DON BOSCO ARTS & SCIENCE COLLEGE

ANGADIKADAVU

(Affiliated to Kannur University Approved by Government of Kerala)

ANGADIKADAVU P.O., IRITTY, KANNUR – 670706

COURSE PLAN

BCA

(2019 – 22)

SEMESTER - IV

ACADEMIC YEAR - (2020-21)

IV Semester BCA (2019 - 22)			
SL. No.	**Name of Subjects with Code**	**Name of the Teacher**	**Duty Hours per week**
1.	4B08 BCA SOFTWARE ENGINEERING	HEBIN LAYOLA	4
2.	4B09 BCA COMPUTER ORGANIZATION	FINCY CYRIAC	4
3.	4B10BCA LINUX PROGRAMMING	SRUTHI N	4
4.	4A14BCA DISCRETE MATHEMATICAL STRUCTURE	REMYA RAJ	4
5.	4C04CMT BCA MATHEMATICS FOR BCA IV	PRIJA V	4
	Name of Class Incharge	SRUTHI N	

TIME TABLE

Day	09.50 Am - 10.45 Am	10.45 Am - 11.40 Am	11.55 Am -12.50 Pm	01.40 Pm - 02.35 Pm	02.35 Pm - 03.30 Pm
1	4B10BCA Linux Programming	4A14BCA Discrete Maths	4B09 BCA Computer Organization	4B08 BCA Software Engineering	4C04CMT BCA Mathematics for Bca IV
2	4C04CMT BCA Mathematics for Bca IV	4B10BCA Linux Programming-Lab	4B08 BCA Software Engineering	4B10BCA Linux Programming	4A14BCA Discrete Maths
3	4B08 BCA Software Engineering	4B10BCA Linux Programming	4A14BCA Discrete Maths	4B09 BCA Computer Organization	4C04CMT BCA Mathematics for Bca IV
4	4B09 BCA Computer Organization	4B10BCA Linux Programming-Lab	4B10BCA Linux Programming	4A14BCA Discrete Maths	4C04CMT BCA Mathematics for Bca IV
5	4A14BCA Discrete Maths	4B09 BCA Computer Organization	4C04CMT BCA Mathematics for Bca IV	4B08 BCA Software Engineering	4B10BCA Linux Programming-Lab

Subject Code:	**4B08 BCA**
Subject Name:	**SOFTWARE ENGINEERING**
No. of Credits:	**4**
No. of Contact Hours:	**72**
Hours per Week:	**4**
Name of the Teacher:	**Hebin Layola**

Objective:

1. Understand the basic processes in software Development life cycle.
2. Familiarize with different models and their significance.
3. Approach software development in a systematic way.
4. To familiarize students with requirement engineering and classical software design techniques .
5. To introduce object oriented design concepts.
6. To familiarize with various Software

SYLLABUS

Module 1: Introduction to software engineering-Definition, program versus software, software process, software characteristics, brief introduction about product and process, software process and product matrices; Software life cycle models – Definition, waterfall model, increment process model, evolutionary process model, selection of the life cycle model.

Module 2: Software Requirement Analysis and Specification – Requirements engineering, types of requirements, feasibility studies, requirement elicitation, various steps of requirement analysis, requirement documentation, requirement validation. ** [An example which illustrate various stages in requirement analysis.]

Module 3: Software design – definition, various types, objectives and importance of design phase, modularity, strategy of design, function oriented design, IEEE recommended practice for software design descriptions.

Module 4: Objected Oriented Design – Analysis, design concept, design notations and specifications, design methodology. **[case study based on Objected Oriented Design]

Module 5: Software Testing – What is testing, Why should we test, who should do testing? Test case and Test suit, verification and validation, alpha beta and acceptance testing, functional testing , techniques to design test cases , Boundary value analysis, equivalence class testing, decision table based testing , cause effect graphing techniques ; structural testing , path testing , cyclomatic

complexity , Graph matrices , Data flow testing , mutation testing , levels of testing , unit testing , integration testing , system testing , validation testing , a brief introduction about debugging and various testing tools.

