ext : 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

- To introduce students to the basic concepts and techniques of Data Mining.
- To understand data mining fundamentals and characterize the kinds of patterns that can be discovered by association rule mining
- To compare and evaluate different data mining techniques like classification, prediction, etc.
- To cluster the high dimensional data for better organization of the data
- To describe complex data types with respect to spatial and web mining
- To design data warehouse with dimensional modelling and apply OLAP operations.

# **Course Outcomes (COs)**

Upon completion of this course students will be able to:

- 1. Understand the basic concepts and techniques of Data Mining
- 2. Extract knowledge using data mining techniques and Implement Preprocess the data for mining applications and apply the association rules for mining the data
- 3. Design and deploy appropriate classification techniques
- 4. Understand the concept of clustering and its real time applications
- 5. Explore recent trends in data mining such as web mining, spatial-temporal mining
- 6. Analyze the basic concepts of data warehouse and OLAP operations

#### **Unit I – OVERVIEW**

Predictive and descriptive data mining techniques

#### **Unit II - LEARNING TECHNIQUES**

Supervised and unsupervised learning techniques

#### Unit III - KNOWLEDGE DISCOVERY

Process of knowledge discovery in databases, pre-processing methods

# **Unit IV - DATA MINING TECHNIQUES**

Association Rule Mining, classification and regression techniques, clustering

#### Unit V - ISSUES

Scalability and data management issues in data mining algorithms, measures of interestingness.

# SUGGESTED READINGS

- 1. Pang-Ning Tan., Michael Steinbach., & Vipin Kumar. (2012). Introduction to Data Mining. New Delhi: PearsonEducation.
- 2. Richard Roiger., & Michael Geatz. (2013). Data Mining: A Tutorial Based Primer.New Delhi: Pearson Education.
- 3. Gupta, G.K. (2006). Introduction to Data Mining with Case Studies.New Delhi:PHI.
- 4. Soman, K. P., DiwakarShyam., & Ajay, V. (2006). Insight Into Data Mining: Theory AndPractice. New Delhi:PHI.

#### WEB SITES

- 1. Thedacs.Com
- 2. Dwreview.Com
- 3. Pcai.Com
- 4. Eruditionhome.Com

# **19CGU503B** INTRODUCTION TO DATA SCIENCE

Semester – V 4H – 4C

## Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objective**

- To provide an overview of a new language R used for data science.
- To introduce students to the R programming environment and related eco-system and thus provide them with an in-demand skill-set, in both the research and business environments
- To introduce the extended R ecosystem of libraries and packages
- To demonstrate usage of as standard Programming Language.
- To familiarize students with how various statistics like mean median etc. can be collected for data exploration in R
- To enable students to use R to conduct analytics on large real life datasets.

#### **Course Outcomes (COs)**

- 1. Install and use R for simple programming tasks.
- 2. Extend the functionality of R by using add-on packages
- 3. Extract data from files and other sources and perform various data manipulation tasks on them.
- 4. Code statistical functions in R.
- 5. Use R Graphics and Tables to visualize results of various statistical operations on data.
- 6. Apply the knowledge of R gained to data Analytics for real life applications.

#### **Unit I - DATA SCIENTIST'S TOOL BOX**

Turning data into actionable knowledge, introduction to the tools that will be used in building data analysis software: version control, markdown, git, GitHub, R, and RStudio.

#### **Unit II -R PROGRAMMING BASICS**

Overview of R, R data types and objects, reading and writing data, Control structures, functions, scoping rules, dates and times, Loop functions, debugging tools, Simulation, code profiling

# **Unit III - GETTING AND CLEANING DATA**

Obtaining data from the web, from APIs, from databases and from colleagues in various formats.basics of data cleaning and making data —tidy.

# Unit IV - EXPLORATORY DATA ANALYSIS

Essential exploratory techniques for summarizing data, applied before formal modeling commences, eliminating or sharpening potential hypotheses about the world that can be addressed by the data, common multivariate statistical techniques used to visualize high-dimensional data.

#### **Unit V- REPRODUCIBLE RESEARCH**

Concepts and tools behind reporting modern data analyses in a reproducible manner, To write a document using R markdown, integrate live R code into a literate statistical program, compile R markdown documents using knitr and related tools, and organize a data analysis so that it is reproducible and accessible to others.

#### SUGGESTED READINGS

- 1. Rachel Schutt., &Cathy O'Neil.(2013). Doing Data Science: Straight Talk from the Frontiline. Schroff/O'Reilly.
- 2. Foster Provost.,&Tom Fawcett.(2013). Data Science for Business What You Need to Know About Data Mining and Data-Analytic Thinking. O'Reilly.
- 3. John, W. Foreman. (2013). Data Smart: Using data Science to Transform Information into Insight. John Wiley & Sons.
- 4. Ian Ayres. (2007). Super Crunchers: Why Thinking-by-Numbers Is the New Way to Be Smart (1st ed.). Bantam.
- 5. EricSeigel. (2013).PredictiveAnalytics:ThePowertoPredictwhoWillClick,BuyLie,or Die (1sted.). Wiley.
- 6. Matthew, A. Russel. (2013). Mining the Social Web: Data mining Facebook, Twitter, Linkedln, Goole+, GitHub, and More (2nd ed.). O'Reilly Media.

#### WEBSITES

- 1. https://www.iqonlinetraining.com/data-science-tutorial/
- 2. https://www.edx.org/course/introduction-to-r-for-data-science-2
- 3. https://www.tutorialspoint.com/r/index.htm
- 4. https://www.w3schools.in/r/

# **19CGU504A CLIENT RELATIONHIP MANAGEMENT**

Semester – V 3H – 3C

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

#### **Course Objectives**

- to Acquire knowledge about ServiceNow platform
- To get comprehensive knowledge of ITSM principles and architecture.
- To get acquainted with various features of Service Now platform and tool.
- To use Flows and Workflows for process automation
- To use various script types used throughout the platform
- To capturing and moving configurations between instances, using update sets

#### **Course Outcomes (COs)**

- 1. Task management using assignment rules, presence, and work notes
- 2. Protecting ServiceNow instance data using Access Control rules
- 3. Populating the database using import sets
- 4. Using Flows and Workflows for process automation
- 5. Various script types used throughout the platform
- 6. Capturing and moving configurations between instances, using update sets

# **Unit I - SERVICE NOW INTERMEDIATE LEVEL**

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

#### **Unit II - SYSTEM PROPERTIES**

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

#### Unit III - CLIENT SCRIPTS & CLIENT GLIDE APIS-BEST PRACTICES

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

# **Unit IV - MANAGE WORKFLOWS**

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

# **Unit V - SERVICENOW SERVICE PORTALS OVERVIEW**

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

# SUGGESTED READINGS

- 1. Tim Woodruff, "Learning ServiceNow: Administration and development on the Now platform, for powerful IT automation", 2nd Edition, Packt Publishing Ltd., 2018.
- 2. AshishRudraSrivastava "ServiceNow Cook Book" Packt Publishing Ltd, 2017.
- 3. Andrew Kindred, "Mastering ServiceNow Scripting" Packt Publishing2018.

