SRI RAMAKRISHNA COLLEGE OF ARTS AND SCIENCE

(An Autonomous Institution)

Nava India, Avinashi Road, Coimbatore

Scheme of Examination

(For the students admitted during the academic year 2020 - 2021 and onwards)

Under

Choice Based Credit System (CBCS)

&Learning Outcomes-Based Curriculum Framework (LOCF)

UNDERGRADUATE PROGRAMMES

Programme: BSc   **Branch: Computer Science**

Part	Course Code	Study Components and Course Title	CIA	Comprehensive Exam (Theory)			Total Marks	Credit
				Online	Descriptive	Total		
Semester – I								
I	20TA01/20HA01/20MA01/20FA01/20AA01	Language-I/**AECC-II** (MIL)	40	10	50	60	100	3
II	20EA01	English-I/**AECC-I**	40	10	50	60	100	3
III	20CSC01	CORE / **DSC-I** Digital Fundamentals and Computer Organization	40	10	50	60	100	3
	20ICS11	CORE / **DSC – I** Software Foundation and Programming using Python	40	-	-			
III	20ITC01	CORE / **DSC-II** Programming in C	40	10	50	60	100	4
III	20ITC02	CORE / **DSC-III** Practical : C Programming and Bio Computing Lab	40	-	-	60	100	3
	20CS101	CORE / **DSC-III** C Programming lab		10	50			
III	20MATCG11	Allied-I /**GE-I** Numerical and statistical methods	40	10	50	60	100	4
	20MATCG10	Allied-I /**GE-I** Statistical methods						
IV	20ESA01/20EIA01	Environmental Studies #/Foundation Course on	100	-	-	-	100**	1#

Part	Course Code	Title						
		Entrepreneurship & Innovation # / **AECC**						
IV	20LSA01	Life Skills-I @ / **SEC** I	100	-	-	-	100**	2 @
V	20NS01 / 20NC01 / 20SP01 / 20YR01 / 20SI01 / 20RB01	Extension Activities NSS/NCC/SPORTS/YRC/SIS	Assessment will be in the Final Semester					

Semester –II

Part	Course Code	Title						
I	20TA02/20HA02/20MA02/20FA02/20AA02	Language-II /**AECC-II** (MIL)	40	10	50	60	100	3
II	20EA02	English-II /**AECC-I**	40	10	50	60	100	3
III	20CACP01	CORE / **DSC-IV** Data Structures and lab using C	50	-	-	50	100	5
	20ICS21	CORE / **DSC-IV** Practical – 3:Foundation in Business Analytics						
III	20CSCP01	CORE / **DSC-V** Java Programming with Bio-Perl Lab	50	-	-	50	100	5
	20ICSP201	CORE / **DSC-V** Advanced java programming with lab						
III	20CSE01/ 20CSE02/ 20CSE03	Elective / **DSE-I**	40	10	50	60	100	4
III	20MATCG12	Allied-II /**GE-II** Discrete Mathematics	40	10	50	60	100	4
IV	20ESA02/ 20EIA02	Environmental Studies /Foundation Course on Entrepreneurship & Innovation #/ **AECC**	100	-	-	-	100**	1#
IV	20LSA02	Life Skills-II @/ **SEC** II	100	-	-	-	100**	2 @
IV	20CS201	Internship / Institutional Training / Mini-Project (Summer Course-1 #)	100 #	-	-	-	100**	1$

Semester III ~

Part	Course Code	Title						
III	20CSCP02	CORE / **DSC-VI** Python Programming with bio python lab	50	-	50	50	100	5
	20ICS31	CORE / **DSC-VI**	40	10	50	60		

		Business Intelligence						
III	20CAC01	CORE / **DSC-VII** RDBMS	40	10	50	60	100	3
III	20ITC03	CORE / **DSC-VIII** Data Mining	40	10	50	60	100	3
III	20CAC02	CORE / **DSC - IX** RDBMS LAB	40	10	50	60	100	3
	20UIT304	Case Study / Project / Other Activity ##						
III	20CSI01	Open Elective-1/**AEE-I**	40	10	50	60	100	4
III	20MATCG15	Allied-III /**GE-III** Operations Research	40	10	50	60	100	4
III	20CSE04/ 20CSE05/ 20CSE06	Electives / **DSE II**	40	10	50	60	100	4
IV	20BT01/ 20AT01	Basic Tamil-I / Advanced Tamil-I #	100	-	-	-	100**	1$
IV	20PEA01	PACE-I @ / **SEC-III**	-	-	-	100	100**	1@
IV	20CAV01	JOC / VAC-I$	-	-	-	-	-	1$
Semester IV								
III	20CSCP03	CORE / **DSC-X** Web programming with Bio Perl lab	50	-	50	50	100	5
		CORE / **DSC-X** Web Programming with lab						
III	20CS401	CORE / **DSC-XI** Artificial intelligence	40	-	-	60	100	3
III	20ITC04	CORE / **DSC-XII** Software engineering	40	10	50	60	100	3
III	20ICS41	CORE / **DSC-XIII** Design and Analysis of Algorithm	40	10	50	60	100	3
	20CS402	CORE / **DSC-XIII** Predictive Modeling						
III	20CAC03	CORE / **DSC-XIV** Software testing lab	40	10	50	60	100	3
III	20CSE07/ 20CSE08/ 20CSE09	Electives / **DSE-III**	40	10	50	60	100	4
III	20COC01	Allied-IV /**GE-IV** Business Accounting	40	10	50	60	100	4
	20MATCG20	Allied-IV /**GE-IV** Research Methodology						

IV	20BT02/ 20AT02	Basic Tamil-II / Advanced Tamil-II #	100	-	-	-	100**	1$
IV	20PEA02	PACE-II @ / **SEC-IV**	-	-	-	100	100**	1@
IV	20CAV02	JOC/VAC–II $	-	-	-	-	-	1$
IV	20CA405	Internship / Institutional Training / Mini-Project (Summer Course-2 #)	100 #	-	-	-	100**	1$
Semester V								
III	20CAC04	CORE / **DSC-XV** Operating System	40	10	50	60	100	3
III	20CAC05	CORE / **DSC-XVI** Practical: Operating System Lab	40	-	-	60	100	3
III	20ITC05	CORE / **DSC-XVII** Machine Learning	40	10	50	60	100	3
	20ICS51	CORE / **DSC-XVII** AP SKILLS						
III	20CS501	Core/ **DSC-XVIII** Cyber Security	40	10	50	60	100	3
III	20ITC09	CORE / **DSC-XIX** Practical: Machine Learning with bio tools Lab	40	10	50	60	100	3
III	20CSI02	Open Elective-II/**AEE-II**	40	10	50	60	100	4
III	20CSE010/ 20CSE011/ 20CSE012	Electives/**DSE-IV**	40	10	50	60	100	4
IV	20PEA03	PACE-III @ / **SEC-V**	-	-	-	100	100**	1@
IV	20CAV03	JOC/VAC-III $	-	-	-	-	-	1$
Semester VI								
III	20CS601	CORE / **DSC-XX** - Block Chain	40	10	50	60	100	4
III	20CSC02	CORE / **DSC-XXI** - Image processing	40	10	50	60	100	3
III	20CS602	CORE / **DSC XXII-** Project / Student Research	80	-	-	20	100	5
IV	20CSS601	Self-Study Course Open source tools	-	-	100	100	100**	3$
V	20NS01 / 20NC01 / 20SP01/ 20YR01/ 20SI01/ 20RB01	Extension Activities NSS/NCC/SPORTS/ YRC/SIS #	100	-	-	-	100**	1

$ Extra credit courses in which Basic Tamil and Advanced Tamil are for the candidates who opted other than Tamil Language in Part–I.

\# Continuous Internal Assessment (CIA) only.

@ Comprehensive Examinations only.

** Not included in Total Marks and CGPA Calculation.

@@ MOOC Course- Minimum of 30 Hours from recognized MOOC portal like SWAYAM, Coursera, etc. Assessment with Score/Credit and Certificate is mandatory.

Abstract of
Scheme of Examination

(For the students admitted during the academic year 2020 - 2021 and onwards)

Part	Course	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages/**AECC-II** (MIL)	2	3	6	100	200
Part II	English/**AECC-I**	2	3	6	100	200
Part III	Core /**DSC**	22	15X3 2X4 5X5	78	100	2200 +400
	Allied /**GE**	4	4	16	100	
	Open Electives /**AEE**	2	4	8	100	200
	Electives/**DSE**	4	4	16	100	400
Part IV	*Lang. (BCT/AT #)*	2	*1*	*2$*	100	*200****
	EVS & EI / **AECC-III** \#	2	1	2	100	200****
	Job Oriented Course / Value Added Course	*3*	*1*	*3$*	-	-
	Skill Based/ PACE/ **SEC** @	3	1	3	100	300****
	Life Skills / **SEC** @	2	2	4	100	200****
	*Self-Study Course /**DSC** **Open source tools**	*1*	*3*	*3$*	100	*100****
	Internship/Institutional Training/Mini-Project (Summer Courses #)	*2*	*2*	*2$*	100	*200****
Part V	@ Extension	1	1	1	100	100****
	Total			**140 + (10Extra Credits)**		**3600 + (1500***)**
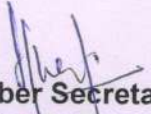
Note:
- **Four core courses are mandatory in MOOC Portal**
- **Minimum 20 and Maximum 24 Credit/Semester (except for VI Sem)**
- **VI Semester will have 12 To 16 Credit (Core/DSE Papers Only)**

List of Open Elective Papers	
Open Electives	Yoga for Human Excellence Human Health & Hygiene Indian Culture and Heritage Indian Constitution and Political System Consumer Awareness and Protection Professional Ethics and Human Values Human Rights, Women's Rights& Gender Equality Disaster Management Green Farming Campus to Corporate How to start a Business? Research Methodology and IPR General Studies for Competitive Examinations IIT JAM Examination (for Science only) CUCET Examination
20CSI01	Fundamentals of Information Technology
20CSI02	Internet of Things

List of Elective Papers/ DSE (Can choose any one of the paper as electives)		
	Course Code	Title
Electives/ **DSE-I**	20CSE01	P/C Hardware
	20CSE02	Distributed Computing
	20CSE03	Compiler Design
Electives / **DSE-II**	20CSE04	Microprocessor
	20CSE05	Grid Computing
	20CSE06	Theory of Computation
Electives / **DSE-III**	20CSE07	Assembly Language Programming
	20CSE08	Cloud Computing
	20CSE09	Robotics
Electives / **DSE-IV**	20CSE010	Data Analytics
	20CSE011	Natural language processing
	20CSE012	Game theory

Syllabus Coordinator

BOS-Chairman/Chairperson

Member Secretary
Academic Council

Outline of Learning Outcomes-Based Curriculum Framework (LOCF)

1. Core Course: A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

2. Elective Course: Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/subject of study or which provides an extended scope or which enables an exposure tosome other discipline/subject/domain or nurtures the candidate's proficiency/skill iscalled an Elective Course.

2.1 Discipline Specific Elective (DSE) Course: Elective courses may be offered by the**main discipline/subject of study** is referred to as Discipline Specific Elective. TheInstitute may also offer discipline related Elective courses ofinterdisciplinary nature (to be offered by main discipline/subject of study).