Text Book:

1. Software Engineering (Third Edition), K K Aggarwal, Yogesh singh, New age International Publication (For unit 1,2,3,5 and case study of unit 4)

2. An integrated approach to software Engineering (Second Edition), Pankaj Jalote , Narosa Publishing House - (For Unit 4)

References:

1. Software Engineering (Seventh edition), Ian Sommerville – Addison Wesley

2. Software Engineering A practitioners approach (Sixth Edition), Roger S Pressman - Mc Graw Hill.

3. Fundamentals of Software Engineering (Second Edition), Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli - Pearson Education.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	04-01-2021 To 08-01-2021	04 January	Study Leave
		05 January	II Semester University Exam
		06 January	II Semester University Exam
		07 January	II Semester University Exam
		08 January	II Semester University Exam
2	11-01-2021 To 15-01-2021	11 January	II Semester University Exam
		12 January	II Semester University Exam
		13 January	II Semester University Exam
		14 January	II Semester University Exam
		1	Introduction to Software Engineering-Definition
3	18-01-2021 To 22-01-2021	2	Program versus software
		3	Software characteristics, Software Process
		4	Brief introduction about product and process
4	25-01-2021 To 29-01-2021	5	Software process and product matrices
		26 January	Republic Day - Holiday
		6	Software life cycle models-definition
		7	Waterfall model
		8	Increment process model
5	01-02-2021 To 05-02-2021	9	Iterative Enhancement model
		10	Increment process model
		11	Rapid application development model
		12	Evolutionary process model
6	08-02-2021 To 12-02-2021	13	prototyping model
		14	Spiral model
		15	Selection of a life cycle
		16	Revision –Module 1
7	15-02-2021 To 19-02-2021	17	Class Test-Module 1
		18	Module-2-Software Requirement Analysis and Specification
		19	Requirements engineering
		20	Types of requirements
8	22-02-2021 To 26-02-2021	21	Feasibility studies
		22	Requirement elicitation
		23	Various steps of requirement analysis
		24	Requirement documentation

9	01-03-2021 To 05-03-2021	25	Requirement validation
		26	An example which illustrate various stages in requirement analysis
		27	**Revision-Module 2**
		28	Class Test-Module 2
10	08-03-2021 To 12-03-2021	29	Module-3-Software design – definition
		30	various types
		31	Objectives and importance of design phase
		11 March	Maha Sivarathri - Holiday
		32	Modularity
11	15-03-2021 To 19-03-2021		III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
12	22-03-2021 To 26-03-2021		III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
13	29-03-2021 To 02-04-2021	33	Modularity
		34	Modularity
			Easter Vacation
			Easter Vacation
			Easter Vacation
14	**05-04-2021 To 09-04-2021**		Easter Vacation
			Easter Vacation
			Easter Vacation
		35	Strategy of design,
15	**12-04-2021 To 16-04-2021**	36	Function oriented design
		37	IEEE recommended practice for software design descriptions
		14 April	**Vishu**
		38	**Revision-Module 3**
16	**19-04-2021 To 23-04-2021**	39	Class Test-Module 3
		40	Module -4-Objected Oriented Design – Analysis
		41	Design concept
		42	Design notations and specifications
17	**26-04-2021**	43	Design methodology
		44	Case study based on Objected Oriented Design

	To 30-04-2021	45	Revision-Module 4
		46	Class Test-Module 4
18	**02-05-2021 To 07-05-2021**	47	Software Testing – What is testing, Why should we test
		48	Who should do testing? Test case and Test suit
		49	Functional testing ,
		50	Verification and validation, alpha beta and acceptance testing
19	**10-05-2021 To 14-05-2021**	51	Boundary value analysis
		52	Equivalence class testing
		13 May	Eid-al-Fiter
		53	Decision table based testing
20	**17-05-2021 To 21-05-2021**	54	Cause effect graphing techniques
		55	Structural testing
		56	Techniques to design test cases
		57	Path testing
21	**30-06-2021 To 04-06-2021**	58	Cyclomatic complexity , Graph matrices
		59	Data flow testing , mutation testing
		60	Levels of testing
		61	Unit testing
22	**07-06-2021 To 11-06-2021**	62	Integration testing
		63	System testing
		64	Validation testing
		65	A brief introduction about debugging and various testing tools.
23	**14-06-2021 To 19-06-2021**	66	Revision-Module 5
		67	Class Test-Module 5
		68	Previous Year Question Paper Discussion
		69	Previous Year Question Paper Discussion
	22-06-2021 To 26-06-2021	70	Revision
		71	Class Test
		72	Revision
			Study Leave
			Study Leave
	28-06-2021 To 02-07-2021		IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam

Subject Code:	**4B09BCA**
Subject Name:	**COMPUTER ORGANIZATION**
No. of Credits:	**3**
No. of Contact Hours:	**72**
Hours per Week:	**4**
Name of the Teacher:	**Fincy Cyriac**

COURSE OUTCOME

CO1: Understand the basic operation of a computer system.