#### WEBSITES

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

# Semester – V 19CGU504B PROGRAMMING IN VISUAL BASIC /GAMBAS 3H – 3C

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

#### **Course Objectives**

- To identify the differences between the procedural languages and event driven languages.
- To introduce computer programming using the VISUAL BASIC programming language.
- To demonstrate knowledge of programming terminology and how applied using Visual Basic (e.g., variables, selection statements, repetition statements, etc.)
- To develop a Graphical User Interface (GUI) based on problem description
- To develop and debug applications using Visual Basic
- To Emphasis on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger.

# Course Outcomes(COs)

- 1. Construct appropriate user interfaces for simple programs, and design systems with minimal complexity and maximal functionality.
- 2. Understand computer programming using the VISUAL BASIC programming language.
- 3. Demonstrate knowledge of programming terminology and how applied using Visual Basic (e.g., variables, selection statements, repetition statements, etc.)
- 4. Develop a Graphical User Interface (GUI) based on problem description
- 5. Develop and debug applications using Visual Basic
- 6. Emphasize on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger.

# **Unit I - GUI ENVIRONMENT**

Introduction to graphical user interface (GUI), programminglanguage (procedural, object oriented, event driven), the GUI environment, compiling, debugging, and running the programs. **Controls :** Introduction to controls textboxes, frames, check boxes, option buttons, images, setting borders and styles, the shape control, the line control, working withmultiple controls and their properties, designing the user interface, keyboard access, tab controls, default & cancel property, coding for controls.

#### **Unit II – OPERATIONS**

Data types, constants, named & intrinsic, declaring variables, scope ofvariables, val function, arithmetic operations, formatting data.

**Decision Making :** If statement, comparing strings, compound conditions (and, or,not), nested if statements, case structure, using if statements with option buttons & check boxes, displaying message in message box, testing whether input is valid or not.

# Unit III -MODULAR PROGRAMMING

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

Menus, sub-procedures and sub-functions defining/creating and modifying a menu, using common dialog box, creating a new subprocedure, passing variables to procedures, passing argument by value or by reference, writing a function/ procedure.

## **Unit IV- FORMS HANDLING**

Multiple forms creating, adding, removing forms in project, hide, show method, load, unload statement, me keyword, referring to objects on a different forms

Iteration Handling: Do/loops, for/next loops, using msgbox function, using stringFunction

# Unit V- ARRAYS AND GROUPED DATA CONTROL

Arrays - 1-dimension arrays, initializing and array using for each, user-defined data types, accessing information with user-defineddata types, using list boxes with array, two dimensional arrays. lists, loops andprinting list boxes & combo boxes, filling the list using property window / add itemmethod, clear method, list box properties, removing an item from a list, list box/combo box operations.

**Database Connectivity:** Database connectivity of forms with back end tool like mysqlpopulating the data in text boxes, list boxes etc. searching of data in database usingforms. Updating/ editing of data based on a criterion.

#### SUGGESTED READINGS

1. Programming in Visual Basic 6.0 by Julia Case Bradley, Anita C. Millispangh. 2014. Tata Mcgraw Hill Edition.

## WEB SITES

- 1. https://www.tutorialspoint.com/vb.net
- 2. howtostartprogramming.com/vb-net/
- 3. https://www.vbtutor.net/lesson1.html
- 4. gambas.sourceforge.net/

#### 19CGU511A INTRODUCTION TO DIGITAL TECHNOLOGY - PRACTICAL

Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

# **Course Objectives**

- To understand the fundamental concepts of digital technology •
- To introduce the concept s of cloud, big data, digital marketing •
- To introduce the principles of Artificial Intelligence, Block chain technology
- To recognize the use of Digital technology in various Industries
- To understand the principles of Automatix, Automation Anywhere •
- To understand and create Bots •

#### **Course Outcomes (COs)**

A student who successfully completes this course should be able to

- 1. Understand the fundamental concepts of digital technology
- 2. Comprehend the concept s of cloud, big data, digital marketing
- 3. Familiarize the principles of Artificial Intelligence, Block chain technology
- 4. Recognize the use of Digital technology in various Industries
- 5. Understand the principles of Automatix, Automation Anywhere
- 6. Create bots and understand its various types

#### List of programs

- 1. Creating bots for automatic software installation
- 2. Creating bots for automatic software patch installation
- 3. Creating bots for file transfer
- 4. Creating bots for automatic file backup

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

Semester – V

4H - 2C

# **19CGU511B** MACHINE LEARNING- PRACTICAL

# Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

- To introduce students to the basic concepts and techniques of Machine Learning.
- To develop skills of using recent machine learning software for solving practical problems.
- To gain experience of doing independent study and research.
- To recognize the characteristics of machine learning that make it useful to real-world problems.
- To characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.
- To effectively use machine learning toolboxes.

# Course Outcomes(COs)

On successful completion of the course the student should be

- 1. Remember the basic concepts and techniques of Machine Learning.
- 2. Develop skills of using recent machine learning software for solving practical problems.
- 3. of doing independent study and research.
- 4. To recognize the characteristics of machine learning that make it useful to real-world problems.
- 5. To characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.
- 6. To effectively use machine learning toolboxes.

#### List of programs

1. Perform elementary mathematical operations in Octave/MATLAB like addition, multiplication, division and exponentiation.

2. Perform elementary logical operations in Octave/MATLAB (like OR, AND, Checking for Equality, NOT, XOR).

3. Create, initialize and display simple variables and simple strings and use simple formatting for variable.

4. Create/Define single dimension / multi-dimension arrays, and arrays with specific values like array of all ones, all zeros, array with random values within a range, or a diagonal matrix.

5. Use command to compute the size of a matrix, size/length of a particular row/column, load data from a text file, store matrix data to a text file, finding out variables and their features in the current scope.

Semester – V 4H – 2C

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

6. Perform basic operations on matrices (like addition, subtraction, multiplication) and display specific rows or columns of the matrix.

7. Perform other matrix operations like converting matrix data to absolute values, taking the negative of matrix values, additing/removing rows/columns from a matrix, finding the maximum or minimum values in a matrix or in a row/column, and finding the sum of some/all elements in a matrix.

8. Create various type of plots/charts like histograms, plot based on sine/cosine function based on data from a matrix. Further label different axes in a plot and data in a plot.

9. Generate different subplots from a given plot and color plot data.

10. Use conditional statements and different type of loops based on simple example/s.

11. Perform vectorized implementation of simple matrix operation like finding the transpose of a matrix, adding, subtracting or multiplying two matrices.

12. Implement Linear Regression problem. For example, based on a dataset comprising of existing set of prices and area/size of the houses, predict the estimated price of a given house.

13. Based on multiple features/variables perform Linear Regression. For example, based on a number of additional features like number of bedrooms, servant room, number of balconies, number of houses of years a house has been built – predict the price of a house.