2.2 Dissertation/Project: An elective course designed to acquire special/advancedknowledge, such as supplement study/support study to a project work, and acandidate studies such a course on his own with an advisory support by ateacher/faculty member is called dissertation/project.

2.3 Generic Elective (GE) Course: An elective course chosen generally from an**unrelated discipline/subject**, with an intention to seek exposure is called a GenericElective.

P.S.: A core course offered in a discipline/subject may be treated as an elective byother discipline/subject and vice versa and such electives may also be referred to asGeneric Elective.

3. Ability Enhancement Courses (AEC): The Ability Enhancement (AE) Courses may beof two kinds: Ability Enhancement Compulsory Courses (AECC) and Skill Enhancement Courses (SEC). "AECC" courses are the courses based upon the content that leads to Knowledge enhancement; i. Environmental Science and ii. English/MIL Communication.These are mandatory for all disciplines. SEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

3.1 Ability Enhancement Compulsory Courses (AECC): Environmental Science, EnglishCommunication/ Media and Information Literacy (MIL) Communication.

3.2 Skill Enhancement Courses (SEC): These courses may be chosen from a pool ofcourses designed to provide value-based and/or skill-based knowledge.

Introducing Research Component in Under-Graduate Courses

Project work/Dissertation is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem. A Project/Dissertationwork would be of 6 credits. A Project/Dissertation work may be given in lieu of a disciplinespecific elective paper.

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SEMESTER I

COURSE CODE	COURSE NAME	CATE GORY	L	T	P	CREDIT	ASSESSMENT CODE
20CSC01	DIGITAL FUNDAMENTALS AND COMPUTER ORGANIZATION	DSC	45	-	-	3	A

PREAMBLE / COURSE OBJECTIVE

This course aims at facilitating the students to understand and develop a strong foundation in number systems and Boolean functions. Analysis and design of Logic gates, combinational circuits and sequential circuits
Explore the fundamentals of computer organization and relate the basic to the contemporary design issues

DEPARTMENT OFFERING

BSc Computer Science

PREREQUISTE

Higher Secondary Level –Number system, memory management

Bridge Course – Yes, If not studied computer Science in Higher Secondary Level

EXPECTED SKILL

Domain Knowledge

COURSE OUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Analyze the number system conversion.	Apply
CO2	Differentiate various codes and logic gates.	Remember
CO3	Identify the various components of computer system design.	Understand
CO4	Develop ability and confidence to handle I/O and memory organization.	Apply
CO5	Design combinational and sequential circuits.	Apply

SYLLABUS

UNIT I
09 HOURS

Digital Vs Analog signals - Number Systems: Binary – Octal – Decimal – Hexadecimal – Conversions of Number systems – Arithmetic operation: Binary addition – Binary subtraction – Binary multiplication – Binary Division – 1's and 2's Compliments addition – subtraction.

UNIT II
09 HOURS

Introduction to codes – Weighted codes – Non weighted codes – Binary codes – BCD codes – Excess 3 codes – Parity codes – Grey Codes – ASCII codes – Introduction to Logic Gates – Truth Tables – Universal Gates.

UNIT III
09 HOURS

Introduction: Boolean Algebraic Laws – Reducing Boolean expression – Karnaugh Map representation – Combinational circuits design procedures: Adders – Subtractor – Decoders – Encoders – Multiplexers – Demultiplexer - Sequential circuits design procedures: Latches - Flip Flop.

UNIT IV
09 HOURS

Central processing unit-General register organization – Stack organization-Instruction formats. Pipeline processing: Pipelining – Arithmetic pipeline- Instruction pipeline-RISC pipeline

UNIT V
09 HOURS

Input output organization – Input output interface. Memory organization – Memory hierarchy – Main memory – Auxiliary memory – Associative memory – Cache memory – Virtual memory.

TEXT BOOKS

A. Anandkumar," Fundamentals of Digital Circuits", PHI, New Delhi, 4th Edition,2016.
B. M. Morris Mano, "Computer system Architecture ", Revised 3rd edition, PHI Pub., 2017.

REFERENCE BOOKS

A. M.Morris Mano, "Digital Logic Computer Design", Pearson Education, 5th Edition, 2013.
B . Donald P Leach, Albert Paul Malvino, Goutam Saha, "Digital Principles and Applications", Tata McGraw-Hill, 7th Edition, 2011.
C. John P Hayes, "Computer Architecture and Organization", Tata McGraw Hill Pub. (P) Ltd. 3rd Edition 2004.

WEB RESOURCES

A https://www.tutorialspoint.com/computer_logical_organization/binary_codes.htm

B https://www.studytonight.com/computer-architecture/pipelining

C https://www.geeksforgeeks.org/cache-memory-in-computer-organization

MAPPING WITH PROGRAM OUTCOMES
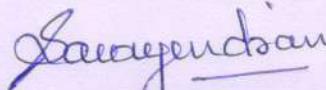
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	S	M	-	-	-	-	L
CO2	S	L	S	-	-	-	M	-
CO3	S	M	-	-	-	-	-	-
CO4	-	L	S	-	-	M	-	-
CO5	M	-	S	-	-	-	-	-

S- Strong; M-Medium; L-Low
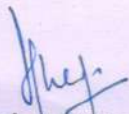
ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prepared By
(Dr. Kavitha P)

Verified by
(Dr Anna Saro Vijendran)

Approved by
(Dr. Maria Priscilla G)

Member Secretary
Academic Council

SEMESTER I

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20ICS101	Software Foundation and Programming using Python	DSC	48	-	12	3	A

PREAMBLE / COURSE OBJECTIVE

The Learning objective of this course are to explain the importance of python and describe its need as a programming language.and to strengthen the understanding of basic concepts of python.Students can able to design, code, and test small programs and also data exploration model

DEPARTMENT OFFERING

BSc Computer Science

PREREQUISTE

The Windows Operating System

Basic understanding of programming langugaes

EXPECTED SKILL

Coding Knowledge

COURSE OUTCOMES

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

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Identify and use various in-built functions, operators and statements supported by python.	Remember
CO2	Analyze basic searching and sorting algorithms	Understand
CO3	Classify various python libraries for Data Aggregation	Understand
CO4	Identify Exceptions and use various technique to handle the errors and exceptions	Apply
CO5	Differentiate Regression and Regular Expression for Data Analysis	Apply

SYLLABUS

UNIT I
12HOURS

What is Python - Advantages and Disadvantages, Benefits and Limitation- Downloading and Python-installation- Python Versions-Running Python Scripts, Executing scripts with python launcher-Using interpreter interactively- Using variables-String types: normal, raw and Unicode-String operations and functions- Math operator and functions.

UNIT II
12 HOURS

Raw input and input- Indentation-Boolean-Conditional Statements (if,elif)-Looping-Functions- Build-in Functions, User Defined Functions- Using List (index & slicing, list comprehensions)-Dictionaries -Tuples - Set- Operations and functions of Data types

UNIT III
12 HOURS

Using pandas-the data analysis libraries-Series and data frames-Pandas Series, Pandas Data frame, Series functionality, Data frame functionality-Grouping, Aggregating and applying-Merging and joining

UNIT IV
12 HOURS

Dealing with Syntax error-Exceptions-Zero division error, Type division error, Name error- Handling Exception with try or Except,file handling.

UNIT V
12 HOURS

Regular Expression: Regular expression objects- Pattern matching-Parsing data

Regression

Introduction-Types of Regression-Exploratory Data Analysis-Correlation Matrix-Visualization using Matplotlib-Implementing linear Regression-Case Studies: Churn Analysis

TEXT BOOKS
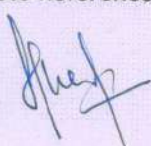
A. IBM CE- Software Foundation with Python Programming by IBM CE 2018

REFERENCE BOOKS

A. Python Programming: An Introduction to Computer Science, 3rd Edition by John Zelle

B . Python Crash Course: A Hands-On, Project-Based Introduction to Programming Nov 2015 by Eric Matthes

C. Python: The Complete Reference Paperback – 20 Mar 2018 by Martin C. Brown

WEB RESOURCES

A. https://developer.ibm.com/articles/os-beginners-guide-python/

B https://www.w3schools.com/python/

C https://www.geeksforgeeks.org/python-programming-language/

MAPPING WITH PROGRAM OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	S	M					
CO2	S	S	S		M		M	L
CO3	S	M	M					
CO4		M	S	S		M		
CO5	M		S	M	S		L	

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prepared By

Verified by
(Dr Anna Saro Vijendran)

Approved by
(Dr. Maria Priscilla G)

Academic council secretary

SEMESTER I

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20ITC01	Programming in C	DSC	55	-	-	4	A

PREAMBLE / COURSE OBJECTIVE

- To learn strategies to solve a problems using algorithms and flowcharts
- To enable students to learn about the basic features of C Programming Language
- To learn the various decision making and looping statements
- To learn how to program using arrays, strings and functions
- To learn about structures and pointers
- To learn file management in C

DEPARTMENT OFFERING

BSc Information Technology

PREREQUISTE

Higher Secondary Level – Basic computer knowledge

Bridge Course – YES (Non computer science students)

EXPECTED SKILL

Domain Knowledge / Employability / Skill Development

COURSE OUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Demonstrate the basics of programming concepts	Remember
CO2	Apply appropriate data types and control structures for solving a given problem.	Apply
CO3	Illustrate the representation of arrays, strings and usage of string operations.	Understand
CO4	Illustrate functions and use structures for solving problems	Apply
CO5	Apply the knowledge of pointers and dynamic memory allocation	Apply
CO6	Implement file handling mechanism.	Apply

SYLLABUS

UNIT I
11 HOURS

Introduction: Computer Algorithms – Developing Algorithms – Flowcharts. Overview of C: History – Importance and applications –Sample programs- Structure of a C Program. Constants, Variables and Data Types: Character set - C Tokens – Constants, Variables and Data Types. Operators and Expressions: Arithmetic Operator – Relational Operator – Logical Operator – Assignment Operator – Increment and Decrement Operator – Conditional Operator – Bitwise Operator – Special Operator – Arithmetic Expressions - Evaluation of Expressions – Precedence of Arithmetic Operators.

UNIT II
11 HOURS

Managing Input and Output Operations: Reading and Writing a Character – Formatted input and Output. Decision making and Branching: Decision Making with IF – Simple IF – The IF…ELSE Statement – Nesting of IF….ELSE Statements – ELSE IF Ladder – Switch Statement - ?: Statement – GOTO Statement. Decision Making and Looping: While Statement – DO Statement – FOR Statement.

UNIT III
11 HOURS

Arrays: Introduction – Declaring and Initializing One Dimensional Array – Declaring and Initializing of Two Dimensional Arrays – Multidimensional Arrays. Character Arrays and Strings: Declaring and Initializing String Variable – Reading Strings from Terminals – Writing String to Screen – Arithmetic Operation on Characters – Putting Strings together – Comparison of two Strings – String Handling Functions.

