



**CURRICULUM FRAMEWORK AND SYLLABUS  
FOR OUTCOME BASED EDUCATION IN  
BACHELOR OF SCIENCE  
IN  
INFORMATION TECHNOLOGY (B.SC IT)  
Degree Program  
FOR THE STUDENTS ADMITTED FROM  
THE ACADEMIC YEAR 2023 ONWARDS**



**Naipunnya Institute of Management and Information Technology**  
*(Affiliated to the University of Calicut , Accredited by NAAC with B++,ISO 9001-2015 Certified)*  
*Pongam ,Koratty East , Thrissur District ,Kerala - 680308*

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## **DEPARTMENT OF COMPUTER SCIENCE**

### **VISION**

“Be the very pinnacle of academic and research excellence in Computer Applications”

### **MISSION**

**As a Department, we are committed to**

- Achieve academic excellence in Computer Applications through innovative teaching and learning processes.
- To prepare the students to be professionally competent to face the challenges in the industry.
- Promote inter-disciplinary research among the faculty and the students to create state of art research facilities.
- To promote quality and ethics among the students.
- Motivate the students to acquire entrepreneurial skills to become global leaders.

### **Courses Offered**

- BSc Computer Science
- BCA
- BSc Information Technology
- MSc Computer Science

## **2. Program Outcomes**

PO1.Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2.Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO3. Citizenship ethics, and sustainability: Demonstrate empathetic social concern and equity centered national development. Guided by ethics. Promoting social, economic and environment sustainability.

PO4: Use of computer skills: Use the knowledge of computers and information technology for data acquisition and data analysis in experimental investigations and in communication.

PO5. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

## **4. Programme Specific Outcome**

**PSO1:** Get familiar with the potentially rich and employable field of computer applications

**PSO2:** Become eligible for higher studies in the area of Computer Science/ Applications.

**PSO3:** Develop skills in software development to take up self-employment in the Indian and global software market.

**PSO4:** Get trained and equipped with meeting the requirements of the software industry in the country and outside.

## **5. PSO-PO Mapping**

	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>PO1.Critical Thinking</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>3</b>
<b>PO2.Effective Communication</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>2</b>
<b>PO3. Citizenship, ethics and Sustainability</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>
<b>PO4. Use of computer skills</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>
<b>PO5.Self-directed and Life-long Learning</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>

## **5. Programme Structure**

### **BACHELOR OF SCIENCE**

#### **IN**

### **INFORMATION TECHNOLOGY (B.SC IT)**

#### **(Choice Based Credit and Semester System for Undergraduate Curriculum 2019)**

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 IT) 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 IT Programme, a student should be able to get an entry level job in the field of Information Technology or ITES or they can take up self-employment in the 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 IT graduates to take up self-employment in the 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.

**Duration:** The duration of the B.SC IT Programme shall be six semesters distributed over a period of three academic years. The odd semesters (1, 3, 5) shall be from June to October and the even Semesters (2, 4, 6) shall be from November to March. Each semester shall have 90 working days inclusive of all examinations.

**Courses:** The UG programme shall include five types of courses, viz; Common Courses (Code A), Core courses (Code B), Complementary courses (Code C), Open Course (Code D) and Audit courses (Code E).  
Course code : Each course shall have a unique alphanumeric code number, which includes abbreviation of the subject in three letters, the semester number (1 to 6) in which the course is offered, the code of the course (A to E) and the serial number of the course (01,02 .....). The course code will be centrally generated by the university. For example: ENG2A03 represents a common course of serial number 03 offered in the second semester and PHY2B02 representing second semester Core course 2 in Physics programme

## PROGRAMME STRUCTURE IN NIMIT

- The Bachelor of science in information technology (B.SC IT) programme will equip the students with the necessary knowledge and skills for the existing and emerging challenges that a career in computing and software technology will entail.
- In addition it prepares graduates to show high quality of independent thought, flexibility and maturity based on a sound technical knowledge of the field.
- The Bachelor of science in information technology (B.SC IT) programme aims to provide graduates with the skills and methods needed to create new generations of software applications and to appreciate the technical basis on which they should be built.
- The emphasis throughout is on a thorough understanding of the foundations on which modern development rests, on the software life cycle and project control, on program specification and implementation, on modern software architectures and on human-computer interaction issues through Mathematical and Statistical concepts.
- After the successful completion of first year, the students will develop problem-solving strategies, techniques and skills that can be applied to computers and problems in other areas which give students an introduction to computer and analytical skills to use in their subsequent course work and professional development. Students will learn in detail about the mathematical foundations for various computer applications and Electronics & Communication Technology . Develop proficiency in C and C++ programming language. Develop fundamental ideas of Mathematical Logic. Develop data reduction techniques. Understand probability theory and random variables. Students will also accrue knowledge of various accounting principles and optimization techniques.
- After the successful completion of second year, the students will be familiar with major algorithms and data structures such as balanced search trees, hash tables, priority queues etc. Be familiar with the role of project management including planning, scheduling, risk management, etc. Understand the approaches to verification and validation including static analysis, and reviews. Be proficient VB.NET and MY SQL Be able to interpret equations of lines and planes in space Expose the real-life applications of Probability distributions. Explain standard error and testing procedures for parameters of a normal population using large and small samples. Students will also be familiar with Python Programming Computer Organization and Architecture , Data communication, Sensors, Discrete Mathematics and transducers.
- In addition to the university syllabus, students will also learn yoga, table manners, and Basic OOPs concepts. Students will also learn to develop simple Python applications, database design in real world organizations. 8 BOS meeting approved: 04.10.2022.

- After the successful completion of third year, the students will be proficient in Object Oriented Programming and Java programming, able to develop and manage a website, familiar with different operating systems, able to develop Android applications, able to develop quality software solution by following the software engineering principles and practices, able to understand, design, and analyze precise specifications of algorithms, procedures, and interaction behavior and experience of working in teams to build software systems.
- In addition to the university syllabus, students will also gain additional skills through add on courses, managerial and entrepreneurship skills, IPR, and cyber laws. Students will also learn to develop software /applications through their final year projects.
- Students will also develop their aptitude and technical interview skills.
- Students will also learn basics industrial practices and ethics through industrial visits and interactions.