14. Implement a classification/ logistic regression problem. For example based on different features of students data, classify, whether a student is suitable for a particular activity. Based on the available dataset, a student can also implement another classification problem like checking whether an email is spam or not.

15. Use some function for regularization of dataset based on problem 14.

16. Use some function for neural networks, like Stochastic Gradient Descent or back propagation - algorithm to predict the value of a variable based on the dataset of problem

4H - 2C

Semester – V

# **19CGU512A SOFTWARE TESTING- PRACTICAL**

# Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

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

#### **Course Outcomes (COs)**

- 1. Understand Selenium Architecture and its components
- 2. Work with Selenium RC
- 3. Understand Selenium WebDriver
- 4. Use WebDriver advanced features e.g. taking screenshots, handling cookies and managing exceptions
- 5. Create Data driven, Keyword driven and Hybrid test framework
- 6. Record and importing tests with Selenium IDE and Write Test cases using TestNG

- 1. Write a test case based on controls.
- 2. Test data in a flat file.
- 3. Manual test case to verify student grade
- 4. Write and test a program to select the number of students who have scored more than 60 in any one subject(or all Subjects)
- 5. Write and test a program to login a specific web page.
- 6. Write and test a program to get the number of list items in a list / combo box.
- 7. Test a HTML file.
- 8. Test a program in MS Excel for Data Driven Wizard.
- 9. Test the addition of two values in C++ Program.

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

#### 19CGU512B INFORMATION SECURITY AND CYBER LAWS - PRACTICAL

# Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

- To provides an overview of Information Security and Assurance.
- To provide an exposure to the spectrum of security activities methods methodologies and procedures with emphasis on practical aspects of Information Security.
- To explain concepts related to applied cryptography including the four techniques for crypto-analysis symmetric and asymmetric cryptography, digital signature, message authentication code, hash functions and modes of encryption operations.
- To explain common vulnerabilities in computer programs including buffer overflowVulnerabilities time-of-check to time-of-use flaws incomplete mediation.
- To understand the concepts of cryptographic utilities and authentication mechanisms to design secure applications
- To understand the various Cyber laws and its sections with case studies.

# Course Outcomes(COs)

A student who successfully completes this course should at a minimum be able to:

- 1. Explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, and public key algorithms
- 2. State the basic concepts in information security
- 3. Explain concepts related to applied cryptography including the four techniques for crypto-analysis symmetric and asymmetric cryptography, digital signature, message authentication code, hash functions and modes of encryption operations.
- 4. Explain common vulnerabilities in computer programs including buffer overflowVulnerabilities time-of-check to time-of-use flaws incomplete mediation.
- 5. Understand the concepts of cryptographic utilities and authentication mechanisms to design secure applications
- 6. Understand the various Cyber laws and its sections with case studies.

#### **List of Programs**

- 1. Demonstrate the use of Network tools: ping, ipconfig, ifconfi
- 2. g, tracert, arp, netstat, whois
- 3. Use of Password cracking tools : John the Ripper, Ophcrack. Verify the strength of passwords using these tools.
- 4. Perform encryption and decryption of Caesar cipher. Write a script for performing these operations.
- 5. Perform encryption and decryption of a Rail fence cipher. Write a script for performing these operations.
- 6. Use nmap/zenmap to analyse a remote machine.
- 7. Use Burp proxy to capture and modify the message.

#### Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

Semester – V 4H – 2C

- 8. Demonstrate sending of a protected word document.
- 9. Demonstrate sending of a digitally signed document.
- 10. Demonstrate sending of a protected worksheet.
- 11. Demonstrate use of steganography tools.
- 12. Demonstrate use of gpg utility for signing and encrypting purposes.

# **19CGU513A DATA MINING- PRACTICAL**

# Semester – V 4H – 2C

# Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objectives**

- To introduce students to the basic concepts and techniques of Data Mining.
- To understand data mining fundamentals and characterize the kinds of patterns that can be discovered by association rule mining
- To compare and evaluate different data mining techniques like classification, prediction, etc.
- To cluster the high dimensional data for better organization of the data
- To describe complex data types with respect to spatial and web mining
- To design data warehouse with dimensional modelling and apply OLAP operations.

# **Course Outcomes (COs)**

Upon completion of this course students will be able to:

- 1. Understand the basic concepts and techniques of Data Mining
- 2. Extract knowledge using data mining techniques and Implement Preprocess the data for mining applications and apply the association rules for mining the data
- 3. Design and deploy appropriate classification techniques
- 4. Understand the concept of clustering and its real time applications
- 5. Explore recent trends in data mining such as web mining, spatial-temporal mining
- 6. Analyze the basic concepts of data warehouse and OLAP operations

- 1. Use the following learning schemes, with the default settings to analyze the weather data (in weather.arff). for test options, first choose "Use training set", then choose "Percentage split" using default 66% percentage split. Report model percent errorate.
- 2. Use iris dataset preprocess and classify it with j4.8 and Naive Bayes classifier. Examine the tree in the classifier outputpanel.
- 3. Using the dataset ReutersCorn Train and ReutersGrain Train. Classify articles using binary attributes and word countattributes.
- 4. Apply any two association rule based algorithm for the supermarketanalysis.
- 5. Using weka experimenter perfrom comparison analysis of j4.8, oneR and ID3 forvote dataset.
- 6. Using weka experimenter perfrom comparison analysis of Naive Bayes with different datasets.
- 7. Apply ZeroR, OneR and j4.8, to classify the iris data in an experiment using 10 train and test runs, with 66% of the data used for 34% used fortesting.
- 8. Using Weka Knowledge flow set up a flow to load an ARFF file (batch mode) and perform a cross-validation using j4.8 (WEKS's C4.5implementation).
- 9. Draw multiple ROC curves in the same plot window, using j4.8 and RandomForest as classifiers.
- 10. Use any three clustering algorithm on Vehicle data set and find best amongthem.

# Semester – V 19CGU513B INTRODUCTION TO DATA SCIENCE – PRACTICAL 4H – 2C

# Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

- To provide an overview of a new language R used for data science.
- To introduce students to the R programming environment and related eco-system and thus provide them with an in-demand skill-set, in both the research and business environments
- To introduce the extended R ecosystem of libraries and packages
- To demonstrate usage of as standard Programming Language.
- To familiarize students with how various statistics like mean median etc. can be collected for data exploration in R
- To enable students to use R to conduct analytics on large real life datasets.

# **Course Outcomes (COs)**

- 1. Describe what Data Science is and the skill sets needed to be a data scientist.
- 2. Explain in basic terms what Statistical Inference means.
- 3. Identify probability distributions commonly used as foundations for statistical modeling. Fit a model to data.
- 4. Use R to carry out basic statistical modeling and analysis.
- 5. Explain the significance of exploratory data analysis (EDA) in data science. Apply basic tools (plots, graphs, summary statistics) to carry out EDA.
- 6. Describe the Data Science Process and how its components interact.

