



AMAL COLLEGE
OF ADVANCED STUDIES

LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK FOR UNDER GRADUATE EDUCATION

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

(Choice Based Credit and Semester System for Under Graduate Curriculum 2019)

EFFECTIVE FROM THE ACADEMIC YEAR 2019-20

DEPARTMENT OF COMPUTER SCIENCE



AMAL COLLEGE OF ADVANCED STUDIES

Myladi, Eranhimangad Po, Nilambur – 679329

Aided by Govt. of Kerala & affiliated to the University of Calicut NAAC Accredited with A Grade (3.11 CGPA)

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PREFACE

We are delighted to introduce the Learning Outcome Based Curriculum Framework for the Bachelor of Science in Computer Science program, which is offered by the Department of Computer Science at Amal College of Advanced Studies, Nilambur. This document embodies our institution's vision and mission, guiding us toward academic excellence and reaffirming our commitment to providing comprehensive and forward-looking education.

Amal College's vision aims to establish an advanced learning center that nurtures personal transformation, social empowerment, and excellence in the field of computer science. Our mission centers on delivering quality education, shaping responsible citizens, fostering research and innovation, and equipping students with essential life skills. These core principles influence the development of this curriculum.

The Department of Computer Science at Amal College aspires to transform the world through computer science and technology, leading the way in teaching and research, and producing future leaders capable of navigating the complexities of the digital world.

This curriculum outlines the Bachelor of Science in Computer Science program, its aims, graduate attributes, Program Learning Outcomes, course-level learning outcomes, CLO-PLO Mapping, teaching and learning methodologies, and assessment techniques. It reflects our commitment to providing transformative education that aligns with the needs of today's rapidly evolving technological landscape. This framework will guide our faculty and students as we continue our educational journey. The revised Guideline on LOCF will be in effect in the Curriculum of the college from the 2022-2023 Academic year onwards.

We express our appreciation to all those who contributed to its development.

Warm regards,

Dr .Zacaria T V

Principal

Amal College of Advanced Studies, Nilambur

VISION AND MISSION OF AMAL COLLEGE OF ADVANCED STUDIES

VISION

The vision of Amal College is to establish an innovative learning institution that catalyzes personal transformation, leads community upliftment, and motivates individuals to attain the highest levels of excellence.

MISSION

- **Education Excellence:** We are committed to delivering high-quality education in a nurturing and inclusive environment.
- **Responsible Citizens:** Our goal is to prepare our youth to become responsible citizens with a deep sense of patriotism.
- **Research and Innovation:** We encourage and support research and innovation to nurture students as contributors to our nation.
- **Global Competency:** We strive to establish collaborative partnerships with high-standard institutions, enhancing the global competitiveness of both our institution and our scholars.
- **Life Skills:** We empower our students with essential life skills that not only transform their own lives but also uplift their communities.
- **Community Empowerment:** We are dedicated to promoting social and educational empowerment in our community through extension and outreach programs.
- **Inclusion and Sustainability:** We are committed to fostering sustainable development and advocating for inclusiveness of all sections of the society.

VISION AND MISSION OF DEPARTMENT OF COMPUTER SCIENCE

VISION

To be a leading hub of innovation and excellence in computer science, fostering cutting-edge research, producing skilled professionals, and contributing significantly to technological advancements.

MISSION

Our mission encompasses the following key objectives:

1. Equip students with a comprehensive understanding of computer science fundamentals, preparing them for dynamic and evolving industry demands.
2. Conduct impactful research that pushes the boundaries of knowledge in areas like artificial intelligence, cyber security, and software engineering.
3. Cultivate a collaborative and inclusive learning environment, encouraging creativity and critical thinking among students and faculty.
4. Establish strong industry partnerships to facilitate real-world applications of computer science, bridging the gap between academia and industry.
5. Promote ethical and responsible use of technology, instilling a sense of social responsibility in students to address global challenges through computational solutions.

Through this vision and mission, the Department of Computer Science at our institution seeks to lead in the realm of computer science education, research, and innovation, while simultaneously fostering a community of skilled, creative, and socially responsible computer scientists.

INTRODUCTION TO BACHELOR OF SCIENCE IN COMPUTER

The learning outcomes-based curriculum framework for a Bachelor of Science in Computer Science degree is meticulously designed to provide a flexible and all-encompassing structure. This structure empowers institutions to customize computer science programs to cater to the unique needs of students while remaining adaptable to the ever-evolving landscape of technology and computer science. This framework is envisioned to maintain the quality and standards of computer science degrees and programs across the nation, facilitating regular program reviews within a broad framework of agreed-upon graduate attributes, qualification descriptors, program learning outcomes, and course-level learning objectives.

It is essential to emphasize that this framework is not intended to standardize syllabi for computer science programs, nor does it impose specific teaching methods or assessment procedures. Instead, it seeks to cultivate an environment that encourages flexibility and innovation in program design, syllabus development, teaching and learning approaches, as well as the assessment of student learning outcomes. This adaptability is essential to ensure that graduates are well-prepared to excel in the ever-evolving realm of computer science and technology.

CHARACTERISTICS AND SCOPE OF THE UNDERGRADUATE PROGRAM IN BACHELOR OF SCIENCE IN COMPUTER

The Bachelor of Science in Computer Science program is an interdisciplinary course that explores the vast and dynamic intersection of computer science and technology. Students in this program gain comprehensive knowledge in computer science, including areas such as programming, data structures, algorithms, and computer systems, while also honing their skills in software development, database management, and computer networking.

The curriculum extends to cutting-edge topics like artificial intelligence, machine learning, and cyber security, where students delve into advanced technologies and practices. Additionally, this program emphasizes problem-solving and analytical skills, covers effective communication in a technical context, and introduces students to the ethical and legal aspects of computer science. Furthermore, students have the opportunity to engage in real-world.

projects, which allows them to apply their knowledge and tackle complex challenges in the field of computer science.