UNIT IV
11 HOURS

User Defined functions: Elements of User Defined Function – Definition of Function – Return Values and Types – Function Call and Declaration - Category of Functions – Recursion – Scope and lifetime of variables in functions. Structures and Unions: Definition of Structure – Declaring Structure Variable – Accessing Structure Member – Structure Initializing – Copying and Comparing Structure Variable – Operation on individual Member – Arrays of Structure – Arrays within Structure - Structure within Structure – Structures and Function – Unions.

UNIT V
11 HOURS

Pointers: Understanding Pointers – Accessing the Address of the Variable – Declaring and initializing pointer variable – Accessing Pointer Variable – Pointers and arrays – Pointers and structures - Pointers and Character strings. File Management in C: Defining and Opening the File – Closing a File – I/O Operation on File.

TEXT BOOKS

1. V. Rajaraman, *Computer Programming in C*, PHI, 2009.
2. E. Balagurusamy, *Programming in ANSI C*, 7th Ed., Tata McGraw - Hill Publications ,2017.
   Unit I: Text 1: Ch-1,2 Text 2:Ch-1,2,3   Unit II: Text 2:Ch-4,5,6   Unit III: Text 2:Ch-7,8
   Unit IV: Text 2: Ch-9,10   Unit III: Text 2:Ch-11,12

REFERENCE BOOKS

1. Yashavant Kanetkar, *Let us C*, 15th Ed., BPB Publications, 2016.
2. Gottfried, *Programming with C*, 3nd Ed.,TMH Publications, 2017.

WEB RESOURCES

1. https://www.w3schools.in/c-tutorial/
2. https://www.tutorialspoint.com/cprogramming/index.htm

MAPPING WITH PROGRAM OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	M	-	-	-	-	L	M
CO2	S	S	M	M	-	-	M	M
CO3	S	S	-	M	-	L	M	-
CO4	S	S	-	S	-	-	-	M
CO5	M	M	-	-	M	-	-	-
CO6	S	M	M	-	-	-	L	M
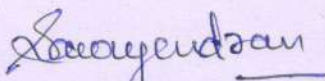
S- Strong; M-Medium; L-Low
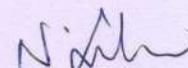
ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prepared By
(Dr Deepa C)

Verified by
(Dr Anna Saro Vijendran)

Approved by
(Dr Sumathi N)

Member Secretary
Academic Council

SEMESTER I

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20ITC02	C Programming and Bio Computing Lab	DSC	-	-	33	3	A

PREAMBLE / COURSE OBJECTIVE

- To be familiar with programming in C Language
- To gain knowledge in using decision making and looping statements
- To understand simple programs using arrays, strings and functions
- To acquire knowledge in structures, pointers and file management
- To understand basics of Bio - Computing.

DEPARTMENT OFFERING

BSc Information Technology

PREREQUISTE

Higher Secondary Level – Basic computer knowledge

Bridge Course – NIL

EXPECTED SKILL

Domain Knowledge / Employability / Skill Development

COURSE OUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Apply the basic programming concepts	Remember
CO2	Illustrate C programs using control structures, arrays and functions	Apply
CO3	Implement programs using pointers and file concepts	Apply
CO4	Apply C programming constructs to perform Bio – Computing concepts	Apply

SYLLABUS

1. Implement various Operators

2. Illustrate the concept to manage various formatted input output operations in C

3. Implement Decision making and branching statements

4. Implement Looping statements

5. Implement a C program to find complementary of DNA sequence using the concept of Arrays

6. Implement Character arrays and Strings

7. Implement User defined function

8. Implement the concept of Structures

9. Implement DNA codon table in C using pointers

10. Illustrate Counting DNA nucleotides in C using the concept of files

*Basics of Bio - Computing is imparted to students in lab hours

TEXT BOOKS
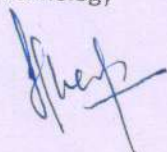
1. V. Rajaraman, Computer Programming in C, PHI, 2009.
2. E. Balagurusamy, Programming in ANSI C, 7thEd., Tata McGraw - Hill Publications, 2017.

REFERENCE BOOKS

3. Yashavant Kanetkar, *Let us C*, 15th Ed., BPB Publications, 2016.
4. Gottfried, *Programming with C*, 3ndEd.,TMH Publications,2017.

WEB RESOURCES

1. https://www.w3schools.in/c-tutorial/
2. https://www.tutorialspoint.com/cprogramming/index.html
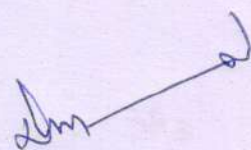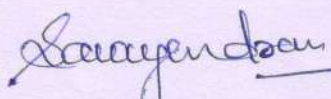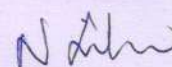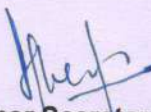
MAPPING WITH PROGRAM OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	M	-	-	-	-	L	M
CO2	S	S	-	M	-	L	M	-
CO3	S	M	M	-	M	-	L	M
CO4	-	M	-	L	M	S	S	S

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prepared By
(Dr Deepa C)

Verified by
(Dr Anna Saro Vijendran)

Approved by
(Dr Sumathi N)

Member Secretary
Academic Council

SEMESTER I

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20CS101	C PROGRAMMING LAB	DSC	-	-	33	3	A

PREAMBLE / COURSE OBJECTIVE

To be familiar with programming in C Language. To understand various programs using decision making and looping statements. To understand simple programs using arrays and functions. To understand simple programs in structures, pointers and file management

DEPARTMENT OFFERING

BSc Computer Science

PREREQUISTE

Higher Secondary Level – Minimum programming knowledge

Bridge Course – Yes, For non Computer science students in Higher Secondary Level
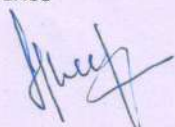
EXPECTED SKILL

Domain Knowledge

COURSE OUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the basic programming concepts	Remember
CO2	Write simple C programs using control structures, arrays and functions	Understand
CO3	Implement simple programs using pointers and file concepts.	Apply

SYLLABUS

1. Implement different data types, Operators and Expressions in C.

2. Illustrate the concept to manage various formatted input output operations in C.

3. Implement Decision making and Branching statements.

4. Implement Looping statements.

5. Illustrate the different dimensions of Array.

6. Implement Character arrays and Strings.

33 Hours.

7. Implement User defined function.

8. Implement Structures and Union.

9. Implement Pointers.

10. Illustrate the concept of files.

TEXT BOOKS

1. V. Rajaraman, Computer Programming in C, PHI, 2009.

2. E. Balagurusamy, Programming in ANSI C, 7thEd., Tata McGraw - Hill Publications, 2017.

REFERENCE BOOKS

3. Yashavant Kanetkar, *Let us C*, 15th Ed., BPB Publications, 2016.

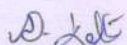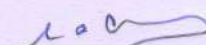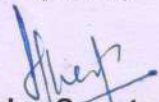4. Gottfried, *Programming with C*, 3ndEd.,TMH Publications,2017.

WEB RESOURCES

1. https://www.w3schools.in/c-tutorial/

2. https://www.tutorialspoint.com/cprogramming/index.html

MAPPING WITH PROGRAM OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	S	M	-	-	L	-	M
CO2	S	S	S	-	-	L	-	M
CO3	S	S	S	-	-	L	-	S

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prepared By
(Dr Kavitha P)

Verified by
(Dr Anna Saro Vijendran)

Approved by
(Dr Maria Priscilla G)

Member Secretary
Academic Council

SEMESTER I

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20EIA01	Entrepreneurship & Innovation	AECC-III	-	26	-	1#	Theory

PREAMBLE / COURSE OBJECTIVE

Students acquire the knowledge and skills needed to manage the development of innovations, to recognize and evaluate potential opportunities to monetize these innovations, to plan specific and detailed methods to exploit these opportunities, and to acquire the resources necessary to implement these plans. Topics include entrepreneurial thinking; innovation management; opportunity spotting and evaluation; industry and market research; business strategy; business models and business plans; financial forecasting and entrepreneurial finance; pitching to resource providers and negotiating deals; and launching new ventures.

DEPARTMENT OFFERING

International Business

PREREQUISTE

Higher Secondary

EXPECTED SKILL

Interested to become an Entrepreneur / Innovator /Design thinker

COURSE OUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Think critically and creatively about the nature of business opportunities, resources, and industries.	Remember
CO2	Delineate the processes by which innovation is fostered, managed, and commercialized.	Understand
CO3	Effectively and efficiently evaluate the potential of new business opportunities.	Apply
CO4	Assess the market potential for a new venture, including customer need, competitors, and industry attractiveness.	Apply
CO5	Develop a business model for a new venture, including revenue, margins, operations, working capital, and investment.	Apply

SYLLABUS

Module No.	Topic	Total Hours
1.	Entrepreneurial Thinking	2
2.	Innovation Management	2
3.	Design Thinking	2
4.	Opportunity Spotting / Opportunity Evaluation	2
5.	Industry and Market Research	2
6.	Innovation Strategy and Business Models	2
7.	Financial Forecasting	2
8.	Business Plans/ Business Model Canvas	3
9.	Entrepreneurial Finance	2
10.	Pitching to Resource Providers / Pitch Deck	3
11.	Negotiating Deals	2
12.	New Venture Creation	2
	Total Hours	26

TEXT BOOKS

A. Arya Kumar "Entrepreneurship – Creating and leading an Entrepreneurial Organization", Pearson, Second Edition (2012).
B. Christopher Golis "Enterprise & Venture Capital", Allen &Unwin Publication, Fourth Edition (2007).
C. EmrahYayici "Design Thinking Methodology", Artbiztech, First Edition (2016).
D. Thomas Lock Wood & Edgar Papke "Innovation by Design", Career Press.com, Second Edition (2017).

REFERENCE BOOKS

A. Andrew J. Dubrin "Leadership – Research Findings, Practice & Skills", Biztantra Publishers, Fourth Edition (2007).
B. Jonathan Wilson "Essentials of Business Research", Sage Publication, First Edition (2010).

WEB RESOURCES

A. https://blog.forgeforward.in/tagged/startup-lessons
B. https://blog.forgeforward.in/tagged/entrepreneurship
C. https://blog.forgeforward.in/tagged/minimum-viable-product
D. https://blog.forgeforward.in/tagged/minimum-viable-product
E. https://blog.forgeforward.in/tagged/innovation
F. https://www.youtube.com/watch?v=8vdEyL7uKXs&list=PLmP9QrmTNPqBEvKbMSXvwIwn7fdnXe6Lw

MAPPING WITH PROGRAM OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	-	L	-	L	S	M	-	-
CO2	L	-	-	L	S	M	-	-
CO3	-	L	-	L	S	M	-	-
CO4	-	-	-	L	S	M	L	L
CO5	L	-	-	L	S	M	L	L

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN

To Successfully Complete the course, Students must achieve a passing grade of 40% in the Comprehensive Internal Examination.