- 1. Write a program that prints \_hello World to thescreen.
- 2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n
- 3. Write a program that prints a multiplication table for numbers up to12.
- 4. Write a function that returns the largest element in alist.
- 5. Write a function that computes the running total of alist.
- 6. Write a function that tests whether a string is apalindrome.
- 7. Implement linearsearch.
- 8. Implement binarysearch.
- 9. Implement matrices addition, subtraction and Multiplication
- 10. Fifteen students were enrolled in a course. There ages were: 20 20 20 20 20 21 21 21 22 22 22 23 2323
  - i.Find the median age of all students under 22 years
  - ii.Find the median age of allstudents
  - iii. Find the mean age of all students
  - iv. Find the modal age for all students

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

- v.Two more students enter the class. The age of both students is 23. Whatisnowmean, mode and median?
- 11. Following table gives a frequency distribution of systolic blood pressure. Compute all the measures of dispersion.

Midpoint	95.5	105.5	115.5	125.5	135.5	145.5	155.5	165.5	175.5
Number	5	8	22	27	17	9	5	5	2

- 12. Obtain probability distribution of , where X is number of spots showing when a sixsided symmetric die (i.e. all six faces of the die are equally likely) is rolled. Simulate randomsamples of sizes 40, 70 and 100 respectively and verify the frequency interpretation of probability.
- 13. Make visual representations of data using the base, lattice, and ggplot2 plotting systems in R, apply basic principles of data graphics to create rich analytic graphics from availabledatasets.
- 14. Use Git / Github software to create Githubaccess count. Also, create a repo usingGithub.

# Semester – V 19CGU514A CLIENT RELATIONHIP MANAGEMENT - PRACTICAL 3H – 1C

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

#### **Course Objectives**

- to Acquire knowledge about ServiceNow platform
- To get comprehensive knowledge of ITSM principles and architecture.
- To get acquainted with various features of Service Now platform and tool.
- To use Flows and Workflows for process automation
- To use various script types used throughout the platform
- To capturing and moving configurations between instances, using update sets

#### **Course Outcomes (COs)**

- 1. Task management using assignment rules, presence, and work notes
- 2. Protecting ServiceNow instance data using Access Control rules
- 3. Populating the database using import sets
- 4. Using Flows and Workflows for process automation
- 5. Various script types used throughout the platform
- 6. Capturing and moving configurations between instances, using update sets

- 1. Creating tickets for servicing requests from clients
- 2. Creating reports of status of client services

#### Semester – V

## 19CGU514BPROGRAMMING IN VISUAL BASIC/GAMBAS 3H – 1C – PRACTICAL

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

# **Course Objectives**

- To identify the differences between the procedural languages and event driven languages.
- To introduce computer programming using the VISUAL BASIC programming language.
- To demonstrate knowledge of programming terminology and how applied using Visual Basic (e.g., variables, selection statements, repetition statements, etc.)
- To develop a Graphical User Interface (GUI) based on problem description
- To develop and debug applications using Visual Basic
- To Emphasis on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger.

# Course Outcomes(COs)

- 1. Construct appropriate user interfaces for simple programs, and design systems with minimal complexity and maximal functionality.
- 2. Understand computer programming using the VISUAL BASIC programming language.
- 3. Demonstrate knowledge of programming terminology and how applied using Visual Basic (e.g., variables, selection statements, repetition statements, etc.)
- 4. Develop a Graphical User Interface (GUI) based on problem description
- 5. Develop and debug applications using Visual Basic
- 6. Emphasize on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger.

#### List of programs

- 1. Print a table of numbers from 5 to 15 and their squares and Cubes.
- 2. Print the largest of three numbers.
- 3. Find the factional of a number n.

4. Enter a list of positive numbers terminated by zero. Find the sum and average of these numbers.

5. A person deposits Rs. 1000 in a fixed account yielding 5% interest. Complete the amount in the account at the end of each year for n years.

6. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.

7. Read n numbers. Count the number of negative numbers, positive numbers and zeroes in the list.use arrays.

- 8. Read a single dimension array. Find the sum and average of these numbers.
- 9. Read a two dimension array. Find the sum of two 2D Array.

10. Create a database Employee and Make a form in VB 6.0 to allow data entry to Employee Form with the following command buttons:

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

Employee Form Employee Name: NEXT Employee Id: Date of Joining: Designation: Department: Address:

4H - 4C

19CGU601A

# PHP PROGRAMMING

Semester – VI

# Instruction Hours / week:L: 4 T: 0 P:0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

# **Course Objectives**

- To write basic PHP syntax using various operators.
- To write PHP scripts to handle HTML forms.
- To analyze different tasks using PHP functions.
- To understand the regular expressions in PHP.
- To learn array data structure using PHP scripts.
- To work with open source applications that deal with database and website development.

# **Course Outcomes (COs)**

Upon completion of this course, students will be able to:

- 1. Write PHP scripts using operators to perform various functions
- 2. Design PHP scripts to handle HTML forms.
- 3. Implement different types of PHP functions.
- 4. Write regular expressions including modifiers, operators, and metacharacters.
- 5. Create PHP scripts using array.
- 6. Develop dynamic web pages.

# **Unit I - INTRODUCTION TO PHP**

PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.) - PHP with other technologies, scope of PHP Basic Syntax, PHP variables and constants - Types of data in PHP, Expressions, scopes of a variable (local, global) - PHP Operators: Arithmetic, Assignment, Relational, Logical operators, Bitwis, ternary and MOD operator -PHP operator Precedence and associativity

# Unit II - HANDLING HTML FORM WITH PHP

Capturing Form Data -GET and POST form methods -Dealing with multi value fields -Redirecting a form after submission. **PHP conditional events and Loops -** PHP IF Else conditional statements (Nested IF and Else) -Switch case, while ,For and Do While Loop – Goto , Break ,Continue and exit

# **Unit III - PHP FUNCTIONS**

Function, Need of Function, declaration and calling of a function - PHP Function with rguments, Default Arguments in Function-Function argument with call by value, call by reference -Scope of Function Global and Local

# **Unit IV- STRING MANIPULATION AND REGULAR EXPRESSION**

Creating and accessing String, Searching & Replacing String -Formatting, joining and splitting String, String Related Library functions -Use and advantage of regular expression over inbuilt function -Use of preg\_match(), preg\_replace(), preg\_split() functions in regular expression

# Unit V- ARRAY

Anatomy of an Array ,Creating index based and Associative array ,Accessing array - Looping with Index based array, with associative array using each() and foreach() -Some useful Library function

# SUGGESTED READINGS

- 1. Steven Holzner.(2007). PHP: The Complete Reference. New Delhi: McGraw Hill Education (India).
- 2. Timothy Boronczyk., & Martin, E. Psinas. (2008). PHP and MYSQL (Create-Modify-Reuse). New Delhi: Wiley India Private Limited.
- 3. Robin Nixon. (2014). Learning PHP, MySQL, JavaScript, CSS & HTML5 (3rd ed.).O'reilly.
- 4. Luke Welling., & Laura Thompson. (2008). PHP and MySQL Web Development (4th ed.). Addition Paperback, Addison-Wesley Professional.
- 5. David Sklar., & Adam Trachtenberg. PHP Cookbook: Solutions & Examples for PHP.