CO2: Understand the organization and design of basic digital computer

CO3: Introduce the concepts of microprogramming and design simple combinational digital systems.

CO4: Understand the organization of memory and techniques that computers use to communicate with I/O devices

Unit I: Functional Units and Basic operational Concepts of a digital computer (Textbook 2). Register Transfer and Micro operations: Register Transfer Language-Register Transfer- Bus and memory Transfer. Basic Computer Organization and Design: Instruction Codes – Computer Registers-Computer Instructions-Timing and Control-Instruction cycle- Memory Reference Instructions-I/O and Interrupt-Complete Computer Description- Design of Basic Computer.

(**18Hrs**)

Unit II: Micro Programmed Control: Control Memory – Address sequencing – Microprogram Example -Design of Control Unit. Central Processing Unit – General Register Organization – Stack Organization - Instruction Formats – Addressing modes – Data Transfer and Manipulations- Program Control – Reduced Instruction set computer(RISC).

(**18Hrs**)

Unit III: Input Output Organization: Peripheral Devices – Input/output Interfaces – Asynchronous Data Transfer – Modes of transfer –Priority Interrupt – Direct Memory Access (DMA) - Input Output Processor - Serial Communications.

(**12Hrs**)

Unit IV: Memory Organization: Memory Hierarchy – Main memory – Auxiliary Memory – Associative Memory – Cache memory – Virtual Memory.

(**12Hrs**)

Unit V: Pipelining: Parallel processing –Pipelining –Instruction pipeline. Multiprocessors: Characteristics of multiprocessors – Inter connection structures – Inter Processor Arbitration. (**12 Hrs**)

Books for Study:

1. M. Morris Mano, Computer System Architecture, 3rd Ed, Pearson
2. Carl Hamacher,ZvonkoVranesic and SafwatZaky, Computer Organization,5th Ed,TMH

Books for Reference:

1. William Stallings, Computer Organization and Architecture. 10th Ed, Pearson
2. John P. Hayes, Computer Architecture And Organization, 3rd Ed, TMH

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	04-01-2021 To 08-01-2021	04 January	Study Leave
		05 January	II Semester University Exam
		06 January	II Semester University Exam
		07 January	II Semester University Exam
		08 January	II Semester University Exam
2	11-01-2021 To 15-01-2021	11 January	II Semester University Exam
		12 January	II Semester University Exam
		13 January	II Semester University Exam
		14 January	II Semester University Exam
		1	Functional Units of a digital computer
3	18-01-2021 To 22-01-2021	2	Basic operational Concepts of a digital computer
		3	Register Transfer and Micro operations
		4	Register Transfer Language
		5	Register Transfer
4	25-01-2021 To 29-01-2021	6	Bus Transfer.
		26 January	Republic Day - Holiday
		7	memory Transfer
		8	Basic Computer Organization and Design
5	01-02-2021 To 05-02-2021	9	Instruction Codes
		10	Computer Register
		11	Computer Instruction
		12	Timing and Control
6	08-02-2021 To 12-02-2021	13	Instruction cycle
		14	Memory Reference Instruction
		15	I/O and Interrupt
		16	Complete Computer Description
7	15-02-2021 To 19-02-2021	17	Design of Basic Computer
		18	Module 1 class test
		19	Micro Programmed Control
		20	Control Memory
8	22-02-2021 To 26-02-2021	21	Address sequencing
		22	Microprogram Example
		23	Microprogram Example
		24	Design of Control Unit.

9	01-03-2021 To 05-03-2021	25	Design of Control Unit.
		26	Central Processing Unit
		26	General Register Organization
		27	Stack Organization
10	08-03-2021To 12-03-2021	28	Instruction Formats
		29	Instruction Formats
		11 March	Maha Sivarathri - Holiday
		30	Addressing modes
		31	Data Transfer and Manipulations
11	15-03-2021 To 19-03-2021		III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
12	22-03-2021 To 26-03-2021		III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
13	29-03-2021 To 02-04-2021	32	Data Transfer and Manipulations
		33	Program Control
		34	Reduced Instruction set computer(RISC)
			Easter Vacation
			Easter Vacation
			Easter Vacation
14	**05-04-2021 To 09-04-2021**		Easter Vacation
			Easter Vacation
			Easter Vacation
		35	Reduced Instruction set computer(RISC)
		36	Module 2 class test
15	**12-04-2021 To 16-04-2021**	37	Input Output Organization:
		14 April	**Vishu**
		38	Peripheral Devices
		39	Input/output Interfaces
16	**19-04-2021 To 23-04-2021**	40	Asynchronous Data Transfer
		41	Modes of transfer
		42	Modes of transfer
		43	Priority Interrupt
17	**26-04-2021**	44	Priority Interrupt
		45	Direct Memory Access (DMA)