\# Extra Credit Course
*No Comprehensive Examination only Continuous Internal Assessment

Assessment Type	Topic	Marks
Assignment	Strategic Innovation	20
Group Discussion/ Presentation	Design Thinking	10
Objective Type	MCQ (CIA 1)	20
Assignment	Market Research	10
Group Discussion/ Presentation	Pitch Deck / Business Plan (Presentation)	20
Descriptive Type	Model Test (4 Questions * 5 Marks)	20
Total		100 Marks

Verified by
Dr D Santhanakrishnan

Approved by
Dr D Santhanakrishnan

Approved by
Dr Anna Saro Vijendran

Member Secretary
Academic Council

SEMESTER I

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20MATCG10	STATISTICAL METHODS	GE	55	-	-	4	A (THEORY)

PREAMBLE / COURSE OBJECTIVE

This course aims at facilitating the students to understand the concepts of probability and basic probability distributions, population, sample and Test of Significance. The course helps the students to assess the applicability of probability in real life situations

DEPARTMENT OFFERING

PG & Research Department of Mathematics

PREREQUISTE

Higher Secondary Level – Basic knowledge in Statistics

EXPECTED SKILL

Skill Development

COURSE OUTCOMES

On successful completion of the course, students will be
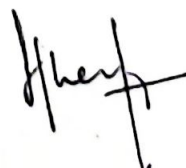
S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Acquire knowledge about probability	Understand
CO2	Apply the concept of Probability Distributions	Apply
CO3	Compare Point and Interval estimation	Analyze
CO4	Analyze data using large sample test	Analyze
CO5	Analyze data using small sample test	Analyze

SYLLABUS

UNIT I   **12 HOURS**

Probability – Definition – Axiomatic approach – Addition Theorem and Multiplication theorem – Conditional probability – Bayes theorem – Simple problems.

BoS-Mathematics

UNIT II
11 HOURS

Binomial, Poisson and Normal distributions (No derivations) – Properties and Applications – Simple Problems.

UNIT III
11 HOURS

Introduction of Statistics – Distinction between Population and Sample, Parameter and Statistic, Estimator and Estimation – Consistency – Unbiasedness – Efficiency (Cramer Rao Inequality) – Sufficiency – Simple Problems.

UNIT IV
10 HOURS

Test of Hypothesis – Critical Region – Type I and Type II errors – Power of the test – Neyman Pearson Lemma.

Test of significance – Standard error – Large sample test with regard to mean, difference of means, Proportion and difference of proportions – Simple problems.

UNIT V
11 HOURS

Small sample test – t-test – Singe mean – Difference of means – Paired t-test for difference of means – χ^2 test for single variance – Goodness of fit – Exact sample test based on F test for equality of two population variances – Simple Problems.

TEXT BOOK

A. S. C. Gupta & V. K. Kapoor : "Fundamentals of Mathematical Statistics" 1st Edition 1970, Reprint 2016.

REFERENCE BOOKS

A. P. R. Vittal : "Mathematical Statistics" 1st Edition 2002, Reprint 2016.
B. S. P. Gupta : "Statistical Methods" 1st Edition 1969, Reprint 2017.

WEB RESOURCES

A. https://www.stat.pitt.edu/stoffer/tsa3/intro_prob.pdf

B. https://incogen.squarespace.com/s/7-Stat-large-sample-hypothesis.pdf

C. https://www.sagepub.com/sites/default/files/upm-binaries/40007_Chapter8.pdf

MAPPING WITH PROGRAM OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	L	-	-	-	-	M	-
CO2	S	L	-	-	-	-	M	-
CO3	S	L	-	-	-	-	M	-
CO4	S	L	-	-	-	-	M	-
CO5	S	L	-	-	-	-	M	-

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prof RAMYA K
(Course Coordinator)

Dr JAYASHEELA D
(Academic Council-Member Secretary)

Dr UMA N
(BOS Chairperson)

SEMESTER I

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20MATCG11	NUMERICAL AND STATISTICAL METHODS	GE	55	-	-	4	A (THEORY)

PREAMBLE / COURSE OBJECTIVE

To enable the students to understand numerical analysis and fundamental Concepts of statistics

DEPARTMENT OFFERING

PG & Research Department of Mathematics

PREREQUISTE

Higher Secondary Level – Numerical Analysis and Fundamental Concepts of Statistics

EXPECTED SKILL

Domain Knowledge , Skill Development

COURSE OUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Solve System of Linear Equations using numerical methods	Apply
CO2	Determine derivatives and integrals using Numerical Methods	Apply
CO3	Acquire Knowledge about representation of data and measures of central Tendency	Understand
CO4	Apply the concepts of probability and probability distribution	Apply
CO5	Analyze data using dispersion and χ^2 test .	Analyze

SYLLABUS

11 HOURS

UNIT I

Introduction to System of Simultaneous linear algebraic equations- Gauss Elimination Method– Gauss Jordan Method – Gauss Jacobi Method – Gauss Seidel Method.

BoS-Mathematics

UNIT II
10 HOURS

Interpolation : Newton's Forward Interpolation - Newton's Backward Interpolation Formula.
Numerical Differentiation : Newton's Forward for equal intervals- Newton's Backward Difference for equal intervals .
Numerical Integration : Trapezoidal Rule- Simson's $1/3^{rd}$ Rule- Simple Problems.

UNIT III
11 HOURS

Statistics – Introduction – Presentation of Data – Diagrams and Graphs – Measures of Central Tendency Mean, Median and Mode– Geometric Mean and Harmonic Mean – Measures of Dispersion – Standard Deviation – Co-efficient of Variation.

UNIT IV
12 HOURS

Probability – Definition – Addition Theorem and Multiplication Theorem (Simple Problems)– Conditional Probability- Baye's Theorem- Simple Problems.
Probability distributions- Binomial, Poisson and Normal distributions (No derivations) – Properties and Applications – Simple Problems.

UNIT V
11 HOURS

Test of Hypothesis – Null and Alternative Hypothesis – Critical region – Type –I & Type-II errors - χ^2 test for single variance – Goodness of fit- Independence of Attributes-Simple Problems.

TEXT BOOKS

A. Dr M.K Venkataraman " Numerical Methods in Science and Engineering " National Publishing Company 5th edition 1999, Reprint 2013- (Unit-I,II).
B. S.C.Gupta & V.K.Kapoor : "Fundamentals of Mathematical Statistics" 1st Edition 1970, Reprint 2016.(Unit – III, IV,V).

REFERENCE BOOKS

A. Kandasamy. P, Thilagavathi. K and Gunavathi. K "Numerical methods" – S. Chand and Company Ltd, New Delhi – Revised Edition 2007. (Chapters: 3,4,9,10 & 11).
B. R. S. N. Pillai& V. Bagavathi "Statistics" S.Chand& Co. ltd, 7th edition 2008, Reprint 2015.
C. S.P.Gupta : "Statistical Methods" 1st Edition 1969, Reprint 2017.

WEB RESOURCES

A. https://www.docdroid.net/file/download/md0C1eS/numerical-methods-by-kandasamy-thilagavathy-gunavathy-pdf-free-downloadgolkesl-pdf.pdf
B. https://www.researchgate.net/publication/272237355_Probability_and_Mathematical_St atistics

MAPPING WITH PROGRAM OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	S	L	-	-	-	-	M	-	-
CO2	S	L	-	-	-	-	M	-	-
CO3	S	L	-	-	-	-	M	-	-
CO4	S	L	-	-	-	-	M	-	-
CO5	S	L	-	-	-	-	M	-	-

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prof MALARVIZHI M
(Course Coordinator)

Dr JAYASHEELA D
(Academic Council-Member Secretary)

Dr UMA N
(BOS Chairperson)

SEMESTER 1

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT
20LSA01	Life Skills-I	SEC	40	-	-	2	Theory

PREAMBLE / COURSE OBJECTIVE

This course aims at enhancingthe students self - confidence to speak in front of an audience, improve their self-awareness and overcome fear and insecurity and also help them realize their potential through various classroom practical activities.

DEPARTMENT OFFERING

TIP Center

PREREQUISITE

Higher Secondary Completion- Listening, Speaking, Reading and Writing skills

EXPECTED SKILL

Communication Skills and Professional Skills

COURSE OUTCOMES

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

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Introduce oneself and speak creatively	Remember
CO2	Listen and Read effectively	Understand
CO3	Write formal and informal mails	Apply
CO4	Maintain good postures, gestures and social distancing	Apply
CO5	Present effectively using tools	Apply

SYLLABUS

UNIT I
7 HOURS

Speaking Skills – Self Introduction, common mispronounced words – stress and intonation, impromptu speaking, two minute topics, storytelling, creative speaking – story completion, small talk, tongue twisters

UNIT II
7 HOURS

Listening skills and Reading Skills – Listening for gist, listening for main ideas, back to back interviews, TED talks, audio clip gap fill exercises, Reading skills – Reading for gist, reading for detail, reading comprehension, newspaper articles, vocabulary search

UNIT III
8 HOURS

Writing skills – email writing – formal vs informal emails, structure, useful expressions, situation based email writing practice, Effective use of social media –do's and don'ts, guidelines for effective usage of social media,

UNIT IV
9 HOURS

Non- verbal communication – gestures, posture, do's and don'ts of non- verbal communication, Social and cultural etiquette- how to behave in public, respect others privacy, social distancing, Trust and collaboration

UNIT V
9 HOURS

Presentation Skills–identifying the audience, analyzing content, creating content, signposting, tone, language, posture, getting audience attention, practice methods, usage of presentations tools, handling questions, Brainstorming – putting ideas together, making notes, selecting relevant ideas, Listening as a team skills - coordinated listening, note taking, identifying main ideas

TEXT BOOKS

A. Sen Madhucchanda (2010), An Introduction to Critical Thinking, Pearson, Delhi
B. Silvia P. J. (2007), How to Read a Lot, American Psychological Association, Washington DC
C Service provider adapted text books

REFERENCE BOOKS

A. New English File – Clive Oxenden, Christina Latham- Koenig, Paul Seligson 3rd Edition
B. New Headway –Liz and John Soars – 4th Edition
C. Business Result – David Grant, Jane Hudson & Robert McLarty 1st Edition

WEB RESOURCES

A. https://busyteacher.org/

B. https://en.islcollective.com/

C. https://www.skillsyouneed.com/presentation-skills.html

D. https://www.englishclub.com/grammar/

E. https://www.mindtools.com/CommSkll/PublicSpeaking.htm

MAPPING WITH PROGRAM OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	-	-	-	S	M	-	L	M
CO2	-	-	-	S	M	-	L	M
CO3	-	-	-	S	M	-	L	M
CO4	-	-	-	S	M	-	L	M
CO5	-	-	-	S	M	M	L	M

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

- Total: 100 Marks
- Online exam: 50 Marks
- Oral Evaluation: 50 Marks
- Passing Minimum: 40 %
- External Assessment

Prepared & Verified by
Dr T Nagaprakash

Approved by
Dr Anna Saro Vijendran

Academic Council

SEMESTER II

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20CACP01	DATA STRUCTURES AND LAB USING C	DSC	45	-	30	5	A

PREAMBLE / COURSE OBJECTIVE

This course aims at facilitating the students should be able to

- Understand the basic data structures and importance of data structures in computer programs.
- Learn the key difference between various data structures like Stack, Queue, Circular Queue and its applications.
- Learn about various Linked Lists and its Applications.
- Apply the basic terminologies of Trees, Binary Trees and Graphs.
- Analyze about the file organizations and its applications.