## 6. Semester wise Courses

Semester	Sl No	Course Type	Course Code	Course Description	Number of Hours
1	1	University Insisted Course	A01	Transactions: Essential English Language Skills	4hrs/wk
	2		A02	Ways With Words:literatures In English	4hrs/wk
	3		A07	Languages other than English	5hrs/wk
	4		BIT1B01	Problem Solving Using C	4hrs/wk
	5		BIT1C01	Mathematical Foundations of IT	4hrs/wk
	6		BIT1C02	Foundations of Information Technology	4hrs/wk
	7		Audit Course	Environment Studies	-
	7	Add-on Course	NCSAOC1	Communication Skills	30 hrs



	8	Bridge Course	NCSBC01	Mathematics	20 hrs
1 & 2	9	Additional Certification Course	NCSACC1	Basics Skill Enrichment Program	30 hrs
2	10	University Insisted Course	A03	Common English	4hrs/wk
	11		A04	Common English	4hrs/wk
	12		A08	Literature in Languages other than English	5hrs/wk
	13		BIT2B02	Object Oriented Programming with C++	2hrs/wk
	14		BIT2B03	Programming Laboratory I – C++	2hrs/wk
	15		BIT2C03	Probability & Statistics	4hrs/wk
	16		BIT2C04	Electronics & Communication Technology	3hrs/wk
	17		Audit Course	Environment Studies	
	18	Bridge Course	NCSBC02	Basics of C Programming	20 hrs
	19	Additional Certification Course	NCSACC2	Advanced Excel	5 hrs
3	20	University Insisted Course	A11	Python Programming	4hrs/wk
	21		A12	Sensors and Transducers	4hrs/wk
	22		BIT3B04	Database Design & RDBMS	5hrs/wk
	23		BIT3B05	Data Structures Using C++	4hrs/wk

	24		BIT3C05	Discrete Mathematics	4hrs/wk
	25		BIT3C06	Fundamentals of Digital Electronics	4hrs/wk
	26		Audit Course	Environment Studies	
	27	Add-on Course	NCSAOC2	Coursera - Python Programming	
3 & 4	28	Additional Certification Course	NCSACC3	Intermediate Skill Enrichment	30 hrs
4	29	University Insisted Course	A13	Data Communication and Optical Fibers	4hrs/wk
	30		A14	Microprocessors-Architecture and Programming	4hrs/wk
	31		BIT4B06	Visual Programming Using VB.NET	5hrs/wk
	32		BIT4B07	Programming Laboratory II - Data Structure Using C++ & RDBMS	4hrs/wk
	33		BIT4C07	Numerical Methods & Operation Research	4hrs/wk
	34		BIT4C08	Computer Organization and Architecture	4hrs/wk
	35		Audit Course	Environmental studies	
	36		Bridge Course	NCSBC03	Introduction to OOPs Concepts
	37	Additional Certification Course	NCSACC4	Digital Marketing	5hrs
5	38	University Insisted Course	BIT5B08	Computer Networks	4hrs/wk

	39		BIT5B09	Software Engineering	4hrs/wk
	40		BIT5B10	Java Programming	6hrs/wk
	41		BIT5B11	Computer Graphics	5hrs/wk
	42		BIT5B12	Management Information Systems	4hrs/wk
	43		XXX5DXX	Open Course	2hrs/wk
	44	Add-on Course	NCSAOC3	Mooc Course- Introductory concepts of Digital Computing	30 hrs
5 & 6	45	Additional Certification Course	NCSACC5	Advanced Skill Enrichment	30 hrs
6	46	University Insisted Course	BIT6B13	Android Programming	4hrs/wk
	47		BIT6B14	Web Programming	4hrs/wk
	48		BIT6B15	Operating Systems	5hrs/wk
	49		BIT6B16	Programming Laboratory- III: Java & Web Programming	6hrs/wk
	50		BIT6B17	Industrial Visit & Project Work (Industrial Visit- 1 Credit, Project Work- 2 Credit)	2hrs/wk
	51		BCA6B16X	Elective Course- BIT6B18c - Software Testing & Quality Assurance	4hrs/wk
	52	Additional Certification Course	NCSACC5	Introduction to Image Processing and Machine Learning	5hrs

## 7. Semester wise Activities

Sem	Sl No	Activity Code	Activity Type	Activity Details
1	1	NCSACT01	Ability test	Mathematics
	2	NCSACT02	Ability test	Basic Computer fundamentals
	3	NCSACT03	Mini Project	Computer Fundamentals & HTML
	4	NCSWWS01	WWS	Introduction to Javascript
2	5	NCSACT04	Competition	PPT presentation on Recent Trends in IT
3	6	NCSACT05	Workshop	Introduction to system hardware
	7	NCSACT06	Mini Project	Python
	8	NCSACT07	Training	Aptitude Training
4	9	NCAWWS02	WWS	Research paper Writing
	10	NCSACT06	Industrial Interaction	Industry Ethics & Practices
	11	NCSACT07	Mini Project	Computer Graphics
	12	NCSACT08	Competition	Research paper review competition
5	13	NCSACT09	Training	Technical Interview preparation
	14	NCSACT10	Seminar	how to become an Entrepreneur
	15	NCSACT11	Industrial Interaction	Getting ready for placements
6	16	NCSACT12	Workshop	Introduction to Manual & Automation testing
	17	NCSACT13	Industrial visit	visit to an IT Industry

## **8. Detailed Syllabus of Courses with Course Outcomes , Course Objectives and CO-PO/PSO Mapping**

### **Semester 1**

**ENG1A01– Transactions: Essential English Language Skills**

**No. of sessions: 72**

<b>Course Objectives</b>	
1.	To help impart the necessary macro and micro English language skills to the learners.
2.	To enable the students to express their feelings, opinions, ideas and thoughts fluently and accurately in a variety of personal and professional contexts.
3.	To create in learners, a definitive sense of stylistic variations of English and how they are used in real life situations.
4.	To inculcate in learners a taste for deeper pursuit and acquisition of advanced level of skills in English.
5.	To guide students on how to participate in discussions and make seminar presentations with special focus on specific vocabularies and style of usage in such contexts.
<b>Course Outcomes</b>	
CO1:	Students will be able to know the basic elements of the English sound system, thereby identifying the mother tongue influences in English pronunciation.
CO2:	Students will be able to enhance their vocabulary.
CO3:	Students will be able to demonstrate understanding of grammatical structures in appropriate context.
CO4:	Students will be able to enhance the skills of communication in academic as well as non-academic setting.
CO5:	Students will learn to use effective strategies for reading and to distinguish between denotative and connotative meanings.

### **CO-PO/PSO Mapping**

PO →	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	3	3	0	0	3	3	3	3	3
CO2	2	3	1	0	3	3	3	2	3
CO3	3	2	0	0	2	2	3	3	2

CO4	2	1	0	1	2	1	3	3	3
CO5	3	2	1	0	1	2	2	2	3

### Module 1: Pronunciation

Introduction--speech sounds-vowels-consonants-basics of word/sentence stress- resolving issues of L1 interference-e/m-learning corner.

### Module 2: Vocabulary

Introduction- synonyms-collocations-phraseal verbs-idiomatic expressions-vocabulary in everyday social contexts- e/m-learning corner.

### Module 3: Grammar

Introduction- major tenses-present-past-future-questions and negatives- modals-conditionals-e/m-learning corner.

### Module 4: Speaking Skills

Social Communication: Introduction – sounding very polite- making a point/persuading- giving opinions/preferences-encouraging/comforting-making suggestions/regrets.- complimenting- guessing-telephoning in English.Academic Communication: discussion skills – presentation skills-debating skills-e/m-learning corner.

### Module 5: Reading Skills

Introduction-effective reading comprehension skills-understanding generic/specific ideas /factual information-vocabulary in context- implications/tone/attitude/ viewpoint.

## ENG1A02: WAYS WITH WORDS: LITERATURES IN ENGLISH

Course Objectives
1. To help students develop the acumen to read, appreciate and discuss literature.
2. To introduce students to the linguistic qualities of a literary text and to unravel the many meanings of the text
3. To acquaint the students with different genres of literature and to analyze them.
4. To inculcate in learners a taste for deeper pursuit and acquisition of advanced level of skills in the use of English.
5. To develop an interest towards reading and comprehending a variety of texts.