	To 30-04-2021	46	Input Output Processor
		47	Serial Communications
18	**02-05-2021 To 07-05-2021**	48	Module 3 class test
		49	Memory Organization
		50	Memory Hierarchy
		51	Main memory
19	**10-05-2021 To 14-05-2021**	52	Main memory
		53	Auxiliary Memory
		13 May	Eid-al-Fiter
		54	Associative Memory
20	**17-05-2021 To 21-05-2021**	55	Associative Memory
		56	Cache memory
		57	Cache memory
		58	Virtual Memory
21	**30-06-2021 To 04-06-2021**	59	Virtual Memory
		60	Module 4 class test
		61	Parallel processing
		62	Parallel processing
22	**07-06-2021 To 11-06-2021**	63	Pipelining
		64	Pipelining
		65	Instruction pipeline.
		66	Multiprocessors:
23	**14-06-2021 To 19-06-2021**	67	Characteristics of multiprocessors
		68	Inter connection structures
		69	Inter connection structures
		70	Inter Processor Arbitration
	22-06-2021 To 26-06-2021	71	Inter Processor Arbitration
		72	Module 5 class test
			Study Leave
			Study Leave
	28-06-2021 To 02-07-2021		IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam

Subject Code:	4B10BCA
Subject Name:	LINUX PROGRAMMING
No. of Credits:	3
No. of Contact Hours:	72
Hours per Week:	4
Name of the Teacher:	Sruthi N

Unit I

Linux OS: History, Features and benefits of Linux, basic concepts of multi user system, open source, free Software concepts, Types of users in Linux, Types of files. **BASICS** : login, password, creating an account, shell and commands, logout, changing password, files and directories, relative and absolute pathnames, directory tree, current working directory, referring home directory, creating new directories, copying files, moving files, deleting files and directories , wild cards, hidden files, cat command **(18Hrs)**

Unit II

Vi editor: different modes-command mode, insert mode, last line mode, vi Editing commands – moving within a file, deleting, editing,Copy and Paste Commands, Saving and Closing the file, redirecting input/output-filter, pipes. **File permissions:** user, group, ls command (long listing),changing file permission. **(15Hrs)**

Unit III

Shell Scripting: Types of shell, Basic shell configuration for bourne and bash shell: /etc/profile, /etc/bashrc, ~/.bash_profile, ~/.bash_login, ~/.profile, ~/.bashrc, ~/.bash_logout, ~/.bash_history. Bourne shell scripts, script execution, variables and parameters, Control structures - Shell if then else, Shell if then elif, Shell for loop, Shell while loop, Shell until loop , Shell case, Shell function. **(15Hrs)**

Unit IV

Linux Boot process: LILO - boot process, /edc/lilo.conf file, GRUB - /etc/grub.conf file runlevels, rc files, startup scripts. **Mounting: mounting** file systems, structure of /etc/fstab. **Linux Administration** : Major services in Linux system - init, /etc/inittab file, login from terminal, syslog and its configuration file /etc/syslog.conf, periodic command execution: at and cron, crontab file , GUI, X windows. Starting and stopping different services – service command. **(12Hrs)**

Unit V: System Maintenance: tmpwatch command, logrotate utility. **Backup and Restore**: types of backup - full, differential, incremental, cp, tar commands. **Linux Installation: Partitioning**, MBR, SWAP, file system mount points, rpm utility - installation of packages. **(12Hrs)**

Books for Study:

1. YashavantKanetkar, UNIX Shell Programming, BPB

2. Æleen Frisch, Essential System Administration, 3rd Edition, O'Reilly Media

Books for Reference:

1. Arnold Robbins, Unix in a Nutshell, 4th Edition, O'Reilly Media 2. Evi Nemeth, Garth Snyder and Trent R. Hein, Linux Administration Handbook, 2nd Ed, Prentice Hall