Importantly, the Bachelor of Science in Computer Science program places a strong emphasis on experiential learning, offering opportunities for internships, research projects, and exposure to industry best practices. This focus on practical experience equips graduates with the skills and knowledge needed to excel in the ever-evolving and competitive world of computer science and technology.

B.SC. COMPUTER SCIENCE PROGRAMME OBJECTIVE

The basic objective of the Programme is to open a channel of admission for computing courses for students, who have done the 10+2 and are interested in taking computing/IT as a career. After acquiring the Bachelor's Degree (B.Sc. Computer Science) at University of Calicut, there is further educational opportunity to go for an MCA or other Master's Programme like MSc (Computer Science), MSc (IT), MBA, etc., at this university or at any other University/Institute. Also after completing the B.Sc. Computer Science Programme, a student should be able to get entry level job in the field of Information Technology or ITES or they can take up self-employment in Indian & global software market. The specific objectives of the Programme include

1. To attract young minds to the potentially rich and employable field of computer applications.
2. To be a foundation graduate Programme this will act as a feeder course for higher studies in the area of Computer Science/Applications.
3. To develop skills in software development so as to enable the B.Sc Computer Science graduates to take up self-employment in Indian and global software market.
4. To train and equip the students to meet the requirements of the Software industry in the country and outside.

QUALIFICATION DESCRIPTORS

On completion of a B.Sc. in Computer Science, the expected learning outcomes that a student should be able to demonstrate are the following.

QD-1. Fundamental understanding of the principles of Computer Science and its connections with other disciplines

QD-2. Procedural knowledge that creates different types of professionals related to Computer Science, including research and development, teaching and industry, government and public service;

QD-3. Skills and tools in areas related to computer science and current developments in the academic field of study.

QD-4. Use knowledge, understanding and skills required for identifying problems and issues, collection of relevant quantitative and/or qualitative data drawing on a wide range of sources, and their application, analysis and evaluation using methodologies as appropriate to Computer Science for formulating solutions

QD-5. Communicate the results of studies undertaken in Computer Science accurately in a range of different contexts using the main concepts, constructs and techniques

QD-6. Meet one's own learning needs, drawing on a range of current research and development work and professional materials

QD-7. Apply Computer Science knowledge and transferable skills to new/unfamiliar contexts,

QD-8. Demonstrate subject-related and transferable skills that are relevant to industry and employment opportunities.

PROGRAMME LEARNING OUTCOMES FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE

The Bachelor of Science in Computer Science program enables students to attain, by the time of graduation:

PLO-1. Demonstrate an aptitude for Computer Programming and Computer-based problem-solving skills.

PLO-2. Display the knowledge of appropriate theory, practices and tools for the specification, design, and implementation

PLO-3. Ability to learn and acquire knowledge through online courses available at different massive open online course providers.

PLO-4. Ability to link knowledge of Computer Science with other two chosen Complementary disciplines of study.

PLO-5. Display an ethical code of conduct in the usage of the Internet and Cyber systems.

PLO-6. Ability to pursue higher studies of specialization and to take up technical employment.

PLO-7. Ability to formulate, model, design solutions, and procedures and use software tools to solve real-world problems and evaluate.

PLO-8. Ability to operate, manage, deploy, and configure computer network, hardware, and software operation of an organization.

PLO-9. Ability to present results using different presentation tools.

PLO-10. Ability to appreciate emerging technologies and tools.

COURSE LEARNING OUTCOMES FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE

Course Learning Outcomes (CLOs) for the Bachelor of Science in Computer Science program provide clear and concise statements that delineate the essential knowledge and skills that students are intended to gain within the context of a specific course. These outcomes play a pivotal role in shaping the curriculum, influencing the selection of appropriate teaching methodologies, and structuring assessments. By doing so, CLOs ensure a seamless alignment with the broader program objectives. Ultimately, this meticulous alignment fosters an effective and enriching educational experience, empowering students to acquire a robust understanding of computer science and its applications, preparing them for the demands and opportunities of the ever-evolving technological landscape.

ABOUT CLO-PLO MAPPING

CLO-PLO Mapping, or Course Learning Outcomes to Program Learning Outcomes Mapping, is a systematic approach in higher education that connects the specific objectives of individual courses (Course Learning Outcomes or CLOs) to the overarching goals of an academic program (Program Learning Outcomes or PLOs). This process is crucial for ensuring the alignment and coherence of the curriculum and assessment methods.

By mapping CLOs to PLOs, educators can track how well course objectives contribute to the broader educational goals of a program. It provides transparency and clarity, enabling instructors and institutions to evaluate the effectiveness of their curriculum design, teaching methods, and assessment strategies.

The benefits of CLO-PLO Mapping include enhanced program quality, improved assessment practices, and a better understanding of whether students are achieving the intended learning outcomes. It also aids in identifying areas where curriculum adjustments may be needed to better meet program objectives. Additionally, it supports accreditation and quality assurance efforts, as it provides evidence of alignment between courses and program goals.

In essence, CLO-PLO Mapping is a valuable tool for promoting educational excellence, ensuring students receive a comprehensive and coherent education, and facilitating continuous improvement in academic programs.

CORE COURSES

SEMESTER I

BCS1B01–COMPUTER FUNDAMENTALS AND HTML

Course Number	: 04
Contact Hours per Week	: 3(1L+2P)
Number of Credits	: 3
Number of Contact Hours	: 48 Hrs.
Course Evaluation	: Internal–15Marks +External–60Marks

COURSE LEARNING OUTCOMES

- CLO1** Familiar with fundamental concepts of Computer hardware and software
- CLO2** Have knowledge of different Number system, Digital codes and Boolean algebra
- CLO3** Understand the problem-solving aspect
- CLO4** Demonstrate the algorithm and flowchart for the given problem.
- CLO5** Design a Webpage with CSS

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	1	2	-	-	1	-	-	2	-	3
CLO2	2	-	-	2	-	1	3	-	2	-
CLO3	-	3	2	-	3	-	-	3	-	-
CLO4	2	2	-	1	1	-	-	-	-	2
CLO5	-	-	2	2	-	-	-	1	-	-
WT. AVG	1.67	2.33	2.00	1.67	1.67	1.00	3.00	2.00	2.00	2.50
Overall Mapping of Subject										1.98