# WEBSITES

- 1. https://www.w3schools.com/php/php\_ref\_overview.asp
- 2. https://www.php.net/manual/en/language.references.php
- 3. https://www.php.net/manual/en/langref.php
- 4. https://www.php.net/manual/en/language.references.whatdo.php

#### Semester – VI

#### 19CGU601B UNIX / LINUX PROGRAMMING 4H – 4C

# Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

## **Course Objective**

- To understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.
- To understand how the operating system abstractions can be used in the development of application programs, or to build higher level abstractions
- To understand how the operating system abstractions can be implemented
- To understand the principles of concurrency and synchronization, and apply them to write correct concurrent programs/software
- To understand basic resource management techniques like scheduling or time management, space management and principles and how they can be implemented.
- To know about the issues of performance and fairness objectives, avoiding deadlocks, as well as security and protection.

#### Course Outcomes(COs)

- 1. This course teaches the student the concepts and principles that underlie modern operating systems, and a practice component to relate theoretical principles with operating system implementation.
- 2. Implement operating system abstractions in the development of application programs
- 3. Apply the principles of concurrency and synchronization to write correct concurrent programs/software
- 4. Implementbasic resource management techniques like scheduling or time management, space management
- 5. Learn about processes and processor management, memory management schemes, file system and secondary storage management.
- 6. Learn about issues of performance and fairness objectives, avoiding deadlocks, as well as security and protection

# **Unit I - INTRODUCTION**

What is Linux/Unix Operating systems, Difference between linux/unix and other operating systems, Features and Architecture, Various Distributions available in the market, Installation, Booting and shutdown process

#### Unit II - SYSTEM PROCESSES (AN OVERVIEW)

External and internal commands, Creation of partitions in OS, Processes and its creation phases – Fork, Exec, wait

#### Unit III- USER MANAGEMENT AND THE FILE SYSTEM

Types of Users, Creating users, Granting rights User management commands, File quota and various file systems available, File System Management and Layout, File permissions, Login process, Managing Disk Quotas, Links (hard links, symbolic links)
# **Unit IV - SHELL INTRODUCTION AND SHELL SCRIPTING**

What is shell and various type of shell, various editors present in Linux Different modes of operation in vi editor, What is shell script, Writing and executing the shell script, Shell variable (user defined and system variables)

# Unit V- SYSTEM CALLS, USING SYSTEM CALLS

Pipes and Filters, Decision making in Shell Scripts (If else, switch), Loops in shell Functions, Utility programs (cut, paste, join, tr, uniq utilities), Pattern matching utility (grep)

# SUGGESTED READINGS

- 1. Sumitabha, Das.(2006). Unix Concepts And Applications. New Delhi: Tata McGraw-Hill Education.
- 2. Michael Jang.(2011). RHCSA/ RHCE Red Hat Linux Certification: Exams (Ex200 & Ex300). Certification Press.
- 3. Nemeth Synder., & Hein. (2010). Linux Administration Handbook (2nd ed.). Pearson Education.
- 4. Richard Stevens.W. Bill Fenner., &Andrew, M. Rudoff. (2014). Unix Network Programming. The sockets Networking API.Vol. 1.(3rd ed.).

- 1. www.sethi.org/tutorials/references\_unix.html
- 2. www.penguintutor.com/linux/basic-shell-programming-reference
- 3. https://swcarpentry.github.io/shell-novice/reference/

#### 19CGU602A

# DIGITAL IMAGE PROCESSING

## Semester – VI 4H – 4C

Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

# **Course Objectives**

- To understand the fundamental concepts of a digital image processing system.
- To understand concepts of image enhancement techniques.
- To apply various Image Transforms.
- To analyze various Compression techniques and Morphological concepts
- To know various segmentation techniques, and object descriptors.
- To apply color models and various applications of image processing

# **Course Outcomes (COs)**

- 1. Remember the fundamental concepts of image processing.
- 2. Explain different Image enhancement techniques
- 3. Understand and review image transforms
- 4. Analyze the basic algorithms used for image processing & image compression with morphological image processing.
- 5. Contrast Image Segmentation and Representation
- 6. Design & Synthesize Color image processing and its real world applications

# **Unit I - INTRODUCTION**

Light, Brightness adaption and discrimination, Pixels, coordinate conventions, Imaging Geometry, Perspective Projection, Spatial Domain Filtering, sampling and quantization. Spatial Domain Filtering: Intensity transformations, contrast stretching, histogram equalization, Correlation and convolution, Smoothing filters, sharpening filters, gradient and Laplacian.

# **Unit II - TRANSFORMS AND PROPERTIES**

Hotelling Transform, Fourier Transforms and properties, FFT (Decimation in Frequency and Decimation in Time Techniques), Convolution, Correlation, 2-D sampling, Discrete Cosine Transform, Frequency domain filtering.

# **Unit III - IMAGE RESTORATION**

Image Restoration, Basic Framework, Interactive Restoration, Image deformation and geometric transformations, image morphing, Restoration techniques, Noise characterization, Noise restoration filters, Adaptive filters, Linear, Position invariant degradations, Estimation of Degradation functions, Restoration from projections, Image Compression-Encoder-Decoder model, Types of redundancies, Lossy and Lossless compression, Entropy of an information source, Shannon's 1st Theorem, Huffman Coding, Arithmetic Coding, Golomb Coding, LZW

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

coding, Transform Coding, Sub-image size selection, blocking artifacts, DCT implementation using FFT, Run length coding.

# **Unit IV- IMAGE COMPRESSION**

FAX compression (CSUITT Group-3 and Group-4), Symbol-based coding, JBIG-2, Bit-plane encoding, Bit-allocation, Zonal Coding, Threshold Coding, JPEG, Lossless predictive coding, Lossy predictive coding, Motion Compensation

Wavelet based Image Compression: Expansion of functions, Multi-resolution analysis, Scaling functions, MRA refinement equation, Wavelet series expansion, Discrete Wavelet Transform (DWT),Continuous Wavelet Transform, Fast Wavelet Transform, 2-D wavelet Transform, JPEG-2000 encoding, Digital Image Watermarking

# **Unit V - MORPHOLOGICAL IMAGE PROCESSING**

Basics, SE, Erosion, Dilation, Opening, Closing, Hit-or-Miss Transform, Boundary Detection, Hole filling, Connected components, convex hull, thinning, thickening, skeletons,pruning, Geodesic Dilation, Erosion, Reconstruction by dilation and erosion. Image Segmentation: Boundary detection based techniques, Point, line detection, Edge detection, Edge linking, local processing, regional processing, Hough transform, Thresholding, Iterative thresholding,Otsu's method, Moving averages, Multivariable thresholding, Region-based segmentation, Watershed algorithm, Use of motion in segmentation

# SUGGESTED READINGS

- 1. Gonzalez, R. C., & Woods, R. E. (2008). Digital Image Processing (3rd ed.). New Delhi: Pearson Education.
- 2. Jain, A. K. (1989). Fundamentals of Digital image Processing. New Delhi: Prentice Hall ofIndia.
- 3. Castleman, K. R. (1996). Digital Image Processing. NewDelhi: PearsonEducation.
- 4. Schalkoff. (1989). Digital Image Processing and Computer Vision. New York: John Wiley and Sons.
- 5. Rafael, C. Gonzalez., Richard, E. Woods., & Steven Eddins. (2004). Digital Image Processing using MATLAB.New Delhi: Pearson Education.