DEPARTMENT OFFERING

BCA – Department of Computer Applications

PREREQUISTE

First Semester – Knowledge in C Programming Language and Logical Skills

EXPECTED SKILL

Domain Knowledge / Skill Development

COURSE OUTCOMES

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

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Articulate the knowledge of basic data structures, its classifications and its importance in computer programs.	Remember
CO2	Examine the various operations of different data structures in real world problems.	Understand
CO3	Analyze the various linked list applications in the real world problems.	Apply
CO4	Design and apply trees and graphs concepts in the real world applications.	Apply
CO5	Design and implement suitable file organizations and the appropriate searching/sorting algorithms in real time applications	Advanced

SYLLABUS

UNIT I
8 Hours

Introduction: Definition, Structure and properties of algorithms, Development of an algorithm, Data Structures and Algorithms, Data Structure - Definition and Classification. **Arrays:** Introduction, Array operations, Number of elements in an array, Representations of arrays in memory, applications.

UNIT II
10 Hours

Stacks: Introduction -Stack Operations - Stack implementations- **Applications:** Recursive Programming – Evaluations of Expressions. **Queues:** Introduction – Queue Operations – Queue implementations - Limitations of Linear Queue. **Circular Queues:** Operations on a Circular Queue – implementations of insertion and deletion in a Circular Queue - Other types of queues Priority Queues - Deque. **Applications** of Linear queue – **Applications** of Priority Queue.

UNIT III
10 Hours

Linked Lists : Drawbacks of sequential data structure – Merits of Linked data structures. **Singly Linked List:**- Representations - Insertion and Deletion in a singly Linked Lists. **Circular Linked lists**: Representations – Advantages of Circular Linked lists Over singly Linked Lists - Disadvantages of Circularly Linked Lists – Primitive Operations on Circular Linked lists. **Doubly linked lists :** Representations – Advantages and Disadvantages of Doubly Linked lists - Operations on Doubly Linked lists. **Applications**: Addition of Polynomials.

UNIT IV
8 Hours

Trees: Introduction, Trees-basic terminologies, Representation of Trees. **Binary Trees:** Basic terminologies and types, representation of Binary Trees, Binary tree Traversals, Threaded Binary Trees, Applications. **Graphs:** Introduction, Definition and basic terminologies

UNIT V
9 Hours

File organizations; Introduction, Files, Keys, Basic File Operations. Sequential File Organizations, Indexed Sequential File Organizations, Direct File Organizations. **Searching :** Linear search, Binary search. **Sorting**: Merge sort and Quick sort.

Total Periods: Theory 45 Hrs

Practical Lab Exercises
1. Create and implement a stack and perform its operations using array
2. Create and implement a queue and perform its operations using array
3. Design and implement linked list and its operations
4. Design and implement doubly linked list and its operations
5. Implementation of Binary Trees and operations of Binary Trees
6. Design and develop Graph representation and Traversal algorithms
7. Demonstrate linear searching technique
8. Examine to search an element in an array using binary search
9. Develop a code to sort the given numbers using Merge Sort Technique
10. Sort the given numbers using Quick Sort Technique

Practical: 30 Hours

EVALUATION PATTERN

CIA – 40 Marks	CE- 60
• CIA- Model (Theory) – 10 Marks • Practical Lab Exercises (10 Marks for each Program to be assessed and Average marks of all programs to be converted to 30 marks) - 30 Marks	Marks (Theory)

TEXT BOOKS

A. G A V PAI" Data Structures and Algorithms-Concepts, Techniques and Applications"- TATA McGRAW HILL, Reprint -2017

REFERENCE BOOKS

1. Ellis Horowitz & Sartaj Sahni "Fundamentals of Data Structures"- Galgotia Publications, 2008.
2. Jean Paul Tremblay, Paul G. Sorenson "An Introduction to Data Structures with Applications"- Second Edition, Tata Mcgraw Hill. 2008

WEB RESOURCES

A. https://www.scribd.com/doc/152191044/Fundamentals-of-Data-Structures-Ellis-Horowitz-Sartaj-Sahni-pdf
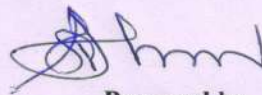
MAPPING WITH PROGRAM OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S		S	S		M		M
CO2	M	S	S		L	L	M	L
CO3			S			L		S
CO4		S	S	S	M		M	M
CO5	M		S	S	M	M		M
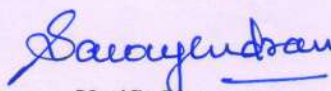
S- Strong; M-Medium; L-Low
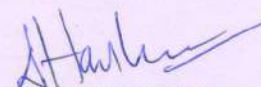
ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.
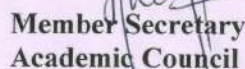
Prepared by
Dr.S.Thavamani
Course Co-ordinator

Verified by
Dr.Anna Saro Vijendran
Dean- School of Computing

Approved by
Dr.D.Hari Prasad
BOS Chairman

Member Secretary
Academic Council

SEMESTER IV

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20ICS21	Foundation in Business Analytics	DSC	60	-	15	5	A

The Learning objective of this course are to explore the concept and regular terminologies of Business Analytics. To provide the knowledge in importing and restructuring data in the workspace. To focus on the basics Of Data Visualizations in Cognos Insight. To identify the benefits of Sharing Workspace in connected Analytics Environment. To explore the various Charts in IBM Cognos Insight.To show the various data sets in business analytics and usage of data in IBM Cognos Insight Workspace

DEPARTMENT OFFERING

BSc Computer Science

PREREQUISTE

The Windows Operating System

Basic understanding of programming languages

EXPECTED SKILL

Coding Knowledge

COURSE OUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Successfully explored the concept and regular terminologies of Business Analytics.	Remember
CO2	Provided knowledge on importing and restructuring data in the workspace.	Understand
CO3	Provided emphasis on the basics Of Data Visualizations in Cognos Insight to identify the benefits of Sharing Workspace in connected Analytics Environment.	Understand
CO4	Explored the various Charts in IBM Cognos Insight.	Apply
CO5	Showed the various data sets in business analytics and usage of data in IBM Cognos Insight Workspace	Apply

SYLLABUS

UNIT I - INTRODUCTION TO IBM COGNOS INSIGHT   12 HOURS

Business Analytics: Descriptive, Predictive, Prescriptive Analytics- Importance of using Business Analytics in modern Enterprises -What is IBM Cognos Insight -Why to use IBM Cognos Insight- Exploring IBM Cognos Insight.

UNIT II - IMPORTING & RESTRUCTURING DATA INTO COGNOS INSIGHT 12 HOURS

Working with Data sets in Cognos Insight-Understanding Data Dimensions, Measures and Cube- Importing and Analysing Data from various sources- Restructuring Data in a Workspace.

UNIT III - DATA VISUALIZATIONS IN COGNOS INSIGHT   12 HOURS

Objectives of Data Visualizations-Working with Effective Chart Types-Importance of Data Visualizations in Modern Business.

UNIT IV - CONSTRUCTING A WORKSPACE IN COGNOS INSIGHT & FORMATTING & ENTERING DATA IN IT   12 HOORS

Understanding Workspace in IBM Cognos Insight and how to work on the same by importing various data sets; Various Data Types to work with in Analytics; Usage of Numeric & Alphanumeric Data in IBM Cognos Insight Workspace.

UNIT V - SHARING A COGNOS INSIGHT WORKSPACE   12 HOURS

Objectives of Sharing Workspace in IBM Cognos Insight-Publishing of Workspace in IBM Cognos Insight- Importance of Sharing Workspace in connected Analytics Environment.

LAB EXERCISES   15 HOORS

1. Navigate and Explore IBM Cognos Insight
2. Introduction to the Reporting Application.
3. Create List Reports.
4. Focus Reports using Filters.
5. Create Crosstab Reports.
6. Present Data Graphically.
7. Focus Reports using Prompts.
8. Extend Reports using Calculations.
9. Customize Reports with Conditional Formatting.

TEXT BOOKS

   A.   IBM CE- Foundation in Business Analytics by IBM CE 2018

REFERENCE BOOKS

   A.   https://www.redbooks.ibm.com/redbooks/pdfs/sg247912.pdf

   B.   https://www.oreilly.com/library/view/first-guide-to/9781788292863/

WEB RESOURCES

   A.   https://www.ibm.com/support/knowledgecenter/SSEP7J_11.1.0/com.ibm.swg.ba.cognos.cbi.doc/manuals.html

MAPPING WITH PROGRAM OUTCOMES
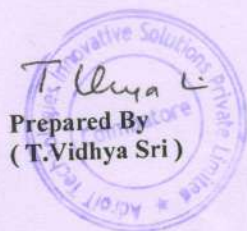
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	S	M					L
CO2	S	S	S		M		M	
CO3	S	M	M					
CO4		M	S	S		M		
CO5	M		S	M	S		L	

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prepared By
(T.Vidhya Sri)

Verified by
(Dr Anna Saro Vijendran)

Approved by
(Dr. Maria Priscilla G)

Academic council secretary

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20CSCP01	JAVA PROGRAMMING WITH BIO-PERL LAB	DSC	-	45	30	5	A

PREAMBLE / COURSEOBJECTIVE

- To introduce the fundamentals of java programming language with oops concepts and provide knowledge about Java programming constructs
- To learn the basic concepts of Classes, Objects, Arrays and Inheritance
- To inculcate Interface, Package, String and Exception handling concepts
- To gain knowledge about Swing and File Management
- Gain the knowledge on Perl and BioPerl concepts

DEPARTMENTOFFERING

BSc Computer Science

PREREQUISTE

Higher Secondary Level –

Basic computer knowledge

Bridge Course – NIL

EXPECTEDSKILL

Domain Knowledge / Employability / Skill Development

COURSEOUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the fundamental concepts of Java Programming Language.(L1)	Remember
CO2	Implement the concepts of Array, Inheritance and Interface concepts in Java. (L2)	Apply
CO3	Apply the concepts of Package, String, Exception Handling and Multithreading in Java. (L2)	Understand
CO4	Demonstrate Swing and File handling using Java. (L3)	Apply
CO5	Analyze all fundamental elements of Perl programming. (L2)	Apply

SYLLABUS

UNIT I
15 HOURS

Java Evolution: Java History- Java Features- How Java differs from C and C++- Java Environment- Fundamentals of Object Oriented Programming.**Overview of Java Language**: Simple Java Program- Java program structures- Java Tokens- Java Statements- Java Virtual Machine- **Constants, Variables and Datatypes**: Constants- Variables- Datatypes – Scope of variables- Type casting. **Operators and Expressions**: Type conversions in Expressions- Operator Precedence and Associativity. **Decision Making and Branching**: Decision making with If statement- The switch statement. **Decision Making and Looping**: while statement- for statement – do statement. – Arrays – Strings

Practical Lab Exercise:

1.Implement String handling functions.

UNIT II
15 HOURS

Fundamentals of Object-Oriented Programming: Basic concepts of Object Oriented Programming. **Classes, objects and methods:** Defining a class- Fields declaration- Methods declaration – creating objects- accessing class members- constructors- method overloading- static members- nesting of methods- Inheritance: Extending class- overriding methods- final variables and methods- Final classes – Finalizer methods- Abstract method and classes – methods with varargs- visibility control.**Interfaces: Multiple Inheritance :**Defining Interfaces- Extending Interfaces- Implementing Interfaces- Accessing Interface variables.