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

SEMESTER II

BCS2B02 – PROBLEM SOLVING USING C

Course Number	: 10
Contact Hours per Week	: 3(1L+2P)
Number of Credits	: 3
Number of Contact Hours	: 48 Hrs.
Course Evaluation	: Internal–15Marks +External–60Marks

COURSE LEARNING OUTCOMES

- CLO1** Interpret the basic principles of C
- CLO2** Acquire decision making and looping concepts.
- CLO3** Design and develop modular programming
- CLO4** Explore usage of Arrays, strings, structures, union and files.
- CLO5** Effective utilization of pointers and dynamic memory allocation

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	-	2	-	-	1	-	-	2	-	3
CLO2	2	-	-	2	-	1	3	-	2	-
CLO3	-	3	2	-	3	-	-	3	-	-
CLO4	2	2	-	1	1	-	-	-	-	2
CLO5	-	-	2	2	-	-	-	1	-	-
WT. AVG	2.00	2.33	2.00	1.67	1.67	1.00	3.00	2.00	2.00	2.50
Overall Mapping of Subject										2.02

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS2B03– PROGRAMMING LABORATORY I: LAB EXAM OF 1ST & 2ND SEMESTER - HTML AND PROGRAMMING IN C

Course Number : 11
Number of Credits : 4
Course Evaluation : Internal–20Marks +External–80Marks

COURSE LEARNING OUTCOMES

- CLO1** Analyze a web page and identify its elements and attributes
- CLO2** Create web pages using HTML5 and Cascading Style Sheets
- CLO3** Design and develop a webpage with Hyperlinks
- CLO4** Enhance their analyzing and problem solving skills and use the same for writing programs in C.
- CLO5** To write diversified programs using C language

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	-	2	-	3	1	-	-	2	-	3
CLO2	2	-	1	-	-	1	3	-	2	-
CLO3	-	3	-	-	3	-	-	-	2	-
CLO4	2	2	-	1	1	2	-	3	-	2
CLO5	-	-	2	2	-	-	-	1	-	-
WT. AVG	2.00	2.33	1.50	2.00	1.67	1.50	3.00	2.00	2.00	2.50
Overall Mapping of Subject										2.05

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

SEMESTER III

XXXXA11 – PYTHON PROGRAMMING

Course Number	: 14
Contact Hours per Week	: 4L
Number of Credits	: 4
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal–20Marks +External–80Marks

COURSE LEARNING OUTCOMES

- CLO1** Explain basic principles of Python programming language
- CLO2** Implement decision making and loop statements in Python
- CLO3** Implement GUI applications using Python
- CLO4** Explain modular programming concepts using Python
- CLO5** Familiarize with List, Tuple, Dictionary concepts in Python

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	-	2	-	3	1	-	-	2	-	3
CLO2	3	-	1	-	-	1	3	-	2	-
CLO3	-	3	-	-	2	-	-	-	2	-
CLO4	2	2	-	1	1	2	-	3	-	2
CLO5	-	-	2	2	-	-	-	1	3	-
WT. AVG	2.50	2.33	1.50	2.00	1.33	1.50	3.00	2.00	2.33	2.50
Overall Mapping of Subject										2.10

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

XXXXA12 SENSORS AND TRANSDUCERS

(BASIC PRINCIPLE, WORKING AND APPLICATIONS ONLY EXPECTED)

Course Number	: 15
Contact Hours per Week	: 4L
Number of Credits	: 4
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal–20Marks +External–80Marks

COURSE LEARNING OUTCOMES

- CLO1** Explain resistance, inductance and capacitance transducers.
- CLO2** Perceive the concepts of temperature transducers
- CLO3** Perceive the concepts level transducers and pressure
- CLO4** Explain flow transducers, electromagnetic transducers, radiation sensors and sound transducers

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	-	2	-	3	1	-	-	2	-	2
CLO2	-	-	2	-	-	2	2	-	1	-
CLO3	2	1	-	-	1	-	3	-	1	2
CLO4	2	-	-	1	3	2	-	1	-	2
WT. AVG	2.00	1.50	2.00	2.00	1.67	2.00	2.50	1.50	1.00	2.00
Overall Mapping of Subject										1.82

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS3B04 – DATA STRUCTURES USING C

Course Number	: 16
Contact Hours per Week	: 7(3L + 4P)
Number of Credits	: 3
Number of Contact Hours	: 112 Hrs.
Course Evaluation	: Internal–15Marks +External–60Marks

COURSE LEARNING OUTCOMES

- CLO1** To be familiar with fundamental data structures and with the manner in which these data structures can best be implemented;
- CLO2** To have a knowledge of complexity of basic operations like insert, delete, search on these data structures
- CLO3** Ability to choose a data structure to suitably model any data used in computer applications
- CLO4** Design programs using various data structures including hash tables, Binary and generalsearch trees, graphs etc
- CLO5** Implement and know the applications of algorithms for sorting, pattern matching

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	-	2	-	3	1	-	-	2	-	2
CLO2	-	-	2	-	-	2	2	-	1	-
CLO3	2	1	-	-	1	-	3	-	1	2
CLO4	2	-	-	1	3	2	-	1	-	2
CLO5	-	3	3	2	-	-	-	1	3	-
WT. AVG	2.00	2.00	2.50	2.00	1.67	2.00	2.50	1.33	1.67	2.00
Overall Mapping of Subject										1.97

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

SEMESTER IV

XXXXA13 – DATA COMMUNICATION AND OPTICAL FIBERS

Course Number	: 19
Contact Hours per Week	: 4L
Number of Credits	: 4
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal–15Marks +External–60Marks

COURSE LEARNING OUTCOMES

- CLO1** Acquaint with the structure of Data Communications System and its components
- CLO2** To Familiarize with different network terminologies and transmission media
- CLO3** To gain knowledge of the different multiplexing techniques, Telephone system, Mobile System GSM.
- CLO4** To become familiar with the functions of a Data link layer and switching.
- CLO5** To acquire the knowledge of Optical Fiber Cable and its working