<b>Course Outcomes</b>
CO1: Students gain an understanding of the relationship between culture, history and texts.
CO2: Students interpret and comprehend different literary works.
CO3: Students express themselves effectively in a variety of forms.
CO4: Students use enhanced skills of communication in academic as well as non-academic settings.
CO5: Students use effective strategies for reading and to distinguish between denotative and connotative meanings.

### **CO-PO/PSO Mapping**

<b>PO→</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>CO ↓</b>											
<b>CO1</b>	3	3	2	3	3	3	3	3	3	3	3
<b>CO2</b>	3	3	3	3	3	3	2	3	3	3	3
<b>CO3</b>	2	2	3	2	3	2	3	3	2	3	2
<b>CO4</b>	2	3	3	2	1	2	1	2	2	3	3
<b>CO5</b>	3	3	3	3	3	3	3	1	3	3	3

### **Course Summary**

Module 1:	Poetry	23 hrs
Module 2:	Short Story	25 hrs
Module 3:	Essay	20 hrs

Module 4:	One Act Play	10 hrs
Evaluation:		12hrs
<b>Total</b>		<b>90 hrs</b>

## Course Details

### Module 1: Poetry

1. Sonnet 29 : Shakespeare
2. Ode to Autumn: John Keats
3. A Roadside Stand: Robert Frost
4. The House of My Childhood: Dilip Chitre
5. Old Folks Laugh: Maya Angelou
6. Once Upon A Time: Gabriel Okara
7. The Times They Are A-Changing : Bob Dylan

### Module 2: Short Story

1. Appointment in Samarra: W. Somerset Maugham
2. A Shocking Accident: Graham Greene
3. Lamb to the Slaughter: Roald Dahl
4. It Used to Be Green Once : Patricia Grace

### Module 3: Essay

1. Bores: E. V Lucas
2. Night Walkers and Mystery Mongers: Sense and Nonsense at the Edge of Science: Carl Sagan

### Module 4: One Act Play

1. Something Unspoken: Tennessee Williams Core tex

**MAL1A07(3) Malayalabhashayum Sahithyavum-1**

No. of sessions: 80



Course Objectives
1. Inplant an interest in Science and literature in students of conventional graduate courses.
2. Make the students to prepare Science essays and studies in Mother tongue.
3. Improve the communication skills and the taste for creative writing.
Course Outcomes
CO1: Inculcate an interest in Mother tongue and regional literature thereby improve their cultural levelopment
CO2: Improve language skills.
CO3: Familiarize with Malayalam literature and the stylistic use of language in various periods.
CO4: Improve the basic grammatical structure of language use of students.
CO5:Familiarise with different and varied cultural realms of Kerala culture.

### CO-PO/PSO Mapping

PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
<u>CO1</u>	<u>3</u>	<u>2</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>0</u>

<u>CO2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>2</u>
<u>CO3</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>0</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>
<u>CO4</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>3</u>
<u>CO5</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>2</u>

\_Module 1: Essays

Kalayum Avishkaravum-Nithyachaithanya Yathi, Njangal Ningalkku Bhoomi Vittal-Siyatil Moopan,Kandal Jeevitham-Pokkudan

Module 2: Stories

Bonsayikal –Kovilan, Lola enna American Penkidavu-Pathmarajan,Vismayachihngal-Ashitha

Module 3: Travelogue Kappirikalude Nattil – S K Pottekkattu

Module 4: Poems

Budhanum Njanum Nariyum-Idassery, Kollendathengane-Sugathakumari, Meera Padunnu-Sachidanandan,

Pala posilulla Photokal-K G S

**HIN 1A 07(3)**

**No. of sessions: 90**

<b>Objectives</b>
Acquaint the students with different forms of thoughts and styles used in Hindi prose writing ,to make them express their thoughts in these different forms.
Introduce Hindi one act plays to the students for appreciation and critical analysis.
Help them to develop their creative thinking and writing .
<b>Outcomes</b>
Approach literary texts in terms of genre, gender and the canon
Understand and use academic conventions: referencing and bibliography.
The learner will be aware of socio-political and economic conditions of the society from different periods .
Be familiar with the theoretical foundations of the genre;
Be able to compare and contrast the genre with other dramatic forms;

### **CO-PO/PSO Mapping**

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO1</b>	2	2	0	2	0	1	2	1	1

<b>CO2</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>
<b>CO3</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>
<b>CO4</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>
<b>CO5</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>

#### Module 1

Selected prose –

- 1.Ramvriksh Benipuri – Subhan Khan
2. Hazariprasad Dwivedi – Bheeshm ko kshama nahin kiya gaya
- 3.Harishankar Parsaee – Trishanku Bechaara
4. Mohan Rakesh – Yatra ka Romance

#### Module 2

One act plays

- 1.Mamta Kaliya – Jan se pyare
- 2.Vinod Rastogee – Bahu kee vida

#### Module 3

- 3.Swadesh Deepak – Shadee kee Bath

.Omprakash Aditya-Rehearsal

#### 4. BIT1B01 Problem Solving Using C

No. of sessions: 64

<b>Course Objectives</b>	
1.	To equip the students with fundamental principles of Problem Solving aspects.
2.	To learn the concept of programming
3.	To study C language
4.	To equip the students to write programs for solving simple computing problems
<b>Course Outcomes</b>	
<b>CO1:</b>	Identify and understand the basics of C program structure ,Familiarization of IDE,Tokens,Variable Declaration and how to define symbolic constant.
<b>CO2:</b>	Explain and apply the basic concepts of operators and Expressions,Type conversions and operator precedence and associativity.
<b>CO3:</b>	Demonstrate familiarity with control structures such as branching, loops and expressions and simple programs
<b>CO4:</b>	Develop the ability to create and use functions and to create arrays of elementary objects as well as equip with the basic concepts of Structures and Union and analytical skills to use in their subsequent coursework and professional development
<b>CO5:</b>	Enable students to understand the creation and processing of files and command line operations.Student will be able to develop programs and understand a defensive programming concept as well as equip the ability to handle possible errors during program execution.

#### CO-PO/PSO Mapping

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	3	1	1	3	3	2	3	3	2

CO2	3	0	1	2	1	1	1	1	1
CO3	3	2	2	2	2	3	2	3	3
CO4	3	2	3	2	3	3	2	3	3
CO5	3	2	3	3	3	3	3	3	3

### Unit I

Introduction: The problem solving aspect, Top-down design, Implementation of algorithms, Program verification, efficiency of algorithms. Introduction to C Programming, overview and importance of C, C Program Structure and Simple programs, Creation and Compilation of C Programs under Linux and Windows Platforms.

### Unit II

Elements of C Language and Program constructs: Character Set, C Tokens, Keywords and Identifier, Constants, Variables, Data types, Variable declaration and assignment of values, Symbolic constant definition. C- Operators, Arithmetic operators, relational operators, and logical operators, assignment operators, increment and decrement operators, conditional operators, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, Type conversion in expressions, operator precedence and associativity, Mathematical Functions, I/O operations.