Practical Lab Exercise:

2.Implement Class mechanism.

3.Illustrate the concept of Method Overloading and Constructor Overloading.

4.Implement various forms of Inheritance and Method Overriding Concept.

5.Illustrate the Interface Concept.

UNIT III
15 HOURS

Packages: Java API Packages- Using System Packages – Creating Packages- Accessing a package- Using a Package- Adding a class to a Package- Hiding Classes- Static Import. **Multithreaded Programming:** Creating Threads- Extending the Thread Class- Lifecycle of a Thread- Using Thread Methods- Thread Priority- Synchronization- Implementing the Runnable Interface. **Managing Errors and Exceptions**: Types of Errors- Exceptions – Syntax of Exception Handling Code- Multiple catch statements – Using Finally statement- Throwing our own Exceptions.

Practical Lab Exercise:

6.Illustrate the following Exceptions.

(a) Null Pointer Exception (b) Arithmetic exception (c) I/O exception

(d) Array Index Out of Bounds exception without using throws exception class.

7.Implement the Multithreading concept

UNIT IV   **15 HOURS**

Graphics Programming Using AWT, Swing and Layout Manager: Introduction – The Graphics Class- Introduction to AWT Package- Windows Fundamentals- Closing an AWT Window or Frame- Layout Managers- Handling Events on AWT Components- Introduction to Swing Package – Components and Containers- AWT versus Swing. **Managing Input/Output Files in Java**: Introduction – Concepts of Streans- Stream Classes- Byte Strean Classes- Character Stream Classes.

Practical Lab Exercise:

8.Implement the Collection Class.

UNIT V   **15 HOURS**

The Perl Language: Names- Variables- Values- Unicode and Strings – Control Flow- Scalars- Arrays- Operators- Functions: Declaring and invoking functions- Function parameters- Functions and Namespaces – Regular Expressions and Matching – Files- Input and Output. **Introduction to BioPerl**- Creating a sequence and objects – writing a sequence to a file- retrieving a sequence from a file

Practical Lab Exercise:

9.Implement DNA Sequence Generation.

10.Implement Protein Sequence Generation.

TEXTBOOKS

1. E. Balagurusamy, "Programming with JAVA – A PRIMER", 6th Edition, McGraw-Hill, 2019
2. Chromatic, "Modern Perl", 4th Edition, Onyx Neon Press, 2016

REFERENCEBOOKS

1. Sachin Malhotra and Saurabh Choudhary", Programming in Java" Revised 2nd Edition, Oxford Publication
2. Patrick Naughton & Hebert Schildt , "The Complete Reference JAVA 2", 3rd edition ,TMH
3. Dr. DSVGK Kaladha, "Basics of Perl and BioPerl", Publisher: GRIN Publishing 2014.

WEB RESOURCES

1. https://bioperl.org/howtos/Beginners_HOWTO.html
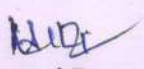
MAPPING WITH PROGRAMOUTCOMES
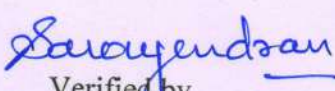
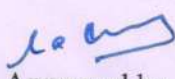| COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S			L			
CO2	S	M					
CO3		S		M			
CO4		S		M			
CO5		S		M			

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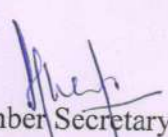
ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prepared By
(Prof Arthi R)

Verified by
(Dr Anna Saro Vijendran)

Approved by
(Dr Maria Priscilla G)

Member Secretary
Academic Council

SEMESTER II

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20ICSP201	ADVANCED JAVA PROGRAMMING WITH LAB	DSC		45	30	5	A

PREAMBLE / COURSEOBJECTIVE

- Inculcate the Object Oriented Programming concepts and basic characteristics of Java
- Gain knowledge about the principles of packages, interfaces and exception handling
- Develop Java application with Threads and events
- Gain Knowledge on database connectivity for computing and enhance the knowledge to server side programming
- Inculcate the knowledge on advanced features like Java Bean and Networking

DEPARTMENT OFFERING

BSc Computer Science

PREREQUISTE

Higher Secondary Level – Basic

computerknowledge Bridge Course – NIL

EXPECTEDSKILL

Domain Knowledge / Employability / Skill Development

COURSE OUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Acquire the knowledge in OOP principles and fundamentals in Java Programming.(L1)	Remember
CO2	Builds Java applications using exceptions. (L2)	Apply
CO3	Gains knowledge on threads and events. (L2)	Understand
CO4	Develop Servlet programs with database connectivity (L3)	Create
CO5	Creates the Java Bean program (L2)	Apply

SYLLABUS

UNIT I
15 HOURS

Fundamentals of Object Oriented Programming – Features of Java –A Simple Java Program - Operators and Control Statements- Introducing Classes- Inheritance Basics – Using Super - Method overriding – Using Abstract Classes – Using Final Methods

Practical Lab Exercise:

1. Write Java programs by making use of the following
   (a)Use of 'this' keyword
   (b) Polymorphism

2. Implement the various forms of Inheritance

UNITII
15 HOURS

Interfaces: Defining an interface, Implementing Interface- differences between classes and interfaces and extending interfaces – Packages and Access protection – Importing packages- Exceptions Handling Fundamentals- Exception Types-Using Try Catch- Multiple Catch Clause- Nested Try Statements-Built-In Exceptions

Practical Lab Exercise:

3. Write a program to prepare pay slip using Interfaces concept.

4. Write a program to handle the following Exceptions
(a) Null Pointer Exception   (b) Arithmetic exception
(c) I/O exception   (d) Array Index Out of Bounds exception

UNITIII
15 HOURS

The Java Thread Model- The Main Thread – Creating Thread- Creating Multiple Threads- Synchronization – Inter thread Communication-Applet Basics- Applet Life cycle– Event Handling: Event Classes – Event Listener Interfaces- Introducing AWT: Working with Windows, Graphics and Text-Introducing Swing.

Practical Lab Exercise:

5. Write a program to explain the multithreading with the use of multiplication tables.

6. Write a program to display all shapes with available built in functions using applets.

UNITIV
15 HOURS

Java Database Connectivity - Servlets: The Lifecycle of Servlet- Using Tomcat for Servlet Development-The Servlet API-The javax.servlet package- Handling HTTP Request and Response – Introduction to JSP-A Basic JSP Example- Remote Method Invocation(RMI) – Simple Client/Server Application Using RMI.

Practical Lab Exercise:

7. Write a Servlet program with database connectivity for a web based application students result checking.

8. Write an RMI application to access a remote method and perform the sum of two numbers.

UNITV
15 HOURS

Java Beans – Application Builder Tools - Using the Bean Developer Kit-Jar Files-Introspection- Using Bean Info Interface – Persistence- Java Beans API - Networking Basics - Java and the Net – Inet Address – TCP/IP Client Sockets – URL –URL Connection – TCP/IP Server Sockets – Datagrams.

Practical Lab Exercise:

9. Write window based GUI applications using frames and applets to convert Fahrenheit to centigrade.

10.Develop a webpage using JSP to convert the kilometers to miles.

TEXTBOOKS

1. Herbert Schildt, "Java The complete reference", 11th Edition, McGraw Hill Education, 2019.

REFERENCEBOOKS

1. E. Balagurusamy ,"Programming with Java", 6th Edition, Tata McGraw Hill Pub.Ltd., New Delhi,2019.
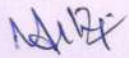
WEBRESOURCES

1. https://www.javatpoint.com/java-tutorial
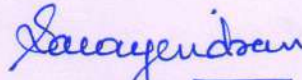2. https://www.geeksforgeeks.org/java/

MAPPING WITH PROGRAMOUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S			L			
CO2	S	M					
CO3		S		M			
CO4		S		M			
CO5		S		M			
CO6		S	L	M			
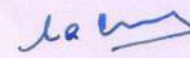
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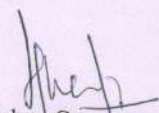
ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prepared By
(Prof Arthi R)

Verified by
(Dr Anna Saro Vijendran)

Approved by
(Dr Maria Priscilla G)

Member Secretary
Academic Council

SEMESTER II

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20CSE01	P/C Hardware	DSC	55	-	-	4	A

PREAMBLE / COURSE OBJECTIVE

This course aims at facilitating the students to understand the various Computer Peripherals, their organization and operations. The course helps the students to assess the applicability of Identify the fundamental components of motherboard layout and different CPU technology and the knowledge of using PC Fundamental (Computer Architecture & Peripherals)

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DEPARTMENT OFFERING

BSc Computer Science

PREREQUISTE

Higher Secondary Level – Basic computer

knowledge Bridge Course – If not studied in

HigherSecondary Level

EXPECTED SKILL

Domain Knowledge / Employability / Skill Development

COURSE OUT COMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Identify the basic types of input devices and output devices	Remember
CO2	Recognize of motherboard layout, components and form factors	Understand
CO3	Recognize the memory form factors, slot types and memory types	Applying
CO4	Classify the basic types of input devices and output devices	Evaluate
CO5	Acquire the knowledge on troubleshooting various input and output devices	Remember

SYLLABUS

UNIT I
11 HOURS

The Personal Computer: -Characteristics of Computers- Evolution of Computers- An overview of systems and components – An Introduction to Digital Logic – Working with the Number system on the PC - An Introduction to Digital Logic – The Microprocessor.

UNIT II
11 HOURS

Motherboards: Motherboard Designs – motherboard form factors- the components of motherboard – Upgrading a motherboard. BIOS and Boot Process: An introduction to BIOS – Booting the computer- ROMs,PROMs,EPROMs- The BIOS configuration.

UNIT III
11 HOURS

Computer Memory :An overview of ROM – RAM- Logical Memory Configuration – Installing memory modules in PC – Cache on the PC – Installing a Cache Memory. Hard disk drives – Interfaces The technology of the CD and CD-ROM- Digital Versatile /Video Disc

UNIT IV
11 HOURS

Monitors and Displays: CRT versus Flat panels – The Cathode Ray Tube – Flat Panel Displays. Printers: Printer types and technologies – Dot matrix printer- Inkjet printer – Laser printer – LED printer – Connecting the printer to the PC – setting up the printer- Keyboards, Mice and Pointing Devices.

UNIT V
11 HOURS

PC Maintenance: Preventive Maintenance of PC – Input devices – output devices – floppy disk drives – CD-ROM and DVD drives- Virus detection and protection. Troubleshooting the PC Hardware: Troubleshooting the CPU- BIOS - Hard disk drives- Memory.

TEXTBOOKS

1. Pradeep Sinha, Priti Sinha, *Computer Fundamentals*, 6th Edition, BPBpublications.
2. Ron Glister, *PC Hardware: A Beginner's Guide*, Osborne / McGraw-Hill Companies Inc.

REFERENCEBOOKS

A. J.L.Hennessy, *Computer Architecture: A Quantitative Approach*, 5th Edition, Elsevier Publications.
B. V. Raja Raman, *Introduction to Computers*,PHI.
C. Vikas Gupta, *Comdex Computer Kit*, Wiley Dreamtech, Delhi.