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO10
CLO1	-	2	-	3	1	-	-	2	-	2
CLO2	3	-	1	-	-	1	2	-	2	-
CLO3	-	3	-	-	2	-	3	-	1	-
CLO4	2	2	-	1	1	2	-	3	-	2
CLO5	-	-	3	2	-	-	-	1	3	-
WT. AVG	2.50	2.33	2.00	2.00	1.33	1.50	2.50	2.00	2.00	2.00
Overall Mapping of Subject										2.02

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

XXXXA14 MICROPROCESSORS-ARCHITECTURE AND PROGRAMMING

Course Number	: 20
Contact Hours per Week	: 4L
Number of Credits	: 4
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal-20Marks +External-80Marks

COURSE LEARNING OUTCOMES

- CLO1** To study general architecture of microprocessor
- CLO2** To write assembly language programs, both simple programs and interfacing programs
- CLO3** To know how to interface peripheral devices with 8085
- CLO4** To study the architecture of 8086 microprocessor

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO10
CLO1	3	2	-	3	2	-	-	2	-	2
CLO2	-	-	2	-	-	2	2	-	1	-
CLO3	2	1	-	-	2	-	3	-	1	2
CLO4	2	-	-	1	3	2	-	1	-	2
WT. AVG	2.33	1.50	2.00	2.00	2.33	2.00	2.50	1.50	1.00	2.00
Overall Mapping of Subject										1.92

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS406 – DATABASE MANAGEMENT SYSTEM AND RDBMS

Course Number	: 21
Contact Hours per Week	: 7 (3L + 4P)
Number of Credits	: 3
Number of Contact Hours	: 112 Hrs.
Course Evaluation	: Internal–15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** Gain knowledge of database systems and database management system software
- CLO2** Ability to model data in applications using conceptual modeling tools such as ERDiagrams and design data base schemas based on the model
- CLO3** Formulate, using SQL, solutions to a broad range of query and data update problems
- CLO4** Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.
- CLO5** Be acquainted with the basics of transaction processing and concurrency control

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	1	1	-	-	2	-	-	3	-	2
CLO2	-	-	2	3	-	2	2	-	1	-
CLO3	2	3	-	-	3	-	3	-	1	2
CLO4	2	-	-	1	-	-	-	2	-	-
CLO5	-	-	3	-	-	3	1	-	-	2
WT. AVG	1.67	2.00	2.50	2.00	2.50	2.50	2.00	2.50	1.00	2.00
Overall Mapping of Subject										2.07

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS4B06- PROGRAMMING LABORATORY II: LAB EXAM OF 3RD AND 4TH SEMESTER - DATA STRUCTURES AND RDBMS

Course Number	: 22
Number of Credits	: 4
Course Evaluation	: Internal-20Marks +External-80Marks

COURSE LEARNING OUTCOMES

- CLO1** Make use of typical data definitions and manipulation commands
- CLO2** Test the implementation of nested and join queries
- CLO3** Develop simple application using views, sequences and synonyms
- CLO4** Inspect and implement applications that require front-end tools
- CLO5** Familiarizing with different data structures tools like searching, sorting, Linked List

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	1	-	2	-	1	-	-	2	3	2
CLO2	-	2	-	3	-	2	2	-	2	-
CLO3	2	3	-	-	2	-	3	-	1	3
CLO4	2	-	3	1	-	3	-	2	-	-
CLO5	-	-	3	-	2	1	1	-	3	2
WT. AVG	1.67	2.50	2.67	2.00	1.67	2.00	2.00	2.00	2.25	2.33
Overall Mapping of Subject										2.11

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

SEMESTER V

BCS5B07 COMPUTER ORGANIZATION AND ARCHITECTURE

Course Number	: 25
Contact Hours per Week	: 4L
Number of Credits	: 3
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal–15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** To make students understand the basic structure, operation and characteristics of a digital computer.
- CLO2** To familiarize with Computer Instruction and Interrupt Design
- CLO3** To make students know the different types of control unit and Addressing Modes
- CLO4** To familiarize with the Memory organization including cache memories and virtual memory
- CLO5** To understand the I/O devices and standard I/O interfaces

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	1	-	2	-	1	-	-	2	-	2
CLO2	-	2	-	3	-	2	2	-	1	-
CLO3	2	3	-	-	2	-	3	-	1	2
CLO4	2	-	-	1	-	3	-	2	-	-
CLO5	-	-	3	-	2	1	1	-	-	2
WT. AVG	1.67	2.50	2.50	2.00	1.67	2.00	2.00	2.00	1.00	2.00
Overall Mapping of Subject										1.93

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS5B08 JAVA PROGRAMMING

Course Number: 26

Contact Hours per Week: 6 (3L + 3P)

Number of Credits: 3

Number of Contact Hours: 96 Hrs.

Course Evaluation: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** Knowledge of the structure and model of the Java programming language
- CLO2** Use the Java programming language for various programming technologies
- CLO3** Develop Software in the java programming language
- CLO4** Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements

CLO-PLO MAPPING										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	1	-	2	-	1	-	-	2	2	2
CO2	-	2	-	3	-	2	2	-	2	-
CO3	2	3	-	-	2	-	3	-	1	3
CO4	2	-	3	1	-	3	-	2	-	-
WT. AVG	1.67	2.50	2.50	2.00	1.50	2.50	2.50	2.00	1.67	2.50
Overall Mapping of Subject										2.13

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS5B09 WEB PROGRAMMING USING PHP

Course Number	: 27
Contact Hours per Week	: 6 (3L + 3P)
Number of Credits	: 3
Number of Contact Hours	: 96 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** To understand basics of the Internet and World Wide Web
- CLO2** To learn basic skill to develop responsive web applications
- CLO3** To acquire the knowledge of HTML and CSS
- CLO4** To understand basic concept of client side scripting language -javascript
- CLO5** To understand the server side scripting language -PHP
- CLO6** To learn about the integration of PHP and Postgresql