### Unit III

Decision making, Branching and Looping: Decision making with IF statement, Simple IF statement, If...else statement, Nesting of if...else and else...if Ladder, switch statement, Conditional operator, go-to statement. Looping: while loop, do-while and for Loops, Nesting of loops, jumps in loop, skipping of loops.

## Unit IV

Array & Strings: One dimensional array, two dimensional array and multi- dimensional array, strings and string manipulation functions. The Concept of modularization and User defined functions-Multi-function Program, calling functions, various categories of functions, Nesting of functions and recursion, functions and arrays, scope and life-time of variables in functions, multi-file programs. Structures & Union structure definition, giving values to members, structure initialization, comparison of structure variables, arrays of structures, arrays within structures, structures within arrays, structures and functions, Unions.

## Unit V

Pointers: Understanding pointers, accessing the address of a variable, declaring and initializing pointers, accessing a variable through its pointer, pointer expressions, pointer and arrays, pointer and character string, pointers and functions, pointers and structures, pointer to pointer - dynamic memory allocation. Files: Defining, Opening and closing files - i/o operations on files - error handling on files, random access of files, command line operations. Pre- processor directives: Macro substitution directives - simple macros - macros with arguments - nesting of macros, Compiler control directives.

### 5. BIT1C01 Mathematical Foundations of IT

No. of sessions: 64

Course Objectives
1. To learn the basic principles of linear algebra and vectors.
2. To learn the basic principles of differential and integral Calculus.
3. To learn mathematical modeling using ordinary and partial equations.
Course Outcomes
CO1: To Acquire knowledge of the principles of linear algebra and vectors, as well as their application in definite integrals
CO2: To Demonstrate an understanding of matrices and their operations, grasping the fundamental concepts associated with these mathematical structures.
CO3: To Apply the concept of Cayley Hamilton and solve systems of equations, showcasing the practical application of linear algebra in solving mathematical problems.
CO4: To Analyze the concept of vectors in two and three dimensions, breaking down their components and understanding their geometric and algebraic properties

CO5: To Integrate knowledge to comprehend the basic principles of differential and integral calculus, including definite and indefinite integrals, synthesizing various mathematical concepts for problem solving

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	3	1	0	1	1	3	3	1	2
CO2	3	0	1	1	0	3	3	1	1
CO3	3	0	0	1	1	3	3	1	2
CO4	3	1	1	1	0	3	3	1	1
CO5	3	0	0	1	1	3	3	1	2

### UNIT I

Linear Algebra and Vector Calculus: Matrices: Matrix Definition, Order of A Matrix, Types of Matrices, Addition Of Matrices, Multiplication Of Matrices, Various Kinds Of Matrices, Transpose Of A Matrix. Linear System of Equations and Solutions Using Gauss Elimination, Linear Independence and Rank, Determinants, Inverse, Eigen Values

### UNIT II

Vectors: Scalar and Quantities. Different Types of Vectors, Addition of Vectors, Properties of Vector Addition, Collinear Vectors, Coplanar Vectors, Cross Product of Two Vectors, Properties of Vector Product. Dot Product.



### UNIT III

Differentiation: Derivative At A Point, Derivative Of A Function, Differentiation From First Principle, Differentiation Of Important Functions, Product Rule, Quotient Rule, Differentiation Of A Function Of A Function (Problem Based), Higher Order Derivatives (Definition Only).

### UNIT IV

Integration: Integral as Anti-Derivative, Indefinite Integral & Constant Of Integration, Fundamental Theorems, Elementary Standard Results, Methods Of Integration integration of the product or the quotient of two functions- Integration by substitution, Some special integrals.

### UNIT V

Integration Through Partial Fractions, Integration by Parts. Definite Integral: Evaluation by Substitution, Properties of Definite Integrals (Problem Based)

## 6.BIT1C02 Foundations of Information Technology

<b>Course Objectives</b>
To learn the basics of computers and software
To learn the essentials of computers and software
To learn the advanced trends in IT industry
<b>Course Outcomes</b>
CO1:Understand the basics of computer architecture and software.
CO2:Remember some commonly used Input Output Media
CO3:Understand the fundamentals of computer programming and languages.Also familiar with assembler,compiler and interpreter.
CO4:Introduces the essentials of computer software. Explain the piracy and techniques of its prevention. Analyze the power of word processing and spreadsheet.
CO5:Create a familiarity with the emerging trends in IT.

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	2	0	1	3	1	0	1	0	0
CO2	2	0	0	2	1	0	1	0	0
CO3	2	0	1	3	2	2	2	1	1
CO4	2	1	2	3	2	2	3	1	3
CO5	2	2	3	3	2	2	1	1	2

### UNIT I

Introduction- Characteristics of Computers, Evolution of computers, Capabilities and limitations of computers, Generations of computers, Types of computers (micro, mini, main frame, supercomputers), Block diagram of computer, Basic components of a computer system- Input unit, output unit, Arithmetic logic Unit, Control unit, central processing unit, Instruction set, registers, processor speed, type of processors, Memory- main memory organization, main memory capacity, RAM, ROM, EPROM, PROM, cache memory, PCs specifications.

### UNIT II

Input devices- Keyboard, Pointing Devices-mouse, Touch Screens, Joystick, Electronic pen, Trackball, Scanning Devices-Optical Scanners, OCR, OMR, Bar Code Readers, MICR, Digitizer, Electronic card reader, Image Capturing Devices-Digital Cameras. Output devices- Monitors- CRT, LCD/TFT, Printers- Dot matrix, Inkjet, Laser, PlottersDrum, Flatbed, Screen image projector. Secondary Storage Devices- Magnetic Tape, Magnetic Disks-Internal Hard Disk, External Hard Drives, Floppy Disks, Optical Disks- CD, VCD, CD-R, CD-RW, DVD, Solid State Storage-Flash Memory, USB Drives.

### UNIT III

Computer Languages: analogy with natural languages, machine language: advantages and limitations of machine language, assembly language: assembler, advantage of assembly language over machine language, limitation of assembly language, high level language: compiler, linker, interpreter, advantages and limitations of high-level languages, object- oriented programming languages, some high-level languages (Fortran, Cobol, BASIC, Pascal), some more high-level languages (C++ and C, Java, RPG LISP, SNOBOL), Characteristics of a Good Programming Language, Selecting a Language for Coding and Application, Subprogram.

### UNIT IV

Computer Software - Software and its Need, Types of software-System software, Application software, System software: operating system, utility program, programming languages, assemblers, compilers and interpreter, introduction to operation system for PCs-DOS, windows, Linux, file allocation table (FAT & FAT32), files & directory structure and its naming rules, programming languages- machine, assembly, high level, 4GL, their merits and demerits, application software and its types – word-processing, spreadsheet, presentation graphics, Data Base Management Software, Educational Software, Entertainment Software. Characteristics, Uses and examples and area of application of each of them, Open Source Terminologies: Open Source Software, Freeware, Shareware, Proprietary Software, FLOSS, GNU, FSF, OSI, Virus working, feature, types of viruses, virus detection prevention and cure.