3. Christopher Negus, Red Hat Linux Bible, John Wiley & Sons

4. Rebecca Thomas,Jean Yates, A User Guide to the Unix System, McGraw Hill

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	04-01-2021 To 08-01-2021	04 January	Study Leave
		05 January	II Semester University Exam
		06 January	II Semester University Exam
		07 January	II Semester University Exam
		08 January	II Semester University Exam
2	11-01-2021 To 15-01-2021	11 January	II Semester University Exam
		12 January	II Semester University Exam
		13 January	II Semester University Exam
		14 January	II Semester University Exam
		1	History, Features and benefits of Linux
3	18-01-2021 To 22-01-2021	2	Basic concepts of multi user system
		3	Open source, free Software concepts
		4	Types of users in Linux,Types of files
		5	**BASICS** : login, password, creating an account
4	25-01-2021 To 29-01-2021	6	Shell and commands, logout, changing password
		26 January	Republic Day - Holiday
		7	Files and directories
		8	Relative and absolute pathnames, directory tree
5	01-02-2021 To 05-02-2021	9	Current working directory, referring home directory
		10	Copying files, moving files, deleting files and directories
		11	Wild cards, hidden files, cat command
		12	Revision Module 1
6	08-02-2021 To 12-02-2021	13	Class test Module1
		14	**Vi editor**: different modes
		15	VI Editing commands
		16	Copy and Paste Commands
7	15-02-2021 To 19-02-2021	17	Saving and Closing the file
		18	Redirecting input/output-filter, pipes
		19	**File permissions:** user, group
		20	ls command
8	22-02-2021 To 26-02-2021	21	Changing file permissions
		22	Revision Module 2
		23	Class test Module2
		24	**Shell Scripting**: Types of shell
9	01-03-2021	25	Basic shell configuration for bourne and bash shell:

	To 05-03-2021		/etc/profile.
		26	/etc/bashrc, ~/.bash_profile
		26	~/.bash_login, ~/.profile
		27	~/.bash_logout, ~/.bash_history
10	08-03-2021 To 12-03-2021	28	Bourne shell scripts, script execution
		29	Variables and parameters
		11 March	Maha Sivarathri - Holiday
		30	Variables and parameters
		31	Control structures
11	15-03-2021 To 19-03-2021		III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
12	22-03-2021 To 26-03-2021		III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
13	29-03-2021 To 02-04-2021	32	Control structures
		33	Control structures
		34	Control structures
			Easter Vacation
			Easter Vacation
			Easter Vacation
14	**05-04-2021 To 09-04-2021**		Easter Vacation
			Easter Vacation
			Easter Vacation
		35	Shell case, Shell function
		36	Shell case, Shell function
15	**12-04-2021 To 16-04-2021**	37	Shell case, Shell function
		14 April	**Vishu**
		38	Revision Module 3
		39	Class test Module 3
16	**19-04-2021 To 23-04-2021**	40	**Linux Boot process**: LILO - boot process, /edc/lilo.conf file
		41	**Linux Boot process**: LILO - boot process, /edc/lilo.conf file
		42	**Linux Boot process**: LILO - boot process, /edc/lilo.conf file

		43	GRUB - /etc/grub.conf file
17	**26-04-2021 To 30-04-2021**	44	GRUB - /etc/grub.conf file
		45	GRUB - /etc/grub.conf file
		46	Runlevels, rc files, startup scripts
		47	Runlevels, rc files, startup scripts
18	**02-05-2021 To 07-05-2021**	48	**Mounting** file systems
		49	Major services in Linux system - init, /etc/inittab file
		50	Syslog and its configuration file /etc/syslog.conf
		51	Periodic command execution: at and cron
19	**10-05-2021 To 14-05-2021**	52	GUI, X windows
		53	Starting and stopping different services – service command
		13 May	Eid-al-Fiter
		54	Revision Module 4
20	**17-05-2021 To 21-05-2021**	55	Class test Module 4
		56	**System Maintenance**: tmpwatch command
		57	Logrotate command
		58	**Backup and Restore**: types of backup
21	**30-06-2021 To 04-06-2021**	59	**Backup and Restore**: types of backup
		60	Cp, tar commands
		61	Cp, tar commands
		62	**Linux Installation: Partitioning**
22	**07-06-2021 To 11-06-2021**	63	**Linux Installation: Partitioning**
		64	MBR, SWAP
		65	File system mount points
		66	File system mount points
23	**14-06-2021 To 19-06-2021**	67	Rpm utility - installation of packages
		68	Rpm utility - installation of packages
		69	Rpm utility - installation of packages
		70	Revision Module 4 & 5
	22-06-2021 To 26-06-2021	71	Class test Module 4
		72	Class test Module 5
			Study Leave
			Study Leave
	28-06-2021 To 02-07-2021		IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam

Subject Code:	**4C04 AMT-BCA**
Subject Name:	**Mathematics for BCA IV**
No. of Credits:	4
No. of Contact Hours:	72
Hours per Week:	4
Name of the Teacher:	Prija V

Unit I- Probability (18 hours)

Text: Higher Engineering Mathematics (41st edition), B.S. Grewal, Khanna Pub.