WEBRESOURCES

A. http://mycsvtunotes.weebly.com/uploads/1/0/1/7/10174835/computer_fundamental_complete-i.pdf

B. https://drive.google.com/file/d/0Bwv926_8gSqwVTNIUEdzaklPVU0/view
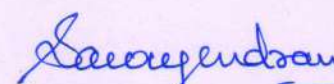
MAPPING WITH PROGRAMOUTCOMES

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	S	S	S	S	L
CO2	S	S	S	S	S	M	M
CO3	S	S	M	M	S	M	M
CO4	S	S	S	S	S	S	M
CO5	S	S	M	M	S	L	L
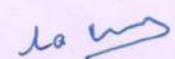
S- Strong; M-Medium; L-Low
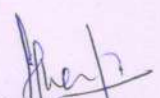
ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prepared By
(Prof Mahendiran N)

Verified by
(Dr Anna Saro Vijendran)

Approved by
(Dr Maria Priscilla G)

Member Secretary
Academic Council

SEMESTER II

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20CSE02	DISTRIBUTED COMPUTING	DSE I	55		-	4	T

PREAMBLE / COURSE OBJECTIVE

Understand the concepts and issues related to distributed systems. Design and develop the programs for distributed environment. Manage performance, reliability and other issues while designing in distributed environment

DEPARTMENT OFFERING

B.Sc Computer Science

PREREQUISTE

Higher Secondary Level – Basic of systems

EXPECTED SKILL

Domain Knowledge

COURSE OUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Study software components of distributed computing systems. Know about the communication and interconnection architecture of multiple computer systems	Remember
CO2	Recognize the inherent difficulties that arise due to distributed-ness of computing esources.	Understand
CO3	Understanding of networks & protocols, mobile & wireless computing and their applications to real world problems	Understand
CO4	Apply the knowledge about internet applications	Apply
CO5	Analyze the CORBA protocols	Apply

SYLLABUS

UNIT–I

11 HOURS

Distributed Computing, An Introduction –Definitions-The History of Distributed Computing-Different Forms of Computing-The Strengths and weakness of Distributed Computing-Basics of operating systems-network basics-Software engineering basics-inter process communications-event synchronization-timeouts

and threading-deadlocks and timeouts-data representation-data encoding-text based protocols-request response protocols-event diagram and sequence diagram-connection oriented versus connections IPC

UNIT–II

11 HOURS

Distributed computing paradigms-paradigms and abstraction-an example application-paradigms for distributed applications-trade-offs-The socket API-Background-the socket metaphor in IPC-the datagram socket API-the stream mode socket API-sockets with non blocking I/O operations-secure socket API-the client server paradigm issues-software engineering for a network service-connection oriented and connectionless servers-iterative server and concurrent server-stateful servers..

UNIT–III

11 HOURS

Group communication-unicasting versus multicasting-an archetypal multicast API-Connectionless versus connection oriented multicast-reliable multicasting versus unreliable multicasting-reliable multicasting versus unreliable multicasting-the java basic multicast API-reliable multicst API-distributed objects-message passing versus distributed object architecture-distributed object systems-remote procedure calls-remote method invocation-the java RMI Architecture-the API for java RMI-steps for building an RMI application-testing and debugging-comparison of RMI and socket APIs

UNIT–IV

11 HOURS

Advanced RMI-client callback-stub downloading-RMI security manager-Internet applications-HTML-XML—HTTP-dynamically generated web contents-common gateway interface-common gateway interface-web session and session state data.

UNIT–V

11 HOURS

The common object request broker architecture-the basic architecture-the CORBA object interface-inter ORB protocols-object servers and object clients- CORBA object references-CORBA   naming   service and the interoperable naming service-CORBA object services-object adapters-internet applications-advanced distributed computing paradigms.

TEXT BOOKS

1. M.L. Liu "Distributed Computing", Fourth Edition 2009, Pearson publications private Limited.

REFERENCE BOOKS

1.Ajay D.Kshemkalyani and mukeshsingal "Distributed computing principals, algorithms and systems

2. Nikhil anurag" Distributed Computing with Go"first Edition 2018,packet publishing.
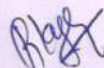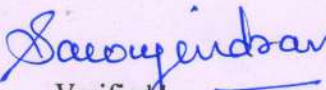
WEB RESOURCES

1. https://1lib.in/book/5299940/fa2bb5

MAPPING WITH PROGRAM OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	M	L	L	L	L	L	L
CO2	L	S	L	M	M	M	L	L
CO3	S	L	L	M	M	L	M	M
CO4	S	M	L	M	M	M	L	L
CO5	M	S	L	M	M	L	M	M
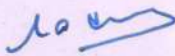
S- Strong; M-Medium; L-Low
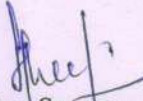
ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prepared By
(Prof Nagarajan R)

Verified by
(Dr Anna Saro Vijendran)

Approved by
(Dr Maria Priscilla G)

Member Secretary
Academic Council

SEMESTER II

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20CSE03	Compiler Design	DSE I	55		-	4	T

PREAMBLE / COURSE OBJECTIVE

Understand the concepts and issues related to compiler design . Provide the skills needed for building compilers for various situations that one may encounter in a career in Computer Science. Learn the process of translating a modern high-level language to executable code required for compiler construction.

DEPARTMENT OFFERING

BScComputerScience

PREREQUISTE

Higher Secondary Level – Basic of systems

EXPECTED SKILL

Domain Knowledge

COURSE OUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand fundamentals of compiler and identify the relationships among different phases of the compiler	Remember
CO2	Understand the application of finite state machines, recursive descent, production rules, parsing, and language semantics	Understand
CO3	Analyze & implement required module, which may include front-end, back-end, and a small set of middle-end optimizations	Understand
CO4	Use modern tools and technologies for designing new compiler.	Apply

SYLLABUS

UNIT–I

11 HOURS

Introduction to Compiler, Phases and passes, Bootstrapping, Finite state machines and regularexpressions and their applications to lexical analysis, Optimization of DFA-Based PatternMatchers implementation of lexical analyzers, lexical-analyzer generator, LEX-compiler,Formal grammars and their application to syntax analysis, BNF notation, ambiguity, YACC.The syntactic specification of programming languages: Context free grammars, derivation andparse trees, capabilities of CFG

UNIT–II

11 HOURS

Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR (0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, and implementation of LR parsing tables.

UNIT–III

11 HOURS

Syntax-directed Translation schemes, Implementation of Syntax directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples, translation of assignment statements, Boolean expressions, statements that alter the flow of control, postfix translation, translation with a top down parser. More about translation: Array references in arithmetic expressions, procedures call, declaration sand case statements

UNIT–IV

11 HOURS

Data structure for symbols tables, representing scope information. Run-Time Administration: Implementation of simple stack al-location scheme, storage allocation in block structured language. Error Detection & Recovery: Lexical Phase errors, syntactic phase errors semantic errors

UNIT–V

11 HOURS

Selected Topics: Algebraic Computation, Fast Fourier Transform, String Matching, Theory of NP-completeness, Approximation algorithms and Randomized algorithms.

TEXT BOOKS

1. ALFRED V AUTOR AHO, JEFFREY D AUTOR ULLMAN "Principles of Compiler Design".
2. V Raghvan, " Principles of Compiler Design", TMH
3. Kenneth Louden," Compiler Construction", Cengage Learning.

REFERENCE BOOKS

1. Aho, Sethi & Ullman, "Compilers: Principles, Techniques and Tools", Pearson Education2
2. Charles Fischer and Ricard LeBlanc," Crafting a Compiler with C", Pearson Education
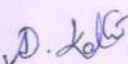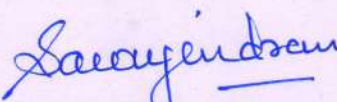
WEB RESOURCES

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

MAPPING WITH PROGRAM OUTCOMES

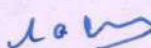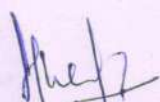| COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H	H	M	-	-	-	-	M
CO2	H	H	M	-	-	-	L	M
CO3	H	M	H	L	-	-	M	M
CO4	M	H	M	L	-	-	L	L

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Prepared By
(Dr. Kavitha P)

Verified by
(Dr. Anna Saro Vijendran)

Approved by
(Dr. Maria Priscilla G)

Member Secretary
Academic Council

SEMESTER II

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20MATCG12	DISCRETE MATHEMATICS	GE	55	-	-	4	A THEORY

PREAMBLE / COURSE OBJECTIVE

To enable the students to learn and visualize the fundamental ideas about Mathematical logic, Formal Languages, Automata, Boolean Algebra and Graph Theory

DEPARTMENT OFFERING

BSc Mathematics

PREREQUISTE

Higher Secondary Mathematics

EXPECTED SKILL

Domain Knowledge

COURSE OUTCOMES

On successful completion of the course, students will be

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Solve Mathematical logic problems.	Apply
CO2	Visualize the fundamental ideas of relations and functions	Analyze
CO3	Describe the different types of formal languages.	Understand
CO4	Apply Lattices and Boolean algebra concepts	Apply
CO5	Analyze the elements of graph theory.	Analyze

SYLLABUS

UNIT I: Mathematical Logic   **11 HOURS**

Connectives, Well – Formed Formulae, Equivalence of formulas, Tautological implications, Duality Law, Normal Forms, Theory of inference .

UNIT II: Relation and Function
11 HOURS

Composition of relations, Equivalence relations, Partial ordering relation, Composition of functions, Inverse functions, One –to –One, Onto and Bijective functions

UNIT III: Formal Languages and Automata
11 HOURS

Language, Grammar- Definition and Types. Deterministic finite automata, Non- deterministic finite automata – Conversion of non-deterministic automata to deterministic automata – procedure and problems

UNIT IV: Lattices and Boolean Algebra
12 HOURS

Partial ordering, Set, Poset, Lattices, Distributive lattices, Boolean Algebra, Minimization of Boolean function using K map.

UNIT V: GRAPH THEORY
10 HOURS

Basic Definitions, Representation of graphs, Paths, Reachability, Connectivity, Euler paths, Hamiltonian paths, Incidence matrix, Adjacency matrix, Trees, Binary trees, Theorems – Statements only (No Proof).

TEXT BOOKS

A. J.K. Sharma , "Discrete Mathematics" -Trinity Press - An imprint of Laxmi Publications Pvt Ltd, 4th edition, Reprint 2015

REFERENCE BOOKS

A. Dr.M.K. Venkataraman, Dr.N. Sridharan, N. Chandrasekaran "Discrete Mathematics", National Publishing Company, 1st edition 2000, Reprint 2012.
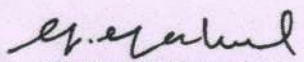
WEB RESOURCES

A. https://www.cis.upenn.edu/~jean/discmath-root-b.pdf

B. http://home.iitk.ac.in/~arlal/book/mth202.pdf

C. https://www.cs.yale.edu/homes/aspnes/classes/202/notes.pdf

MAPPING WITH PROGRAM OUTCOMES

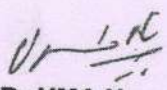| COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	M	-	-	-	-	-	-
CO2	M	S	-	-	-	-	-	-
CO3	M	S	-	-	-	-	-	-
CO4	S	M	-	-	-	-	-	-
CO5	S	L	-	-	-	-	-	-

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

INFANT GABRIEL G
(Course Coordinator)

Dr JAYASHEELA D
(Academic Council -Member Secretary)

Dr UMA N
(BOS Chairperson)

SEMESTER II

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT CODE
20ESA01	ENVIRONMENTAL STUDIES	AECC - III	26	-	-	1#	Theory

PREAMBLE / COURSE OBJECTIVE

1. To recognize the major concepts of ecosystem and have in-depth understanding of environmental interactions and alternate energy resources.
2. To realize the effects of various environmental pollutants and measures to control pollution.
3. To identify the environmental social issues and develop problem – solving skills using scientific techniques.
4. To be aware of human population growth among the nations and the significance of human rights.