### UNIT V

Advanced Trends in IT. Wireless: Mobile Internet, GPS, 3G, 4G, Wi-Fi, Bluetooth, Social Networking, Cloud Technology, Virtual LAN Technology, Firewall, MCommerce, Nanotechnology, Virtual Reality, BPO and KPO, Social and Ethical Issue YouTube, Facebook, LinkedIn, Orkut

## NCSAOC01- Communication Skills

### Description:

The add on course on “**Communication Skills**” aims to provide the students with increasing the communication skills of students so that they will be able to communicate effectively in English with others. The training will be provided by the Department of English. It is a 30 hour program. Certificate will be provided to the students after successful completion of the course.

<b>Course Objectives</b>
1. Students will develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others.
<b>Course Outcomes</b>

CO1: Understand the relevance of the English language in the contemporary society and how this language acts as a lingua franca in a multilingual context
CO2: Develop language and vocabulary skills relevant to a professional
CO3: Interpret, summarise and analyze different sorts of textual content
CO4: Improve the basic aspects of LSRW and use it accordingly
CO5: Create technical and professional documents that are precise and vivid.

<u>PO</u>	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO									
CO1	3	0	3	0	2	2	3	3	2
CO2	3	2	3	0	2	2	3	3	2
CO3	3	2	3	0	2	3	3	3	3
CO4	3	2	3	0	2	3	3	3	3
CO5	3	2	3	0	2	3	3	3	3

### Module 1 (2 hrs)

Introduction to the English Language: English as the lingua franca: The relevance of using English in multilingual contexts and communication. English as a non-phonetic language, change in the meaning of words with respect to pronunciation, loan words from other languages such as French, German, Chinese etc.

### Module 2 (4 hrs)

Grammar: Basic Verb forms, pragmatic usage in sentences, auxiliary verbs, Subject-Verb agreement, common errors in the usage of the English language.

### Module 3 (10 hrs)

Tenses: Present Tense, Past Tense and Future Tense; Sentences: declarative sentences, imperative sentences, interrogative sentences, exclamatory sentences; using different sentence types in your writing, dependent clause, independent clause

### Module 4 (5 hrs)

Sentence types: Simple Sentences, Compound Sentences, Complex Sentences and Compound-Complex Sentences; Practice Questions; Conjunctions, linkers, connectors; degrees of comparison; idioms, onomatopoeic words, acronyms, homophones, Punctuation marks and its uses, the differences that punctuation marks make in a sentence

### Module 5 (9 hrs)

Introduction to LSRW: listening, speaking, reading and writing; Verbal communication, Non-verbal communication, Barriers to effective communication, fluency and accuracy, skimming, scanning, summarizing, paraphrasing

### NCSBC01-Bridge Course-Mathematics

**Description:**The bridge course aims to act as a buffer for the new entrants with an objective to provide adequate time for the transition to hardcore of degree courses.The syllabus for the course is framed in such a way that they get basic knowledge on the subjects which they would be learning through graduation.The course consist of 30 Hrs of interactive sessions.

Course Objectives	
1. To provide students the confidence and skills to successfully transition to new system	
Course Outcomes	
CO1: To define the basic concepts in mathematics	
CO2:To develop academic skills and assist the students in mathematics.	

PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO									
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	2	3	3	2

### Unit I

Limits and continuity- Properties of limits-infinite limits-continuity of functions

### Unit II

Trigonometric functions: Laws of trigonometric functions-Identities

### Unit III

Derivatives- formulas - rules of derivatives- substitution method-chain rule-exponential method

#### Unit IV

Integration: Formulas-Rules of integration-Application of integration

#### Unit V

Linear equations: Solution of linear equations Introduction of matrices

#### NCSACC01- Basic Skill Enrichment program

**Description:**The additional certification program on “Basic Skill Enrichment Program” is given to students by the Training Department.It is a 30 hour course.Certificate will be provided to students after the completion of the course.

Course Objectives	
1. To ensure that ‘all education and training develops self-reliance, flexibility and breadth’. Learn the process of setting and reaching through learning the steps to goal setting and applying those steps in real life.	
Course Outcomes	
CO1: By the end of this program, students will be equipped with all skills needed to successfully face the interview and gets easily hired.	

<u>PO</u>	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO									
CO1	3	3	3	2	3	3	3	3	3

#### Module 1: Environmental scanning and Need for competencies

Session 1-2 : NIMIT’s culture, climate, practices, expectations, initiatives of training department.

Session 3: Challenging business environment & Need for soft skills

Session 4-5: Grooming, professionalism

Session 6-8: Etiquettes – Social, Telephone, Email, Netiquettes

#### Module 2: Self-Management

Session 9-10: Know thyself-Self Rating and how others rate you

Session 11 : SWOT Analysis

Session 12-13: Goal setting

Session 14-15: Emotional & Spiritual Intelligence

#### Module 3: Effective Communication

Session 16-17 : Listening skills :\_Listening the words, sentences and passages. Sharing You tube videos , homework related to the topics and its presentation in class.

Session 18-19: Speaking skill: vocabulary plus speech, pronunciation of the words, sentences and passages. Assigning Situational conversation exercises.

Session 20-21 : Reading: Comprehension passages\_question and answers

Session 22-23: Writing: Grammar: basics: exercises, letter writing

#### Module 4: MS office Suite

Session 24: Starting MS Word, working with symbols, working with tables, headers, footers and other controls, formatting

Session 25- 26: MS Excel-Advanced, formatting a worksheet, formatting cells, Using formula, graphs

Session 27-28: Google docs, Google forms, Google spreadsheet, Google Meet

Session 29-30: Introduction to Photoshop/poster making and video editing

#### NCSACT02-Ability test-Basic Computer fundamentals

**Description** -This test has been designed to assess the ability of a candidate to work using a computer. It tests if an individual is aware of the functions in a computer including basic hardware,and computer fundamentals. The test uses different difficulty levels of questions to accurately identify candidates who understand computer fundamentals.

Course Objectives	
1. To understand the basic hardware and software functionalities.	
Course Outcomes	
CO1: To define the basic concepts computer fundamentals	
CO2: Will be able to understand the common hardware units	

<u>PO</u>	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO									
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	2	3	3	2

### NCSACT03-Mini Project-Computer Fundamentals & HTML

**Description:**It enables the candidate to create a web page using HTML and can also be able to customize an existing web template which is available online. HTML can be used to create the web pages which are available on the web.

<b>Course Objectives</b>	
1. To understand the real time software development environment. The student can gain a thorough knowledge in developing a web page using basic HTML tags.	
2.Introduces stylesheets (CSS) and responsive (mobile) web design.	
<b>Course Outcomes</b>	
CO1: Use knowledge of HTML and CSS code and an HTML editor to create personal websites following current professional standards.	
CO2:.Use critical thinking skills to design and create websites.	

<u>PO</u>	PO	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO	1								
CO1	3	2	3	0	3	3	3	3	3
CO2	3	2	3	0	3	3	3	3	3

### NCSW S01-Walk with the scholar:Introduction to Javascript

**Description:** The scheme originally introduced the idea of mentoring, building on the concept of mentor as a “Guide and Friend”.The outcome of the programme indicated positive changes in the student participants such as increased self-confidence, improved communication skills, better academic performance, increased awareness regarding higher studies and career options in one’s academic field and improved interpersonal functioning.The selection of the students was based on screening of their Marks, Interests, Potentials and Capabilities.