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	1	-	2	-	1	-	-	3	2	2
CLO 2	-	2	-	3	-	2	2	-	2	-
CLO 3	2	3	-	-	2	-	3	-	1	3
CLO 4	2	-	3	1	-	3	-	2	-	-
CLO 5	-	3	-	2	-	-	2	-	3	-
CLO 6	-	2	-	3	-	2	2	-	2	-
WT. AVG	1.67	2.67	2.50	2.00	1.50	2.50	2.33	2.50	2.00	2.50
Overall Mapping of Subject										2.22

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS5B10 PRINCIPLES OF SOFTWARE ENGINEERING

Course Number	: 28
Contact Hours per Week	: 6 (3L + 3P)
Number of Credits	: 3
Number of Contact Hours	: 96 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** Ability to apply software engineering principles and techniques
- CLO2** To produce efficient, reliable, robust and cost-effective software solutions
- CLO3** Familiarize with Unified Modeling Language
- CLO4** Acquire the basics of software testing and maintenance phase

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	1	-	2	-	1	-	-	3	2	2
CLO 2	-	2	-	3	-	2	2	-	2	-
CLO 3	2	3	-	-	2	-	2	-	1	3
CLO 4	2	-	2	1	-	3	-	2	-	-
CLO 5	-	-	-	-	-	-	-	-	-	-
WT. AVG	1.67	2.50	2.00	2.00	1.50	2.50	2.00	2.50	1.67	2.50
Overall Mapping of Subject										2.08

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

OPEN COURSES (XXX5DXX)

BCS5D01 INTRODUCTION TO COMPUTERS AND OFFICE

Course Number	: 2
Contact Hours per Week	: 3L
Number of Credits	: 3
Number of Contact Hours	: 48 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** Understand different types of computers
- CLO2** Learn documentation using Word processing software such as MS wordand Open Office Writer
- CLO3** Learn calculations using spreadsheet MS Excel and Open Office Writer
- CLO4** Learn presentations using Open Office Impress/MS-Power Point)

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	1	-	2	-	1	-	2	-	2	2
CLO 2	-	2	-	3	-	2	-	2	2	-
CLO 3	2	3	-	2	2	-	2	-	-	2
CLO 4	-	1	-	-	3	-	-	2	-	-
CLO 5	-	-	-	-	-	-	-	-	-	-
WT. AVG	1.50	2.00	2.00	2.50	2.00	2.00	2.00	2.00	2.00	2.00
Overall Mapping of Subject										2.00

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS5D02 WEB DESIGNING AUTOMATION

Course Number	: 29
Contact Hours per Week	: 3L
Number of Credits	: 3
Number of Contact Hours	: 48 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** Learn Hypertext markup language
- CLO2** Learn Web designing using HTML,
- CLO3** Dhtml with JavaScript and HTML Editor (FrontPage/Bluefish)

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	1	-	2	-	1	-	2	-	2	2
CLO 2	-	2	-	3	-	2	-	2	2	-
CLO 3	2	3	-	2	2	-	2	-	1	2
WT. AVG	1.50	2.50	2.00	2.50	1.50	2.00	2.00	2.00	1.67	2.00
Overall Mapping of Subject										1.97

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS5D03 INTRODUCTION TO PROBLEM SOLVING AND C

Course Number	: 29
Contact Hours per Week	: 3L
Number of Credits	: 3
Number of Contact Hours	: 48 Hrs.
Course Evaluation	: Internal–15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** Learn problem solving and programming concept
- CLO2** Learn C programming concepts
- CLO3** Learn looping constructs
- CLO4** Acquire skills in programming using arrays, functions, structures and unions

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	1	-	-	-	1	-	2	-	2	2
CLO 2	-	2	-	2	-	2	-	2	2	-
CLO 3	2	-	2	-	-	-	2	-	-	2
CLO 4	-	1	-	-	3	-	-	2	-	-
WT. AVG	1.50	1.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Overall Mapping of Subject										1.90

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS5D04 INTRODUCTION TO DATA ANALYSIS USING SPREAD SHEET

Course Number	: 29
Contact Hours per Week	: 3L
Number of Credits	: 3
Number of Contact Hours	: 48 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

CLO1	Basics of Data Analysis
CLO2	Knowledge about Pivot Table application
CLO3	Familiarize with MS Excel

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	1	-	2	-	3	-	1	2
CLO 2	-	2	-	2	-	1	-	2	2	-
CLO 3	2	-	2	-	3	-	2	-	-	2
WT. AVG	2.00	2.00	1.50	2.00	2.50	1.00	2.50	2.00	1.50	2.00
Overall Mapping of Subject										1.90

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

SEMESTER VI

BCS6B11 ANDROID PROGRAMMING

Course Number	: 30
Contact Hours per Week	: 7 (4L + 3P)
Number of Credits	: 3
Number of Contact Hours	: 80 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** To gain knowledge of developing end user application using Android SDK
- CLO2** To familiarize with Android Resources
- CLO3** To acquaint with user interfaces development in Android
- CLO4** To acquire knowledge about creating menus and operating files in Android

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	1	-	2	-	3	-	1	2
CLO 2	-	2	-	3	-	2	-	2	3	-
CLO 3	2	-	2	-	3	-	2	-	-	2
CLO 4	-	3	-	2	-	1	-	3	2	-
WT. AVG	2.00	2.50	1.50	2.50	2.50	1.50	2.50	2.50	2.00	2.00
Overall Mapping of Subject										2.15

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS6B12 OPERATING SYSTEMS

Course Number	: 31
Contact Hours per Week	: 7 (4L + 3P)
Number of Credits	: 3
Number of Contact Hours	: 80 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** To Familiarize with the Objectives, functions and types of Operating System
- CLO2** To have a basic knowledge about process, Threads, Deadlock
- CLO3** To understand the knowledge of Linux shell programming
- CLO4** To learn about CPU scheduling and memory management