- 1. https://www.tutorialspoint.com/dip/
- 2. https://www.engineersgarage.com/articles/image-processing-tutorial-applications
- 3. https://nptel.ac.in/courses/106105032/

Semester – VI

#### **19CGU602B COMPUTER GRAPHICS**

# 4H – 4C

Instruction Hours / week:L: 4 T: 0 P: 0 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

- To describe characteristics and functioning of common graphics input/output devices
- To learn the basic principles of 3- dimensional computer graphics
- To Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition
- To Provide an understanding of mapping from a world coordinates to device coordinates and projections.
- To extract scene with different clipping methods and its transformation to graphics display device.
- To explore projections and visible surface detection techniques for display of 3D scene on 2D screen

# Course Outcomes(COs)

- 1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
- 2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
- 3. Use of geometric transformations on graphics objects and their application in composite form.
- 4. Extract scene with different clipping methods and its transformation to graphics display device.
- 5. Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.
- 6. Render projected objects to naturalize the scene in 2D view and use of illumination models for this..

# **Unit I -INTRODUCTION**

Basic elements of Computer graphics, Applications of Computer Graphics.

# **Unit II -GRAPHICS HARDWARE**

Architecture of Raster and Random scan display devices, input/output devices.

# **Unit III- FUNDAMENTAL TECHNIQUES IN GRAPHICS**

Raster scan line, circle and ellipse drawing, thick primitives, Polygon filling, line and polygon clipping algorithms, 2D and 3D Geometric Transformations, 2D and 3D Viewing Transformations (Projections- Parallel and Perspective), Vanishing points.

# **Unit IV -GEOMETRIC MODELING**

Representing curves & Surfaces.

B.ScComputer Science	2019-2020
----------------------	-----------

# Unit V -Visible Surface determination

Hidden surface elimination.**Surface rendering-** Illumination and shading models. Basic color models and Computer Animation.

# SUGGESTED READINGS

1. J.D.Foley, A.Van Dan, Feiner, Hughes Computer Graphics Principles & Practice. (1990). 2nd Edition. Publication Addison Wesley.

2. D.Hearn, Baker. (2008). Computer Graphics. Prentice Hall of India. 2008.

3. D.F.Rogers.(1997). Procedural Elements for Computer Graphics. McGraw Hill.

4. D.F.Rogers. (1989). Adams Mathematical Elements for Computer Graphics. McGraw Hill 2<sup>nd</sup>Edition.

- 1. https://w3.cs.jmu.edu/bernstdh/web/common/references/graphics.php
- 2. www.cs.kent.edu/~farrell/cg02/reference/
- 3. www.cs.brandeis.edu/~cs155/Intro\_6.pdf

Semester - VI

# ARTIFICIAL INTELLIGENCE 3H – 3C

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

# **Course Objectives**

19CGU603A

- To gain a historical perspective of AI and its foundations.
- To become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
- To investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- To experience AI development tools such as an 'AI language', expert system shell, and/or data mining tool.
- To experiment with a machine learning model for simulation and analysis.
- To explore the current scope, potential, limitations, and implications of intelligent systems.

# **Course Outcomes (COs)**

- 1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
- 2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- 3. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- 4. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.
- 5. Demonstrate proficiency in applying scientific method to models of machine learning.
- 6. Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

# **Unit I – INTRODUCTION**

Introduction to Artificial Intelligence, Background and Applications, Turing Test and Rational Agent approaches to AI, Introduction to Intelligent Agents, their structure, behavior and environment.

# **Unit II - PROBLEM SOLVING AND SEARCHING TECHNIQUES**

Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search, Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, A\* algorithm, Constraint Satisfaction Problem, Means-End Analysis, Introduction to Game Playing, Min-Max and Alpha-Beta pruning algorithms.

# Unit III - KNOWLEDGE REPRESENTATION

Introduction to First Order Predicate Logic, Resolution Principle, Unification, Semantic Nets, Conceptual Dependencies, Frames, and Scripts, Production Rules, Conceptual Graphs.Programming in Logic (PROLOG)

# **Unit IV- DEALING WITH UNCERTAINTY AND INCONSISTENCIES**

Truth Maintenance System, Default Reasoning, Probabilistic Reasoning, Bayesian Probabilistic Inference, Possible World Representations.

# **Unit V- UNDERSTANDING NATURAL LANGUAGES**

Parsing Techniques, Context-Free and Transformational Grammars, Recursive and Augmented Transition Nets.

#### SUGGESTED READINGS

- 1. DAN.W. Patterson. Introduction to A.I and Expert Systems. PHI.2007.
- 2. Russell &Norvig. Artificial Intelligence-A Modern Approach. LPE. Pearson Prentice Hall.2nd edition. 2005.
- 3. Rich & Knight. Artificial Intelligence. Tata McGraw Hill. 2nd edition. 1991.
- 4. W.F. Clocksin and Mellish. Programming in PROLOG.Narosa Publishing House. 3rd edition. 2001.
- 5. Ivan Bratko. Prolog Programming for Artificial Intelligence. Addison-Wesley. Pearson Education. 3rd edition. 2000.

- 1. https://artint.info/html/ArtInt\_350.html
- 2. https://www.cleverism.com/artificial-intelligence-complete-guide/
- 3. https://search.credoreference.com/content/topic/artificial\_intelligence

3H - 3C

#### 19CGU603B SYSTEM PROGRAMMING

Semester – VI

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

# **Course Objectives**

- To introduce students the concepts and principles of system programming
- To provide students the knowledge about both theoretical and practical aspects of system programming, teaching them the methods and techniques for designing and implementing system-level programs.
- To train students in developing skills for writing system software with the aid of sophisticated OS services, programming languages and utility tools.
- To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
- To describe the various concepts of assemblers and macroprocessors.
- To understand how linker and loader create an executable program from an object module created by assembler and compiler.

# Course Outcomes(COs)

- 1. Understand different components of system software.
- 2. This course enables for good understanding of the role of system programming and the scope of duties and tasks of a system programmer.
- 3. This course enables to learn the concepts and principles of developing system-level software (e.g., compiler, and networking software)
- 4. Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
- 5. Describe the various concepts of assemblers and macroprocessors.
- 6. Understand how linker and loader create an executable program from an object module created by assembler and compiler.

# Unit I - ASSEMBLERS & LOADERS, LINKERS

One pass and two pass assembler design of an assembler, Absolute loader, relocation and linking concepts, relocating loader and Dynamic Linking., overview of compilation, Phases of a compiler.