<b>Course Objectives</b>
1. To help the students to identify a better career option.
<b>Course Outcomes</b>
CO1: To develop certain generic skills, non-technical competencies, attitudes and behaviours
CO2: To provide necessary orientation, guidance, motivation and support to enrich and nourish their talents.
Introduction, Client side programming, script tag, comments, variables. Including JavaScript in HTML, Data types, Operators, Conditional Statements, Loops, break and continue. Functions and Objects.

## Semester 2

### **ENG2A03 – WRITING FOR ACADEMIC AND PROFESSIONAL SUCCESS**

**No. of hours: 72 (4hrs/wk)**

<b>Objectives</b>
To develop writing skills, to learn to integrate writing and thought and to apply the conventions of academic correctly.
To acquire the correct sense of format, syntax, grammar, punctuation and spelling.
To acquire concepts, principles and vocabulary of reasoning and argumentation and use analysis, synthesis evaluation to advance arguments.
To understanding of discourse conventions ranging from structure and paragraphing to tone and mechanics
To guide students on how to make seminar presentations and participate in discussions and with special focus various perspectives of analysis.
<b>Outcomes</b>

CO1: Students will develop critical thinking, research mentality and academic writing aptitude.
CO2: Students will be able to improve their format, syntax, grammar, punctuation and spelling.
CO3: Students will be sensitized to acquire concepts, principles and vocabulary of reasoning and argumentation.
CO4: Students will develop the ability to understand a set of discourse conventions ranging from structure and paragraphing to tone and mechanics.
CO5: Students will exhibit improved capabilities to make seminar presentations and participate in discussions with focus on various modes of analysis.

#### COURSE DESCRIPTION:

##### A. COURSE SUMMARY:

Module 1:	Process of Writing: 18 hrs
Module 2:	Elements of Writing: 12 hrs
Module 3:	Writing for Professional Purposes 1: 18 hrs
Module 4:	Writing for Professional Purposes 2: 12 hrs
Evaluation:	12 hrs
<b>TOTAL</b>	<b>72 hrs</b>

#### COURSE DETAILS:

##### Module 1: The Process of Writing

Introduction to Academic writing: What is academic writing - Purpose of academic writing - Types of academic writing - Features of academic writing. Structuring the Essay: Planning an essay- Brain-storming- Organizing and outlining. Writing a thesis statement - Nature of supporting sentences - Writing paragraphs structure of an essay. Vocabulary for Writing: Selection of vocabulary- Abbreviations- Choice of nouns and adjectives Appropriate verbs and adverbs- Conjunctions and prepositions- Prefixes and suffixes- Synonyms Common

errors. Composing the Content: Writing introductions and conclusions- Ordering the paragraphs - Proof-reading and editing- Finalising the final draft.

## **Module 2: Elements of Writing**

Shaping Strategies: Discussions, persuasions and arguments- Comparison and contrast- Cause and effect- Defining and classifying Problems and solutions Mechanics and conventions of Writing: Punctuations, Use of articles, Relevance of examples, Generalizations, Academic style.

## **Module 3: Writing for Professional Purposes 1**

Writing Reviews: Reviewing books – Reviewing movies - Writing product reviews Writing Case Studies  
Writing Reports: Feasibility report, Progress reports, Evaluative reports Surveys: Conducting surveys-  
Designing questionnaires, Collecting data - Writing descriptive reports

## **Module 4: Writing for Professional Purposes II**

Writing CVs , Letter Writing: Transmittal and cover letters - Emails Writing summaries -Writing memos-Writing blogs-Etiquette in writing

### **Core Text:**

Code: ENG2A03

Title: Writing for Academic and Professional Success

Author: Dr. Anvar Sadhath V P and Dr. Jacob George

Publisher: University of Calicut

### **FURTHER READING:**

Day, R. A. 1983. How to write and publish a scientific paper. 2nd ed. Philadelphia: ISI Press.

## ENG2A04 – ZEITGEIST: READINGS ON SOCIETY AND CULTURE

No. of hours: 90 (5hrs/wk)

<b>Course Objectives</b>
1. To inculcate the values enshrined in the constitution of India and to provide an insight on the secular framework of the country.
2. To familiarize the learners with concepts such as conservation, sustainability and the life of the marginalized and their interconnectedness.
3. To foster among learners an awareness of the diverse problems faced by women and the sexual minorities and to promote a culture of inclusion and mutual respect.
4. To understand the “human” as articulated among the various cultures and promote a multicultural and plural understanding of rights.
5. To cultivate in students, the critical and philosophical skills with which literature can be appreciated
<b>Course Outcomes</b>
CO1: Students will understand the constitution of India and have an insight on the secular framework of the country.
CO2: Students will get familiarized with concepts like conservation, sustainability and the life of the marginalized and their interconnectedness.
CO3: Students will be able to have an awareness of the diverse problems faced by women and the sexual minorities

CO4: Students will understand the “human” as articulated among the various cultures and promote a multicultural and plural understanding of rights.

CO5: Students will acquire a critical and philosophical perspective with which literature can be appreciated

### **CO-PO/PSO Mapping**

<b>PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>CO</b>											
<b>CO1</b>	1	0	2	3	0	3	1	2	1	3	2
<b>CO2</b>	1	1	2	2	0	2	1	3	2	2	3
<b>CO3</b>	3	2	3	3	0	3	2	2	3	3	2
<b>CO4</b>	3	2	3	3	0	2	3	2	2	3	2
<b>CO5</b>	2	2	3	3	0	2	3	3	2	2	3

Module 1:

## Indian Constitution and Secularism

1. Preamble to the Constitution of India
2. Should Gandhi's Assassin be Killed?: Pearl S. Buck
3. Toba Tek Singh: Hassan Saadat Manto
4. Freedom: Tagore

## Module 2:

### Sustainable Environment

1. The End of Living and the Beginning of Survival: Chief Seattle
2. On Killing a Tree: Gieve Patel
3. Zlateh the Goat: Issac Bashevis Singer

## Module 3: Gender

1. The Story of an Hour: Kate Chopin
2. The First time I Uttered a Prayer: Lee Mokobe
3. Claiming an Education: Adrienne Rich

## Module 4: Human Rights

1. Refugee Blues: W H Auden
2. Amnesty: Nadine Gordimer
3. Akkarmashi: Sarankumar Limbale (Extracts from Chapter 1)
4. The Meaning of Life: Yuval Noah Harari (Extracts from Chapter 19)

ENG2 A04- ZEITGEIST: READINGS ON CONTEMPORARY CULTURE

**MAL2A08(3) Malayalabhashayum Sahithyavum-**

**No. of sessions: 80**

<b>Course Objectives</b>
1. Realize the different and varied cultural realms
2. Make the students to prepare Science essays and studies in Mother tongue.
3. Familiarize with Malayalam literature and the stylistic use of language in various periods
<b>Course Outcomes</b>
CO1:Familiarise with different literary forms and communication modes of Malayalam.
CO2: Students will be able to enhance their vocabulary.
CO3: Students will be able to demonstrate understanding of grammatical structures in appropriate context.
CO4: Inculcate an interest in Mother tongue and regional literature thereby improving their cultural development.
CO5: Implant an interest in Science and literature in students of conventional graduate courses.