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	3	-	2	-	3	-	1	2
CLO 2	-	2	-	2	-	2	-	2	3	-
CLO 3	2	-	2	-	3	-	2	-	-	1
CLO 4	-	3	-	2	-	3	-	3	2	-
CLO 5	-	-	-	-	-	-	-	-	-	-
WT. AVG	2.00	2.50	2.50	2.00	2.50	2.50	2.50	2.50	2.00	1.50
Overall Mapping of Subject										2.25

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS6B13 COMPUTER NETWORKS

Course Number	: 32
Contact Hours per Week	: 5L
Number of Credits	: 3
Number of Contact Hours	: 80 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** To understand about different network terminologies
- CLO2** To familiarize with different layers of network
- CLO3** To understand the functions of data link layer and network layer
- CLO4** To familiarize with the functions of Transport layer
- CLO5** To understand the concept of network security and Cryptography

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	3	-	2	-	3	-	1	2
CLO 2	-	2	-	2	-	2	-	2	3	-
CLO 3	2	-	2	-	3	-	2	-	-	1
CLO 4	-	3	-	2	-	3	-	3	2	-
CLO 5	-	1	3	-	-	-	1	-	-	-
WT. AVG	2.00	2.00	2.67	2.00	2.50	2.50	2.00	2.50	2.00	1.50
Overall Mapping of Subject										2.17

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS6B14 PROGRAMMING LABORATORY III: LAB EXAM OF VTH SEMESTER JAVA AND PHP PROGRAMMING

Course Number	: 33
Contact Hours per Week	: 0
Number of Credits	: 4
Number of Contact Hours	: 0 Hrs.
Course Evaluation	: Internal–20Marks +External-80Marks

COURSE LEARNING OUTCOMES

- CLO1** To learn about the Object Oriented Concepts in Java Programming
- CLO2** To understand the practical knowledge of Web programming using PHP

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	3	-	1	-	2	-	1	3
CLO 2	1	2	1	3	-	2	-	2	3	-
WT. AVG	1.50	2.00	2.00	3.00	1.00	2.00	2.00	2.00	2.00	3.00
Overall Mapping of Subject										2.05

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS6B15 PROGRAMMING LABORATORY IV: LAB EXAM OF ANDROID AND LINUX SHELL PROGRAMMING

Course Number	: 34
Contact Hours per Week	: 0
Number of Credits	: 4
Number of Contact Hours	: 0 Hrs.
Course Evaluation	: Internal-20Marks +External-80Marks

COURSE LEARNING OUTCOMES

- CLO1** To learn the practical knowledge of Android Programming
- CLO2** To familiarize with the practical knowledge of shell programming

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	3	-	2	-	2	-	1	3
CLO 2	1	2	1	3	-	2	-	2	3	-
WT. AVG	1.50	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00
Overall Mapping of Subject										2.15

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

BCS6B17 (PROJECT WORK OR RESEARCH METHODOLOGY PAPER) AND INDUSTRIAL VISIT

Course Number	: 35
Contact Hours per Week	: 4 (0T + 2L in V Sem + 2L in VI Sem)
Number of Credit	: 2 (Project Work/Research Methodology Paper) + 1(Industrial Visit)= 3 (Total)
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** To acquire the implementation level knowledge and interaction with industry
- CLO2** To acquire the Research skills
- CLO3** To define a Research problem
- CLO4** To familiarize with the Data Collection Methods
- CLO5** Apply theoretical knowledge to real-world industrial scenarios.

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	3	-	2	-	2	-	1	3
CLO 2	1	2	-	3	-	2	-	2	3	-
CLO 3	2	-	3	-	-	-	3	-	1	-
CLO 4	-	2	-	2	3	-	1	2	-	2
CLO 5	1	-	1	-	-	2	-	-	3	-
WT. AVG	1.50	2.00	2.33	2.50	2.50	2.00	2.00	2.00	2.00	2.50
Overall Mapping of Subject										2.13

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

ELECTIVES

BCS6B16A SYSTEM SOFTWARE

Course Number	: 36
Contact Hours per Week	: 4L
Number of Credits	: 3
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** To learn about the concept of system software
CLO2 To understand the knowledge of Macros and macro processors
CLO3 To Familiarize with Loader and Linkers

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	2	-	2	-	2	-	1	3
CLO 2	-	1	-	1	-	2	-	2	3	-
CLO 3	2	-	3	-	-	-	3	-	1	-
WT. AVG	2.00	1.00	2.50	1.00	2.00	2.00	2.50	2.00	1.67	3.00
Overall Mapping of Subject										1.97

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation

BCS6B16B | MACHINE LEARNING

Course Number	: 36
Contact Hours per Week	: 4L
Number of Credits	: 3
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** The students will be able to familiarize the machine learning concepts
- CLO2** To acquire the essential mathematical and statistical foundations of machine learning

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	1	-	2	-	3	-	2	-	1	2
CLO 2	2	1	-	3	-	2	-	2	2	-
WT. AVG	1.50	1.00	2.00	3.00	3.00	2.00	2.00	2.00	1.50	2.00
Overall Mapping of Subject										2.00

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation

BCS6B16C DISCRETE STRUCTURES

Course Number	: 37
Contact Hours per Week	: 4L
Number of Credits	: 3
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

CLO1 Familiarize with Boolean algebra, Propositional Calculus

CLO2 Understand the concept of sets, Relations , Functions

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	3	-	2	-	2	-	1	2
CLO 2	-	2	-	2	-	2	-	2	3	-
WT. AVG	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Overall Mapping of Subject										2.10

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation

BCS6B16D COMPUTER GRAPHICS

Course Number	: 38
Contact Hours per Week	: 4L
Number of Credits	: 3
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal–15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** Familiarize with basics of Computer Graphics
- CLO2** To acquire knowledge of Different line, circle drawing algorithms

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	3	-	1	-	2	-	1	-
CLO 2	-	2	-	1	-	-	-	2	3	-
WT. AVG	2.00	2.00	3.00	1.00	1.00		2.00	2.00	2.00	
Overall Mapping of Subject										1.88