# Unit II - LEXICAL ANALYSIS

Role of a Lexical analyzer, Specification and recognition of tokens, Symbol table, lexical

# Unit III – PARSING

Bottom up parsing- LR parser, **Intermediate representations:** Three address code generation, syntax directed translation, translation of types, control Statements.

# Unit IV- STORAGE ORGANIZATION

Activation records stack allocation.

# **Unit V- CODE GENERATION**

Object code generation

# SUGGESTED READINGS

- 1. SantanuChattopadhyaya. (2011). Systems Programming. New Delhi: PHI.
- 2. Alfred, V. Aho., Monica, S. Lam., RaviSethi., & Jeffrey, D. Ullman. (2006). Compilers: Principles, Techniques, and Tools (2nd ed.). New Delhi: Prentice Hall.
- 3. Dhamdhere, D. M. (2011). Systems Programming. New Delhi: Tata McGraw Hill.
- 4. Leland Beck., & Manjula, D. (2008). System Software: An Introduction to System Programming(3<sup>rd</sup> ed.). New Delhi: Pearson Education.
- 5. Grune, D., Van Reeuwijk, K., Bal, H. E., Jacobs, C. J. H., & Langendoen, K. (2012). ModernCompiler Design (2nd ed.). Springer.

- 1. https://cs.gmu.edu/~setia/cs365-S02/assembler.pdf
- 2. https://www.geeksforgeeks.org/compiler-lexical-analysis/
- 3. https://www.javatpoint.com/parser

#### 19CGU611A

# PHP PROGRAMMING - PRACTICAL

#### Semester – VI 4H – 2C

# Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

#### **Course Objectives**

- To write basic PHP syntax using various operators.
- To write PHP scripts to handle HTML forms.
- To analyze different tasks using PHP functions.
- To understand the regular expressions in PHP.
- To learn array data structure using PHP scripts.
- To work with open source applications that deal with database and website development.

# **Course Outcomes (COs)**

Upon completion of this course, students will be able to:

- 1. Write PHP scripts using operators to perform various functions
- 2. Design PHP scripts to handle HTML forms.
- 3. Implement different types of PHP functions.
- 4. Write regular expressions including modifiers, operators, and metacharacters.
- 5. Create PHP scripts using array.
- 6. Develop dynamic web pages.

# List of programs

1. Create a PHP page using functions for comparing three integers and print the largest number.

2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.

3. WAP to check whether the given number is prime or not.

4. Create a PHP page which accepts string from user. After submission that page displays the reverse of provided string.

5. Write a PHP function that checks if a string is all lower case.

6. Write a PHP script that checks whether a passed string is palindrome or not? ( A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)

7. WAP to sort an array.

8. Write a PHP script that removes the whitespaces from a string. Sample string : 'The quick brown fox' Expected Output : Thequickbrownfox

9. Write a PHP script that finds out the sum of first n odd numbers.

10. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.

11. Write a PHP script that checks if a string contains another string.

12. Create a simple 'birthday countdown' script, the script will count the number of days between current day and birth day.

13. Create a script to construct the following pattern, using nested for loop.

\* \* \* \* \* \* \* \* \* \*

14. Write a simple PHP program to check that emails are valid.

15. WAP to print first n even numbers.

16. \$color = array('white', 'green', 'red")

Write a PHP script which will display the colors in the following way : Output :

white, green, red,

• green • red

• white

17. Using switch case and dropdown list display a —Hello message depending on the language selected in drop down list.

18. Write a PHP program to print Fibonacci series using recursion.

19. Write a PHP script to replace the first 'the' of the following string with 'That'.

**Sample :** 'the quick brown fox jumps over the lazy dog.' **Expected Result :** That quick brown fox jumps over the lazy dog.

#### **19CGU611B UNIX / LINUX PROGRAMMING - PRACTICAL**

#### Semester - VI 4H - 2C

#### Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

# **Course Objective**

- To understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.
- To understand how the operating system abstractions can be used in the development of application programs, or to build higher level abstractions
- To understand how the operating system abstractions can be implemented •
- To understand the principles of concurrency and synchronization, and apply them to • write correct concurrent programs/software
- To understand basic resource management techniques like scheduling or time management, space management and principles and how they can be implemented.
- To know about the issues of performance and fairness objectives, avoiding deadlocks, as • well as security and protection.

#### **Course Outcomes(COs)**

- 1. This course teaches the student the concepts and principles that underlie modern operating systems, and a practice component to relate theoretical principles with operating system implementation.
- 2. Implement operating system abstractions in the development of application programs
- 3. Apply the principles of concurrency and synchronization to write correct concurrent programs/software
- 4. Implementbasic resource management techniques like scheduling or time management, space management
- 5. Learn about processes and processor management, memory management schemes, file system and secondary storage management.
- 6. Learn about issues of performance and fairness objectives, avoiding deadlocks, as well as security and protection

# **List of Programs**

- 1. Write a shell script to check if the number entered at the command line is prime or not.

 Write a shell script to modify —call command to display calendars of the specified months.
Write a shell script to modify —call command to display calendars of the specified range of months.

- 4. Write a shell script to accept a login name. If not a valid login name display message -
- -Entered login name is invalid.
- 5. Write a shell script to display date in the mm/dd/yy format.

6. Write a shell script to display on the screen sorted output of —who command along with the total number of users.

7. Write a shell script to display the multiplication table any number,

8. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.

9. Write a shell script to find the sum of digits of a given number.

10. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.

11. Write a shell script to find the LCD (least common divisor) of two numbers.

- 12. Write a shell script to perform the tasks of basic calculator.
- 13. Write a shell script to find the power of a given number.
- 14. Write a shell script to find the binomial coefficient C(n, x).
- 15. Write a shell script to find the permutation P(n,x).
- 16. Write a shell script to find the greatest number among the three numbers.
- 17. Write a shell script to find the factorial of a given number.
- 18. Write a shell script to check whether the number is Armstrong or not.
- 19. Write a shell script to check whether the file have all the permissions or not

#### Semester – VI 19CGU612A DIGITAL IMAGE PROCESSING - PRACTICAL 4H – 2C

# Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

# **Course Objectives**

- To understand the fundamental concepts of a digital image processing system.
- To understand concepts of image enhancement techniques.
- To apply various Image Transforms.
- To analyze various Compression techniques and Morphological concepts
- To know various segmentation techniques, and object descriptors.
- To apply color models and various applications of image processing

# **Course Outcomes (COs)**

- 1. Remember the fundamental concepts of image processing.
- 2. Explain different Image enhancement techniques
- 3. Understand and review image transforms
- 4. Analyze the basic algorithms used for image processing & image compression with morphological image processing.
- 5. Contrast Image Segmentation and Representation
- 6. Design & Synthesize Color image processing and its real world applications