### CO-PO/PSO Mapping

PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
<u>CO1</u>	<u>2</u>	<u>3</u>	<u>0</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>0</u>
<u>CO2</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>2</u>
<u>CO3</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>0</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>
<u>CO4</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>3</u>
<u>CO5</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>1</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>2</u>

Module 1: Stories

Oru manushyan-Basheer,

Vanmarangal veezhumpol-N S

Madhavan,Payaru vallikalil ini nammalokke-Priya A S

Module 2: Novel

Enmagaje-Ambika Suthan Mangad

Module 3: Drama

Bhagnabhavanam-N Krishnapillai

Module 4: Autobiography, Memoire

Pavam manushyan-Cherukadu(Jeevithappatha)



Santhanagopalam-M N Palooru(Kadhayillathavante Kadha) Ulsavakalam –Chandramathi(Njandukalude nattil oridavela)

**BIT2B02 Object Oriented Programming with C++**

**No. of sessions: 64**

<b>Course Objectives</b>
1.To learn the basic concepts and principles of object oriented design
2.To learn C++language
<b>Course Outcomes</b>
CO1:Describe how C++ improves C with object oriented features
CO2:Familiarize basic concepts of Object Oriented Programming Concepts.
CO3:Use functions in C++ programs.
CO4:Apply the fundamental concepts of constructors and overloading.
<b>CO5:Understand files,templates and stream classes.</b>

**CO-PO/PSO Mapping**

<b>PO→</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO ↓</b>									
<b>CO1</b>	1	0	0	1	2	2	1	1	1
<b>CO2</b>	1	0	0	1	1	1	2	2	2
<b>CO3</b>	0	0	1	1	1	1	2	2	2

CO4	0	0	1	1	1	1	2	2	2
CO5	0	0	1	2	3	3	3	3	3

### Unit I

Introduction to Object Oriented Programming - Features of Procedure oriented programming - Basic Concepts of Object Oriented Programming - Benefits of OOP - Applications of OOP. Introduction to C++: Comments - Output operator - Input operator - Cascading of I/O operators. Tokens - keyword, identifiers, constants, strings and operators. Basic data types - User defined data types - Dynamic initialization of variables - Reference variables - Operators in C++ - Scope resolution operators - applications - Member dereferencing operators - Memory Management operators - new and delete. Control Structures - simple if, if else, nested if, switch, while do, break and continue statements

### Unit II

Functions: Introduction - Function Prototyping - Call by reference - Return by reference - Inline functions - Default arguments - Const arguments Classes and Objects: Introduction - Limitations of C structures - Defining a class - Class Vs structures - Creating objects - Accessing class members - Defining member functions - Outside the class definition - Inside the class definition - Outside functions as inline - Nesting of member functions - Private member functions - Memory allocation for objects - Array of objects. Friendly functions.

### Unit III

Constructors and Destructors: Basic Concepts of constructors - Default constructor - Parameterized constructor - Multiple constructors in a class - Constructor with default arguments - Dynamic initialization of objects - Copy constructor - Dynamic constructors - Destructors. Function and Operator overloading: Introduction - Rules for overloading operators - Defining operator overloading - Overloading Unary operators - Prefix and Postfix operators overloading - Overloading Binary operators - Overloading relational operators - Overloading using friend functions - Overloading subscript operator. Function overloading.

### Unit IV

Inheritance - Introduction - Defining derived classes - Types of inheritances - Single - Multiple inheritance - Member inheritance - Multilevel inheritance - Multiple inheritance - Hierarchical inheritance - Hybrid inheritance - Virtual base classes - Abstract classes - Constructors in derived classes - Nesting of classes - Containership Virtual functions and Run time polymorphism - Introduction - Compile time and Runtime

polymorphism - Pointers to objects - this pointer - Pointer to derived classes - Virtual functions - Rules for virtual functions - Pure virtual functions

### Unit V

Streams: C++ stream classes - put() and get() functions - getline() and write() functions - Overloading << and >> operators - Formatted Console I/O operations - ios class functions - width(), precision(), fill(), setf() and unsetf() - Formatting flags - Manipulators - User defined manipulators. Files: Introduction - Stream classes for files - Opening files using constructor - Opening files using open() - File modes - Detecting end of file - eof() - Sequential input and output - put() and get() - Reading and writing objects - read() and write() - Random Access files - Manipulating file pointers - seekg(), seekp(), tellg() and tellp() - Error handling during file operations - Command line arguments. Templates: Generic programming, Class templates, Class templates with multiple parameters, Function templates, Overloading of template functions

### BIT2C03 Probability & Statistics

No. of sessions: 64

Course Objectives	
1.	To present a broad overview of statistics as a subject
2.	To organize a statistical survey
3.	To understand the importance of summary measures to describe the characteristics of data set
4.	To analyze the relationship between two variables To use the various forecasting techniques
Course Outcomes	
CO1:	To understand the basics of statistics and statistical concepts required for a statistical survey..
CO2:	To understand the analysis of statistical tools like the central tendencies of measures, coefficient of variance.
CO3:	Develop the ability to use statistical tools to measure quantitative and qualitative data.
CO4:	To understand the concept of random variables, their features, expected values and probability distribution.
CO5:	To understand the properties of correlation and compute Karl-Pearson's coefficient of correlation

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4

<b>CO ↓</b>									
<b>CO1</b>	3	0	3	2	1	3	3	2	2
<b>CO2</b>	3	1	2	2	0	2	3	2	2
<b>CO3</b>	3	1	2	3	1	2	2	2	2
<b>CO4</b>	2	0	1	2	0	1	2	1	1
<b>CO5</b>	3	1	3	2	1	2	2	2	2

## UNIT I

Statistical inquiries and sampling: Collection of Data, Primary & secondary, questionnaire, definition of statistics, population, census and sampling different sampling techniques, simple random sampling, stratified random sampling, systematic sampling, cluster sampling, sampling and non-sampling error.

## UNIT II

Characteristics of statistical data: Classification tabulation, diagrams and graphs Frequency distribution one & two dimensional bar diagram, pie diagram, line graph, histogram frequency polygon, curve, ogive.

## UNIT III

Analysis of data: Range, Q.D, M.D, Mean, Median, Mode, Standard deviation, coefficient of variation.

## UNIT IV

Probability: Basic concepts in probability, statistical dependence and independence, prior estimates of probabilities, Baye's theorem, random variables, expected value decision making, binomial distribution, poisson continuous random variable, choosing correct probability distribution

## UNIT V

Correlation & Regression: different types of correlation, different methods of studying correlation, correlation coefficient, rank correlation coefficient, two regression lines, estimation of dependent variable - difference between correlation & regression.