Probabiliy – introduction, principle of counting, permutations, combinations,basic terminology, definition of probability, statistical definition of probability,probability and set notations, random experiment, sample space, event, axioms,notations, addition law of probability or theorem of total probability (proof excluded), independent events, multiplication law of probability.

(Sections 26.1, 26.2, 26.3, 26.4, 26.5)

Unit II- Linear Programming (24 hours)

Text: Operations Research (18th thoroughly revised edition), Kantiswaroop, P.K. Gupta and Manmohan, Sultan Chand & Sons.

Mathematical formulation of daily life situations – simple cases only

*(Questions should be avoided for end semester examination from this section).*Canonical and standard form, Graphical solution method, Simplex method – computational procedure (Proof of theorems excluded)(Sections 2.1, 2.2, 2.3, 2.4, 3.2, 4.3)

Unit III - Linear programming (14 hours)

Text: Operations Research (18th thoroughly revised edition), Kantiswaroop, P.K. Gupta and Manmohan, Sultan Chand & Sons.

Network routing problems – introduction, network flow problem, minimal spanning tree problem, shortest route problems (algorithm omitted)(Sections 24.1, 24.2, 24.3, 24.4)

Unit IV - Numerical Analysis (16 hours)

Text: Introductory Methods of Numerical Analysis (fifth edition), S.S. Sastri PHI Learning, 2015

Numerical Integration: Trapezoidal Rule, Simpson's 1/3- Rule
(Sections 6.4, 6.4.1, 6.4.2)Numerical Solutions of Ordinary Differential Equations: Introduction, Solution by Taylor's series, Euler's method, Modified Euler's method, Runge-Kutta methods. (Sections 8.1, 8.2, 8.4, 8.4.2, 8.5)

References

1. Introduction to Probability and Statistics, S. Lipschutz, J. Schiller, Schaum's Outline series
2. Linear Programming, G. Hadley, Oxford & IBH Publishing Company, New Delhi.
3. Operations Research, S. Kalavathy, Vikas Pub.
4. Mathematical methods, S. R. K. Iyengar and R. K. Jain, Narosa Pub
5. Advanced Engineering Mathematics (10th edition), E. Kreyszig, Wiley

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	04-01-2021 To 08-01-2021	04 January	Study Leave
		05 January	II Semester University Exam
		06 January	II Semester University Exam
		07 January	II Semester University Exam
		08 January	II Semester University Exam
2	11-01-2021 To 15-01-2021	11 January	II Semester University Exam
		12 January	II Semester University Exam
		13 January	II Semester University Exam
		14 January	II Semester University Exam
		1	Unit I- Probabiliy – introduction. Definitions.
3	18-01-2021 To 22-01-2021	2	Examples.
		3	Exercise questions.
		4	Principle of counting, Definitions.
		5	Examples.
4	25-01-2021 To 29-01-2021	6	Permutations, Definitions.
		26 January	Republic Day - Holiday
		7	Combinations, Definitions.
		8	Exercise questions.
5	01-02-2021 To 05-02-2021	9	basic terminology, Definitions, Exercise questions.
		10	definition of probability
		11	Class test.
		12	statistical definition of probability, Examples, Exercise questions.
6	08-02-2021 To 12-02-2021	13	probability and set notations
		14	Examples, Exercise questions.
		15	random experiment, Examples, Exercise questions.
		16	sample space.
7	15-02-2021 To 19-02-2021	17	event, axioms, notations, Definitions.
		18	Examples, Exercise questions.
		19	addition law of probability or theorem of total probability, Examples, Exercise questions.
		20	independent events, multiplication law of probability
8	22-02-2021 To	21	Examples, Exercise questions.
		22	Class test.
		23	Unit II-Mathematical formulation of daily life situations

	26-02-2021		– simple cases only.
		24	Canonical form of LPP, Definitions. Examples, Exercise questions.
9	01-03-2021 To 05-03-2021	25	Examples, Exercise questions.
		26	standard form of LPP, Definitions.
		27	Examples, Exercise questions.
		28	Class test.
10	08-03-2021 To 12-03-2021	29	Graphical solution method.
		30	Examples, Exercise questions. Assignment.
		31	Examples, Exercise questions
		11 March	Maha Sivarathri - Holiday
11	15-03-2021 To 19-03-2021		III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
12	22-03-2021 To 26-03-2021		III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
13	29-03-2021 To 02-04-2021	32	Simplex method – computational procedure.
			Easter Vacation
			Easter Vacation
			Easter Vacation
14	05-04-2021 To 09-04-2021		Easter Vacation
			Easter Vacation
			Easter Vacation
		33	Class test.
15	12-04-2021 To 16-04-2021	34	Unit III-Network routing problems – introduction.
		35	network flow problem
		14 April	**Vishu**
		36	Examples, Exercise questions.
		37	Examples, Exercise questions.
16	19-04-2021 To 23-04-2021	38	Minimal spanning tree problem, Definitions. Examples.
		39	Examples, Exercise questions.
		40	Assignment
		41	Examples, Exercise questions.
17	26-04-2021	42	Examples, Exercise questions.
		43	Examples, Exercise questions.