#### List of programs

- 1. Write program to read and display digital image using MATLAB orSCILAB
  - a. Become familiar with SCILAB/MATLAB Basiccommands
  - b. Read and display image inSCILAB/MATLAB
  - c. Resize givenimage
  - d. Convert given color image into gray-scaleimage
  - e. Convert given color/gray-scale image into black & whiteimage
  - f. Draw imageprofile
  - g. Separate color image in three R G & Bplanes
  - h. Create color image using R, G and B three separateplanes
  - i. Flow control and LOOP inSCILAB
  - j. Write given 2-D data in imagefile
- 2. To write and execute image processing programs using point processingmethod
  - a. Obtain Negativeimage b. Obtain Flipimage
  - b. Thresholding d. Contraststretching
- 3. To write and execute programs for image arithmeticoperations
  - a. Addition of twoimages
  - b. Subtract one image from other image
  - c. Calculate mean value of image
  - d. Different Brightness by changing meanvalue
- 4. To write and execute programs for image logical perations
  - a. AND operation between twoimages

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

- b. OR operation between twoimages
- c. Calculate intersection of twoimages
- d. Water Marking using EX-ORoperation
- e. NOT operation (Negativeimage)
- 5. To write a program for histogram calculation and equalizationusing
  - a. Standard MATLABfunction
  - b. Program without using standard MATLAB functions
  - c. CProgram
- 6. To write and execute program for geometric transformation ofimage
  - a. Translation
  - b. Scaling
  - c. Rotation
  - d. Shrinking
  - e. Zooming
- 7. To understand various image noise models and to write programsfor
  - a. imagerestoration
  - b. Remove Salt and PepperNoise
  - c. Minimize Gaussiannoise
  - d. Median filter and Weinerfilter
- 8. Write and execute programs to remove noise using spatial filters
  - a. Understand 1-D and 2-D convolutionprocess
  - b. Use 3x3 Mask for low pass filter and high passfilter
- 9. Write and execute programs for image frequency domainfiltering
  - a. Apply FFT on givenimage
  - b. Perform low pass and high pass filtering in frequencydomain
  - c. Apply IFFT to reconstructimage
- 10. Write a program in C and MATLAB/SCILAB for edge detection using different edge detectionmask
- 11. Write and execute program for image morphological operations erosion anddilation.
- 12. To write and execute program for wavelet transform on given image and performinverse wavelet transform to reconstructimage.

Semester - VI

# 19CGU612BCOMPUTER GRAPHICS – PRACTICAL 4H – 2C

# Instruction Hours / week:L: 0 T: 0 P: 4Marks: Internal: 40 External: 60 Total: 100 End Semester Exam: 3 Hours

- To describe characteristics and functioning of common graphics input/output devices
- To learn the basic principles of 3- dimensional computer graphics
- To Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition
- To Provide an understanding of mapping from a world coordinates to device coordinates and projections.
- To extract scene with different clipping methods and its transformation to graphics display device.
- To explore projections and visible surface detection techniques for display of 3D scene on 2D screen

#### Course Outcomes(COs)

- 1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
- 2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
- 3. Use of geometric transformations on graphics objects and their application in composite form.
- 4. Extract scene with different clipping methods and its transformation to graphics display device.
- 5. Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.
- 6. Render projected objects to naturalize the scene in 2D view and use of illumination models for this..

#### **List of Programs**

- 1. Write a program to implement Bresenham's line drawing algorithm.
- 2. Write a program to implement mid-point circle drawing algorithm.
- 3. Write a program to clip a line using Cohen and Sutherland line clipping algorithm.
- 4. Write a program to clip a polygon using Sutherland Hodgeman algorithm.
- 5. Write a program to apply various 2D transformations on a 2D object (use homogenous coordinates).
- 6. Write a program to apply various 3D transformations on a 3D object and then apply paralleland perspective projection on it.
- 7. Write a program to draw Hermite/Bezier curve.

# Semester – VI

# 19CGU613A ARTIFICIAL INTELLIGENCE – PRACTICAL 3H – 1C

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

# **Course Objectives**

- To gain a historical perspective of AI and its foundations.
- To become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
- To investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- To experience AI development tools such as an 'AI language', expert system shell, and/or data mining tool.
- To experiment with a machine learning model for simulation and analysis.
- To explore the current scope, potential, limitations, and implications of intelligent systems.

# **Course Outcomes (COs)**

- 1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
- 2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- 3. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- 4. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.
- 5. Demonstrate proficiency in applying scientific method to models of machine learning.
- 6. Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

# List of programs

- 1. Write a prolog program to calculate the sum of two numbers.
- 2. Write a prolog program to find the maximum of two numbers.
- 3. Write a prolog program to calculate the factorial of a given number.
- 4. Write a prolog program to calculate the nth Fibonacci number.

5. Write a prolog program, insert\_nth(item, n, into\_list, result) that asserts that result is the list into list with item inserted as the n'th element into every list at all levels.

6. Write a Prolog program to remove the Nth item from a list.

7. Write a Prolog program, remove-nth(Before, After) that asserts the After list is the Before

list with the removal of every n'th item from every list at all levels.

8. Write a Prolog program to implement append for two lists.

9. Write a Prolog program to implement palindrome(List)

10. Write a Prolog program to implement max(X,Y,Max) so that Max is the greater of two numbers X and Y.

Karpagam Academy of Higher Education (Deemed to be University), Coimbatore - 641 021.

B.ScComputer Science	2019-2020
----------------------	-----------

11. Write a Prolog program to implement maxlist(List,Max) so that Max is the greatest number in the list of numbers List.

12. Write a Prolog program to implement sumlist(List,Sum) so that Sum is the sum of a given list of numbers List.

13. Write a Prolog program to implement two predicates evenlength(List) and oddlength(List) so that they are true if their argument is a list of even or odd length respectively.

14. Write a Prolog program to implement reverse(List,ReversedList) that reverses lists.

15. Write a Prolog program to implement maxlist(List,Max) so that Max is the greatest number in the list of numbers List using cut predicate.

16. Write a Prolog program to implement GCD of two numbers.

17. Write a prolog program that implements Semantic Networks/Frame Structures.

# 19CGU613B SYSTEM PROGRAMMING - PRACTICAL

#### Semester – VI 3H – 1C

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

# **Course Objectives**

- To introduce students the concepts and principles of system programming
- To provide students the knowledge about both theoretical and practical aspects of system programming, teaching them the methods and techniques for designing and implementing system-level programs.
- To train students in developing skills for writing system software with the aid of sophisticated OS services, programming languages and utility tools.
- To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
- To describe the various concepts of assemblers and macroprocessors.
- To understand how linker and loader create an executable program from an object module created by assembler and compiler.

# Course Outcomes(COs)

- 1. Understand different components of system software.
- 2. This course enables for good understanding of the role of system programming and the scope of duties and tasks of a system programmer.
- 3. This course enables to learn the concepts and principles of developing system-level software (e.g., compiler, and networking software)
- 4. Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
- 5. Describe the various concepts of assemblers and macroprocessors.
- 6. Understand how linker and loader create an executable program from an object module created by assembler and compiler.

# List of programs

- 1. To implement an assembler for a hypothetical language.
- 2. To get familiar with lex: write a program to recognize numbers, identifiers.
- 3. To get familiar with yacc: write a desk calculator