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation

BCS6B16E TECHNICAL WRITING

Course Number	: 39
Contact Hours per Week	: 4L
Number of Credits	: 3
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** To understand the basics of Technical Communication
- CLO2** To learn Constituents of Technical Written Communication
- CLO3** To learn Forms of Technical Communication

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	1	-	2	-	3	-	2	-	2	2
CLO 2	2	3	1	3	-	2	-	2	2	-
CLO 3	-	2	-	1	1	2	-	3	-	-
WT. AVG	1.50	2.50	1.50	2.00	2.00	2.00	2.00	2.50	2.00	2.00
Overall Mapping of Subject										2.00

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation

BCS6B16F FUNDAMENTALS OF LIFE SKILL EDUCATION

Course Number	: 40
Contact Hours per Week	: 4L
Number of Credits	: 3
Number of Contact Hours	: 64 Hrs.
Course Evaluation	: Internal-15Marks +External-60Marks

COURSE LEARNING OUTCOMES

- CLO1** To familiarize with life skill education
- CLO2** To acquire the communication skills, plan career, self-management

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	1	-	2	-	3	-	2	-	2	2
CLO 2	2	1	-	3	-	2	-	2	1	-
WT. AVG	1.50	1.00	2.00	3.00	3.00	2.00	2.00	2.00	1.50	2.00
Overall Mapping of Subject										2.00

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation

COMPLEMENTARY COURSES

MATHEMATIC

SEMESTER I

MTS1C01- MATHEMATICS 1

Course Code	MTS1C01
Course Title	Mathematics 1
Credits	3
Hours/Weeks	4

COURSE LEARNING OUTCOMES

- CLO1** Understand the fundamental ideas of limit, continuity, and differentiability
- CLO2** Analyze to find the solution of maximum-minimum problems using the idea of derivatives
- CLO3** Understand to solve the area problem, the problem of finding the arc length of a plane curve, and volume of solids

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	2	-	2	-	2	-	1	3
CLO 2	-	1	-	1	-	2	-	2	3	-
CLO 3	2	-	3	-	-	-	3	-	1	-
WT. AVG	2.00	1.00	2.50	1.00	2.00	2.00	2.50	2.00	1.67	3.00
Overall Mapping of Subject										1.97

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation

SEMESTER I I

MTS2C02- MATHEMATICS 2

Course Code	MTS2C02
Course Title	Mathematics 2
Credits	3
Hours/Weeks	4

COURSE LEARNING OUTCOMES

CLO1	Learn to represent points in polar coordinates and convert from one system to another
CLO2	Understand to find the derivatives and anti-derivatives of hyperbolic and inverse hyperbolic functions
CLO3	Examine to solve a system of linear equations using matrix theory
CLO4	Understand to find the Eigen values and the corresponding Eigen vectors of a matrix

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	3	-	2	-	2	-	-	-
CLO 2	-	2	-	3	-	2	-	2	-	-
CLO 3	2	-	3	-	-	-	3	-	-	-
CLO 4	-	2	-	2	3	-	1	2	-	-
WT. AVG	1.50	2.00	2.33	2.50	2.50	2.00	2.00	2.00	2.00	2.50
Overall Mapping of Subject										2.13

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation

SEMESTER III

MTS3C03- MATHEMATICS 3

Course Code	MTS3C03
Course Title	Mathematics 3
Credits	3
Hours/Weeks	5

COURSE LEARNING OUTCOMES

CLO1: Understand the properties and applications of the gradient of a function

CLO2: Apply double integral and triple integral to find the mass of a lamina, center of mass, etc.

CLO3: Understand line integral, surface integral, and triple integral

CLO4: Learn the three important theorems: Green's theorem, Gauss's theorem, and Stokes's theorem and their applications

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	3	-	2	-	3	-	1	2
CLO 2	-	2	-	2	-	2	-	2	3	-
CLO 3	2	-	2	-	3	-	2	-	-	1
CLO 4	-	3	-	2	-	3	-	3	2	-
WT. AVG	2.00	2.50	2.50	2.00	2.50	2.50	2.50	2.50	2.00	1.50
Overall Mapping of Subject										2.25

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation

SEMESTER IV

MTS1C04- MATHEMATICS 4

Course Code	MTS4C04
Course Title	Mathematics 4
Credits	3
Hours/Weeks	5

COURSE LEARNING OUTCOMES

- CLO1** Learn the major classifications of differential equations.
- CLO2** Learn to solve the first order differential equations that are of linear, separable, exact, and Bernoulli's forms
- CLO3** Acquire the knowledge of solving a differential equation using the Laplace method, which is useful to deal with problems in engineering.

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
CLO 1	2	-	2	-	2	-	2	-	1	3
CLO 2	-	1	-	1	-	2	-	2	3	-
CLO 3	2	-	3	-	-	-	3	-	1	-
WT. AVG	2.00	1.00	2.50	1.00	2.00	2.00	2.50	2.00	1.67	3.00
Overall Mapping of Subject										1.97

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation

SEMESTER I

I. INTRODUCTORY STATISTICS (CODE: STA 1C 01)

Contact Hours per Week	: 4
Number of Credits	: 3
Number of Contact Hours	: 48 Hrs.
Course Evaluation	: Internal–15Marks +External–60Marks

COURSE LEARNING OUTCOMES

- CLO1** Understand the statistical system in India.
- CLO2** Learn the basics of data collection and techniques of exploratory data analysis.
- CLO3** Familiarize with the basic visualization techniques of data analysis and interpretations.
- CLO4** Identify an appropriate relationship between two variables using scatter plot and fitting the same by the method of least squares- straight line, second degree polynomial, power & exponential curves
- CLO5** Make the students aware of the areas of time series and index numbers.