	To 30-04-2021	44	Class test.
		45	shortest route problems, Definitions. Examples.
18	02-05-2021 To 07-05-2021	46	Examples, Exercise questions.
		47	Examples, Exercise questions.
		48	Seminar.
		49	Seminar.
19	10-05-2021 To 14-05-2021	50	Exercise questions.
		51	Numerical Integration- Introduction ,Trapezoidal Rule.
		52	Examples, Exercise questions.
		53	Examples, Exercise questions.
			Eid-al-Fiter
20	17-05-2021 To 21-05-2021	54	Simpson's 1/3- Rule – Introduction.
		55	Examples, Exercise questions.
		56	Examples, Exercise questions.
		57	Numerical Solutions of Ordinary Differential Equations: Introduction
21	30-06-2021 To 04-06-2021	58	Examples, Exercise questions.
		59	Examples, Exercise questions.
		60	Solution by Taylor's series– Introduction.
		61	Examples, Exercise questions.
22	07-06-2021 To 11-06-2021	62	Euler's method– Introduction.
		63	Examples, Exercise questions.
		64	Examples, Exercise questions.
		65	Modified Euler's method- Introduction.
23	14-06-2021 To 19-06-2021	66	Examples, Exercise questions.
		67	Runge-Kutta methods- Introduction.
		68	Examples, Exercise questions.
		69	Examples, Exercise questions.
	22-06-2021 To 26-06-2021	70	Revision.
		71	Revision.
		72	Revision.
			Study Leave
			Study Leave
	28-06-2021 To 02-07-2021		IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam

Subject Code:	**4A14BCA**
Subject Name:	**DISCRETE MATHEMATICAL STRUCTURES**
No. of Credits:	**4**
No. of Contact Hours:	**72**
Hours per Week:	**4**
Name of the Teacher:	**REMYA RAJ**

Unit I

Sets and Mathematical Logic: Set Theory - Types of sets, Set operations, Principles of Inclusion and Exclusion. Mathematical Logic - Propositional Calculus - Statement, Connectives, Conditional and Biconditional, Equivalence of Formula, Well Formed Formula, Tautologies, Normal Forms, Theory of Inference for the Statement Calculus, Predicate Calculus, Theory of Inference for the Predicate Calculus. **(12 Hrs)**

Unit II

Functions and Relations: Functions – Types of Functions, Composition of Functions and Inverse Functions. Relations - Relations and Their Properties, Functions as relations, Closure of Relations, Composition of relations, Equivalence Relations and Partitions. Partial Ordering, Hasse Diagram.The Pigeonhole Principle. **(15 Hrs)**

Unit III

Lattices and Boolean Algebra - Lattices and Algebraic Systems, Principles of Duality, Basic Properties of Algebraic Systems Defined by Lattices, Distributive Lattices and Complemented Lattices. Boolean Lattices and Boolean Algebras.Boolean Functions and Boolean Expressions.

(15 Hrs)

Unit IV

Group Theory – Definition and Elementary Properties - Permutation Groups, Cyclic Groups – Subgroups - Cosets,Semigroup and Monoid.Homomorphism and Isomorphism.Rings, Integral Domains and Fields. **(15 Hrs)**

Unit V

Graph Theory- Basic concepts- Introduction, Directed Graph, Undirected Graph, Connected and Disconnected Graphs, Bipartite Graph, Complete Bipartite Graph, Isomorphic Graphs, Subgraph. Paths and Circuits.Shortest Paths in Weighted Graphs Dijkstra's Algorithm.Eulerian Paths and Circuits, Hamiltonian Paths and Circuits.Storage representation and manipulation of graphs.Minimum Spanning Trees. **(15 Hrs)**

Books for Study:

1. Kenneth H. Rosen and Kamala Krithivasan, Discrete Mathematics And Its Applications with Combinatorics and Graph Theory, 7th Ed, TMH

Books for Reference:

1. J. K. Sharma, Discrete Mathematics, 2004, Macmillan Publishers India Limited 2. Alan Doerr, Kenneth Levasseur, Applied Discrete Structures for Computer Science, Galgotia Publications Pvt Ltd

3. N Ch S N Iyengar, V. M. Chandrasekaran, K. A. Venkatesh and P. S. Arunachalam, Discrete Mathematics, Vikas Publishing

4. C. L. Liu and D. P. Mohapatra, Elements Of Discrete Mathematics (SIE), 4thEd, TMH

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	04-01-2021 To 08-01-2021	04 January	Study Leave
		05 January	II Semester University Exam
		06 January	II Semester University Exam
		07 January	II Semester University Exam
		08 January	II Semester University Exam
2	11-01-2021 To 15-01-2021	11 January	II Semester University Exam
		12 January	II Semester University Exam
		13 January	II Semester University Exam
		14 January	II Semester University Exam
		1	Set theory-basic concepts
3	18-01-2021 To 22-01-2021	2	Venn diagram-examples
		3	Cartesian product-examples
		4	Functions -injective functions,examples
		5	Surjective functions-examples
4	25-01-2021 To 29-01-2021	6	Bijective functions-examples
		26 January	Republic Day - Holiday
		7	Mathematical logic-propositional calculus-statements, examples
		8	Connectives, negation-examples
5	01-02-2021 To 05-02-2021	9	Conjuction, disjunction-examples
		10	Biconditional statement, equivalence formula-examples
		11	Well formed formula
		12	Tautologies-examples
6	08-02-2021 To 12-02-2021	13	Normal forms
		14	Rules of inference
		15	Revision
		16	Class test
7	15-02-2021 To 19-02-2021	17	Functions -types of functions, examples
		18	examples
		19	Composition of functions-examples
		20	Inverse functions-examples
8	22-02-2021 To 26-02-2021	21	Relations and their properties
		22	Functions as relations, examples
		23	Closure of relations, examples
		24	Composition of relations, examples

9	01-03-2021 To 05-03-2021	25	Equivalence relations, examples
		26	Partitions, examples
		27	Partial ordering, examples
		28	Hasse diagram, examples
10	08-03-2021 To 12-03-2021	29	The pigeonhole principle
		30	Revision
		31	Class test
		11 March	Maha Sivarathri - Holiday
11	15-03-2021 To 19-03-2021		III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
12	22-03-2021 To 26-03-2021		III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
			III Semeser U G Examination
13	29-03-2021 To 02-04-2021	32	Boolean algebra: definition, laws
		33	Laws
			Easter Vacation
			Easter Vacation
			Easter Vacation
14	05-04-2021 To 09-04-2021		Easter Vacation
			Easter Vacation
			Easter Vacation
		34	Boolean functions and expressions
		35	Boolean functions and expressions
15	12-04-2021 To 16-04-2021	36	Representation of Boolean expressions
		37	Representation of Boolean expressions
		14 April	**Vishu**
		38	Applications of Boolean algebra
16	19-04-2021 To 23-04-2021	39	Revision
		40	Class test
		41	Graph theory- basic concepts
		42	Paths ,circuits, examples
17	26-04-2021 To 30-04-2021	43	Subgraph - examples
		44	Bipartite graph ,complete bipartite graphs-examples
		45	Isomorphic graphs -examples
		46	Trees – definition, examples

18	02-05-2021 To 07-05-2021	47	Spanning trees - examples
		48	Minimal spanning trees – examples
		49	BFS ,DFS
		50	Incidence matrix-examples
19	10-05-2021 To 14-05-2021	51	Traveling salesman problem
		52	Revision
		53	Class test
		13 May	Eid-al-Fiter
20	17-05-2021 To 21-05-2021	54	Planar graph, examples
		55	Shortest path in weighted graphs, examples
		56	Euler path and circuit, examples
		57	Hamiltonian path and circuit, examples
21	30-06-2021 To 04-06-2021	58	Storage representation of graphs, examples
		59	Examples
		60	Graph coloring, examples
		61	Examples
22	07-06-2021 To 11-06-2021	62	Revision
		63	Class test
		64	Revision of module 1
		65	Revision of module 1
23	14-06-2021 To 19-06-2021	66	Revision of module 2
		67	Revision of module 2
		68	Revision of module 3
		69	Revision of module 4
	22-06-2021 To 26-06-2021	70	Revision of module 5
		71	Class test
		72	Class test
			Study Leave
			Study Leave
	28-06-2021 To 02-07-2021		IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam
			IV Semester UG Internal Exam