DEPARTMENT OFFERING

Biotechnology

PREREQUISTE

Higher Secondary Level

EXPECTED SKILL

Skill Development

COURSE OUTCOMES

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

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Describe the principles of ecology and major concepts in environmental sciences.	Remember
CO2	Interpret the key concepts in Environmental pollution that apply to air, land and water issues on a global scale and population growth.	Understand
CO3	Investigate the polluted environment area and document the risks and formulate a design for the environmental health.	Analyze
CO4	Identify the Socio- Environmental issues and apply the related analysis for the protection of environment.	Apply
CO5	Describe the human rights and welfare and role of information technology in the environment.	Analyze

UNIT I
4 HOURS

Multidisciplinary nature of environmental studies Definition, scope and importance, Need for public awareness. Introduction to Renewable and Nonrenewable sources – Uses of alternate energy sources.

UNIT II
6 HOURS

Ecosystems - Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Food chains, food webs and ecological pyramids. Types of ecosystem - Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Biodiversity – Levels – Patterns – Threats – Biodiversity services.

UNIT III
5 HOURS

Environmental Pollution – Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Solid waste Management : Causes, effects and control measures of urban and industrial wastes. Disaster management : floods, earthquake, cyclone and landslides.

UNIT IV
6 HOURS

Social Issues and the Environment Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Environmental Issues in Coimbatore District (Noyyal River, Dye Industries and Agricultural issues). Environmental ethics : Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents. Environment Protection Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation.

UNIT V
5 HOURS

Human Population and the Environment - Population growth, variation among nations, Population explosion – Family Welfare Programme, Environment and human health, Human Rights - Women and Child Welfare, Role of Information Technology in Environment and human health.

*Activity – Documentation about Impacts of pollutants in Environment/ Socio – Environmental Issues.

TEXT BOOKS

A. Erach Bharucha. "Textbook for Environmental Studies for Undergraduate Courses", 2nd edition, University Grants Commission, New Delhi and Bharati Vidyapeeth Institute of Environment Education and Research, Pune, University Press, Revised edition.

REFERENCE BOOKS

A. M P Poonia and S C Sharma "Environmental Studies - Concepts, Impacts, Mitigation and Management", 2nd edition, Khanna Book Publishing, 2017.

B. R Rajagopalan "Environmental Studies", 3rd edition, Oxford University Press, 2015.

C. Dr D K Asthana and Dr Meera Asthana, Text Book of Environmental Studies, Revised edition, S Chand and Company, 2010.

D. Shashi Chawla "A Text Book of Environmental Studies", 1st edition, Tata McGraw Hill, 2012.

WEB RESOURCES

A. https://ugc.ac.in/oldpdf/modelcurriculum/env.pdf

B. https://play.google.com/books/reader?id=ZHsoDwAAQBAJ&hl=en&pg=GBS.PP1

C. http://www.nacwc.nic.in (Suggested by UGC)

D. http://www.opcw.org (Suggested by UGC)

MAPPING WITH PROGRAM OUTCOMES

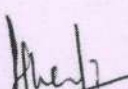| COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1					S				
CO2					S				
CO3				L	S		M		
CO4			M		S		M		M
CO5					S				

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

No Comprehensive Examinations. Only Continuous Internal Assessment (CIA).

Verified and Approved by

Course Coordinator
(Dr Jayasheela D)

Academic Council

Principal

Sri Ramakrishna College of Arts and Science (Autonomous)
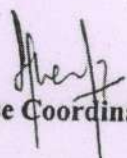## Coimbatore – 641006

20ESA01 - ENVIRONMENTAL STUDIES

[A one Credit Course offered for First years
With effect from 2020-2021 Academic year and onwards]

SCHEME OF EXAMINATION

1. Environmental Studies paper is an Ability Enhancement Compulsory Course (AECC) with **ONE CREDIT**.

2. It is an extra credit course. Not included in total marks and CGPA calculation.

3. The course will have only one Internal Examination (Model Examination for 2 hours) at the end of the semester.

4. The evaluation pattern is descriptive type written examination.

5. The course carries a total marks of 100 out of which 60 marks will be allocated for descriptive examination and 40 marks will be assigned for other assessment components.

6. The Passing minimum is 40 out of 100 marks.

7. The assessment will consist of two parts, as detailed below:

S.No	Nature of Exam	Maximum Marks	Remarks
1.	Descriptive Examination	**60 Marks** (Section A: 8 x 5 = 40) (Section B: 2 x 10 = 20)	• Centralized Examination • For 2 Hours Duration • Descriptive type questions • Model Examination only
2.	Other Assessment Components	**40 Marks** (Activity – 20 Seminar – 10 Documentation Report – 10)	**Activity** – Quiz (Kahoot, Hot Potatoes, Plickers)/ Group Discussion/ Participation certificate in seminar/ workshop/ Paper presentation/ Model Design **Seminar** – Classroom activity/ Google Classroom **Documentation Report** – Google Classroom/ Individual Report to be
	Total	**100 Marks**	submitted to the Subject handling faculty

Course Coordinator   Academic Council   Principal

SEMESTER 2

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT	ASSESSMENT
20LSA02	Life Skills-II	SEC	40	-	-	2	Theory

PREAMBLE / COURSE OBJECTIVE

This course aims at

- Developing essential skills to influence and motivate others
- Creating and maintaining an effective and motivated team to work for the society
- Nurture a creative and entrepreneurial mindset and Explore desired career opportunities
- Inculcating and practicing human values

DEPARTMENT OFFERING

TIP Center

PREREQUISITE

First Semester - Life Skills- I

EXPECTED SKILL

Leadership Skills/ Professional Skills/ Entrepreneurial Skills

COURSE OUTCOMES

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

S. NO.	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the skills, strengths and abilities of different leadership styles	Understand
CO2	Demonstrate the practical skills in conflict management and self management	Apply
CO3	Understand the basics of entrepreneurship and develop business plans	Apply
CO4	Explore sources of career opportunities	Apply
CO5	Become conscious practitioners of human values	Apply

SYLLABUS

UNIT I Leadership Skills
8 Hours

Understanding leadership and its importance – meaning of leadership, significance of leadership required, characteristics of an ideal leader

Traits and Models of Leadership - leaders born or made, key characteristics of an effective leader, Leadership styles, perspectives of different leaders

Basic Leadership Skills – motivation, team work, negotiation, networking

UNIT II Managerial Skills
8 Hours

Basic Managerial Skills - planning for effective management, organizing teams, recruiting and retaining talent, delegation of tasks, learning to coordinate, conflict management

Self-Management Skills - understanding self-concept, developing self-awareness, self-examination, self-regulation

UNIT III Entrepreneurial skills
8 Hours

Basics of Entrepreneurship - meaning of entrepreneurship, classification and types of entrepreneurship, traits and competencies of entrepreneur

Creating Business Plan - problem identification and idea generation, idea validation, pitch making

UNIT IV Career Skills
8 Hours

Group Discussion- meaning and methods, , procedure, simulation ,common errors

Exploring career opportunities – knowing yourself, personal characteristics, knowledge about the world of work, requirements of jobs including self-employment, sources of career information, preparing for a career based on potentials and availability of opportunities

UNIT V Universal Human Values
8 Hours

Universal human values - love and compassion, truth, non-violence, righteousness, peace, service, renunciation (sacrifice)

TEXT BOOKS

A. Ashokan, M. S. (2015). Karmayogi: A Bibliography of E. Sreedharan. Penguin, UK.

B. Brown, T. (2012). Change by Design. Harper Business

C. Elkington, J., & Hartigan, P. (2008). The Power of Unreasonable People: How Social Entrepreneurs Create Markets that Change the World. Harvard Business Press.

D. Goleman D. (1995). Emotional Intelligence. Bloomsbury Publishing India Private Limited

E. Kalam A. A. (2003). Ignited Minds: Unleashing the Power within India. Penguin Books India

F. Kelly T., Kelly D. (2014). Creative Confidence: Unleashing the Creative Potential within Us All. William Collins

G. Kurien V., & Salve G. (2012). I Too Had a Dream. Roli Books Private Limited

H. Livermore D. A. (2010). Leading with cultural intelligence: The New Secret to Success. New York: American Management Association

I. McCormack M. H. (1986). What They Don't Teach You at Harvard Business School: Notes From A Street-Smart Executive. RHUS

REFERENCE BOOKS

A. O'Toole J. (2019) The Enlightened Capitalists: Cautionary Tales of Business Pioneers Who Tried to Do Well by Doing Good. HarperCollins
B. Sinek S. (2009). Start with Why: How Great Leaders Inspire Everyone to Take Action. Penguin
C. Sternberg R. J., Sternberg R. J., &Bales P. B. (Eds.). (2004). International Handbook of Intelligence. Cambridge University Press.

WEB RESOURCES

A. Fries, K. (2019). 8 Essential Qualities That Define Great Leadership. Forbes. Retrieved 2019- 02-15 from https://www.forbes.com/sites/kimberlyfries/2018/02/08/8-essentialqualities-that-define-great-leadership/#452ecc963b63.
B. How to Build Your Creative Confidence, Ted Talk by David Kelly - https://www.ted.com/talks/david_kelley_how_to_build_your_creative_confidence
C. India's Hidden Hot Beds of Invention Ted Talk by Anil Gupta - https://www.ted.com/talks/anil_gupta_india_s_hidden_hotbeds_of_invention
D. Knowledge@Wharton Interviews Former Indian President APJ Abdul Kalam - . "A Leader Should Know How to Manage Failure" https://www.youtube.com/ watch?v=laGZaS4sdeU
E. Martin, R. (2007). How Successful Leaders Think. Harvard Business Review, 85(6): 60.
F. NPTEL Course on Leadership - https://nptel.ac.in/courses/122105021/9
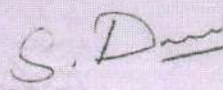
MAPPING WITH PROGRAM OUTCOMES

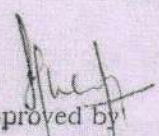| COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	POL			M	S				
CO2				L	M	S			
CO3				S	L	S			
CO4				M	S		S		
CO5				L	M	S			

S- Strong; M-Medium; L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

- Total: 100 Marks
- Online exam: 50 Marks
- Oral Evaluation: 50 Marks
- Passing Minimum: 40 %
- **External Assessment**

Prepared & Verified by
Dr Thamarai selvan M

Dr. S. DEENA, Ph.D.,
DIRECTOR
Catering Science & Hotel Mgt.,
Sri Ramakrishna College of Arts & Science
(Formerly S.N.R. Sons College)
Coimbatore - 641 006

Approved by
Academic Council