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	1	2	-	-	1	-	-	2	-	3
CLO2	2	-	-	2	-	1	3	-	2	-
CLO3	-	3	2	-	3	-	-	3	-	-
CLO4	2	2	-	1	1	-	-	-	-	2
CLO5	-	-	2	2	-	-	-	1	-	-
WT. AVG	1.67	2.33	2.00	1.67	1.67	1.00	3.00	2.00	2.00	2.50
Overall Mapping of Subject										1.98

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

II. PROBABILITY THEORY (STA 2C 02)

Contact Hours per Week	: 4
Number of Credits	: 3
Number of Contact Hours	: 48 Hrs.
Course Evaluation	: Internal–15Marks +External–60Marks

COURSE LEARNING OUTCOMES

CLO1	Understand the concept of probability and its applications
CLO2	Understand the basic concepts about random variables and its properties
CLO3	Learn the random variables in two-dimension and their properties.

CLO-PLO MAPPING										
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO10
CLO1	-	2	-	-	1	-	-	2	-	3
CLO2	2	-	-	2	-	1	3	-	2	-
CLO3	-	3	2	-	3	-	-	3	-	-
WT. AVG	2.00	2.5	2.00	2	1.67	1.00	3.00	2.50	2.00	3
Overall Mapping of Subject										2.02

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

SEMESTER III

PROBABILITY DISTRIBUTIONS AND SAMPLING THEORY (STA 3C 03)

Contact Hours per Week	: 5
Number of Credits	: 3
Number of Contact Hours	: 48 Hrs.
Course Evaluation	: Internal–15Marks +External–60Marks

COURSE LEARNING OUTCOMES

CLO1	Understand the applications of theoretical discrete distributions
CLO2	Learn the concept of convergence of sequence of random variables, law of large numbers and central limit theorem.
CLO3	Categorize and defines various sampling methods Identifies and derives the important sampling distributions.
CLO4	

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	-	2	-	3	1	-	-	2	-	3
CLO2	3	-	1	-	-	1	3	-	2	-
CLO3	-	3	-	-	2	-	-	-	2	-
CLO4	2	2	-	1	1	2	-	3	-	2
WT. AVG	2.50	2.33	1.	2.00	2	1.50	3.00	2.50	2.	2.50
Overall Mapping of Subject										2.10

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

SEMESTER IV

STATISTICAL INFERENCE AND QUALITY CONTROL (STA4C04)

Contact Hours per Week	: 5
Number of Credits	: 3
Number of Contact Hours	: 48 Hrs.
Course Evaluation	: Internal–15Marks +External–60Marks

COURSE LEARNING OUTCOMES

CLO1	Equip the students with the theory essential for estimation of unknown parameters.
CLO2	Describe the criteria of good estimators
CLO3	Defines the Cramer Rao inequality, MVU estimators and MVB estimators.
CLO4	Understand the concepts of testing of hypotheses
CLO5	Identify and apply the small sample and large sample tests

CLO-PLO MAPPING										
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	-	2	-	3	1	-	-	2	-	2
CLO2	3	-	1	-	-	1	2	-	2	-
CLO3	-	3	-	-	2	-	3	-	1	-
CLO4	2	-	-	1	-	2	-	3	-	2
CLO5	-	-	3	2	-	-	-	1	-	-
CLO5	-	2	-	-	1	-	-	-	3	-
WT. AVG	2.50	2.33	2.00	2.00	1.33	1.50	2.50	2.00	2.00	2.00
Overall Mapping of Subject										2.02

In the matrix above, use the following correlation levels: "1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation, "3" – Substantial (High) Correlation, "-" indicates there is no correlation.

TEACHING LEARNING PROCESS

The teaching and learning methodology for our Bachelor of Science in Computer Science program at our institution is designed to be dynamic and adaptive to the ever-evolving field of technology. We blend traditional and contemporary approaches to cater to the diverse learning styles and needs of our students. Our methodology includes a combination of classroom lectures, making use of both traditional and cutting-edge information and communication technology (ICT) tools to ensure a comprehensive grasp of the subject matter.

We emphasize active engagement through various means such as coding assignments, student-led seminar presentations, and immersive field experiences, all of which foster critical thinking and provide practical insights. Assessment is a pivotal component, involving unit tests, discussions, debates, and role-playing exercises, which empower students to apply their knowledge effectively.

In addition, we have embraced the flexibility and accessibility of online classes, facilitated by a robust learning management system. We are sensitive to the varying learning paces of our students and offer additional support through remedial classes while encouraging advanced learners with self-study assignments.

The pinnacle of our program is the project work in the final semester, where students have the opportunity to apply their skills in real-world scenarios. Through this holistic teaching and learning approach, we aim to equip our students with a well-rounded education, preparing them for success in the dynamic and competitive global landscape of computer science.

ASSESSMENT METHODS

The assessment methods for the Bachelor of Science in Computer Science program encompass both Continuous Internal Evaluation (CIE) and External Evaluation (EE). CIE constitutes 20% of the total evaluation and involves a variety of components, including assignments, presentations, attendance, and two internal tests, designed to assess students' ongoing performance. The remaining 80% weightage is attributed to EE, which consists of 2.5-hour written examinations conducted at the conclusion of each semester.

In addition, the program culminates with a viva voce examination, specifically for project work in the final semester. These assessment methods collectively ensure a thorough evaluation process that combines continuous engagement, external examinations, and practical project assessments to comprehensively assess students' knowledge, skills, and understanding in the field of computer science. This multifaceted approach is designed to provide a holistic evaluation of students' capabilities and their readiness to excel in the dynamic realm of computer science.

CONCLUSION

In summary, this Learning Outcome Based Curriculum Framework serves as a strategic roadmap, guiding us towards the pinnacle of educational excellence within the Bachelor of Science in Computer Science program. It harmonizes our program's objectives with concrete learning outcomes, charting a course for academic distinction. This framework not only encapsulates our educational vision but also sets clear, measurable learning objectives, underpinning our commitment to achieving the highest academic standards and nurturing a new generation of computer science experts. Through this structured approach, we aspire to equip our students with the knowledge, skills, and adaptability necessary to excel in the dynamic field of computer science. This framework is our foundation for academic rigor, innovation, and continuous improvement, ensuring that our students are prepared to thrive in a competitive and ever-evolving technological landscape.



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