**BIT2C04 Electronics & Communication Technology**

**No. of sessions: 64**

<b>Course Objectives</b>	
To learn the basics of the semiconductor technologies	
To learn the basics of the modulation systems	
To learn the basics of the communication technologies	
<b>Course Outcomes</b>	
CO1: To understand basic knowledge of electronics components and its operations	
CO2: To understand Transistor operations and applications in real life	
CO3: :Identify and understand the basics of different types of transistors	
CO4: Students able to compare the AM, FM and PM	
CO5: Enable students to understand basics of Digital Modulation Techniques	

### CO-PO/PSO Mapping

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	2	0	1	2	0	0	2	1	2
CO2	1	0	1	1	1	0	2	1	1
CO3	1	0	1	1	1	0	2	1	1

<b>CO4</b>	1	1	0	1	0	1	1	1	0
<b>CO5</b>	2	0	1	0	1	1	0	0	1

### Unit I

Concept of Conductor, Semiconductor, Insulator, Semiconductor Diode, Forward bias, Reverse Bias, Application of Diode as Rectifier, Zener diode and its applications, Introduction to Transistor, PNP, NPN Transistors their Characteristics, Transistor biasing. Application of as amplifier and as a Switch

### Unit II

Application of BJT as single stage Amplifier, Frequency response of single stage Amplifier. Multistage Amplifiers: (Basics concepts) RC coupled, cascade, Darlington pair, DC amplifiers. Concept of Feedback: Negative Feedback and its advantage in Amplification, Positive Feedback: Oscillators, RC Phase Shift Oscillator, LC Oscillator.

### Unit III

FET, Types of FET, JFET - characteristics, advantages, parameters, applications of MOSFET - types of MOSFET, characteristics, comparison. SCR - working, characteristics, applications, SCR-switching.

### Unit IV

Need for modulation system, Concept of Modulation. AM: Definition of AM, Modulation index, Power relation in AM, Generation and Demodulation of AM. SSB: Power requirement in comparison with AM, Advantages of SSB over AM, Concept of Balanced Modulator, Generation of SSB, Pilot Carrier System, Independent Side System, Vestigial Sideband Transmission.

### Unit V

FM: Definition of FM, Bandwidth, Noise triangle, Pre-emphasis and De-emphasis. PM: Definition of PM. Difference between AM and FM. Radio receivers. Pulse Modulation: Sampling Theorem, PAM, PTM, PWM, PPM, pulse code modulation, Quantization noise, companding, PCM system, differential PCM, Delta modulation. Multiplexing: FDM/TDM. Introduction to Digital Communication: PSK, ASK, FSK

### BIT2B03 Programming Laboratory I – C++

<b>Course Objectives</b>
To provide the students with hands on experience on OOP
To get implementation skill on OOP
To understand various concepts in C++ language
<b>Course Outcomes</b>
CO1:Identify and recall the syntax and semantics of C++ programming language
CO2:Demonstrate the use of C++ classes and object oriented techniques to improve code reuse and modularity
CO3:Compare and analyze various operations in C++.
CO4:Design and implement complex C++ programs using object oriented features

### CO-PO/PSO Mapping

<b>PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO</b>									
<b>CO1</b>	1	0	0	1	0	1	1	2	2
<b>CO2</b>	0	0	0	2	2	1	3	2	3
<b>CO3</b>	0	0	0	1	2	2	2	2	2
<b>CO4</b>	0	0	0	2	2	2	2	2	3

C++ lab work

List of Exercises:

1. Simple C++ Programs to implement various Control Structures such as if, switch, do while, for, while, etc
2. Programs to understand Structure & Unions
3. Programs to understand Pointer Arithmetic
4. Programs to understand Functions & Recursion
5. Programs to understand Inline Functions

6. Programs to understand different function call mechanism such as Call by reference & Call by Value
7. Programs to understand Storage Specifiers
8. Use of Constructors & Destructors
9. Use of “this” Pointer
10. Programs to implement inheritance and function overriding such as multiple inheritance and hierarchical inheritance
11. Programs to overload unary & binary operators as member function & non-member function
12. Programs to understand friend function & friend class
13. Programs on Class Templates

### NCSBC01-Bridge Course-Basics of C programming

<b>Course Objectives</b>
1. To provide students the confidence and skills to successfully transition to new system
<b>Course Outcomes</b>
CO1: To define the basic concepts in C
CO2: To develop academic skills and assist the students in C.

<u>PO</u>	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
<b>CO</b>									
<b>CO1</b>	3	0	2	0	3	2	3	3	2
<b>CO2</b>	3	2	3	0	3	2	3	3	2

#### Unit I

Structure of C: Header and body, Use of comments, Compilation of a program

#### Unit II

Data Concepts: Variables, Constants, data types like: int, float char, double and void. Declaring and initialize variables

#### Unit III

Types of operators: Arithmetic, Relational, Logical, Compound Assignment, Increment and decrement, Conditional or ternary, Bitwise and Comma operators. Statements and Expressions.

#### Unit IV



Data Input and Output functions:printf(), scanf()

### Unit V

Iterations: Control statements for decision making:Branching: if statement, else... if statement, switch statement.Looping: while loop, do.. while, for loop.Jump statements: break, continue and goto.

### Additional Certification Course:

Description-An additional Certification Course on Advanced Excel will be provided to 3rd semester students.The duration of the course will be 5hrs.Faculties from Computer Science Department or IT Department will handle the session.

Course Objectives	
1. This course is aimed at exposing participants to the use of Advanced Excel formulas and features in intensive data analyse	
Course Outcomes	
CO1: To explore the magic of analyzing data using Advanced Excel	

<u>PO</u>	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO									
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	2	3	3	2

Course Outline are

- Excel Basics
- Work with Cells and Worksheets
- Calculate Your Data
- Format your Workbook
- Add Charts and Graphics
- Collaborate with Others
- Analyze your Data
- Work with Macros and the Web

## Semester 3

### 1. A11 – Python Programming

<b>Course Objectives</b>
1. To learn basics of Python programming
2. To learn decision making, looping and functions in Python
3. Understand Object Oriented Programming using Python
<b>Course Outcomes</b>
<b>CO1:</b> Identify and recall Python programming basics and paradigm, demonstrating an understanding of fundamental concepts in Python programming.
<b>CO2:</b> Demonstrate an understanding of Python looping and control statements, interpreting how they function within the context of programming tasks.
<b>CO3:</b> Apply knowledge to develop the ability to create and use functions, global variables, recursion, and analytical skills. Demonstrate the practical application of Python programming in coursework and professional development.
<b>CO4:</b> Analyze and comprehend the use of Python string, list, tuple, dictionary, and manipulations on them, showcasing the ability to break down and understand complex data structures in Python programming.
<b>CO5:</b> Equip students for developing mini projects using Python standards.

### CO-PO/PSO Mapping

<b>PO→</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO ↓</b>									

CO1	3	0	1	3	3	2	3	3	2
CO2	3	0	0	3	3	3	3	3	2
CO3	3	0	1	3	3	3	3	3	2
CO4	3	0	1	3	3	3	3	3	2
CO5	3	0	3	3	3	3	3	3	2

### UNIT I

Introduction to python, features, IDLE, python interpreter, Writing and executing python scripts, comments, identifiers, keywords, variables, data type, operators, operator precedence and associativity, statements, expressions, user inputs, type function, eval function, print function.

### UNIT II

Boolean expressions, Simple if statement, if-elif-else statement, compound boolean expressions, nesting, multi way decisions. Loops: The while statement, range functions, the for statement, nested loops, break and continue statements, infinite loops.

### UNIT III

Functions, built-in functions, mathematical functions, date time functions, random numbers, writing user defined functions, composition of functions, parameter and arguments, default parameters, function calls, return statement, using global variables, recursion.

### UNIT IV

String and string operations, List- creating list, accessing, updating and deleting elements from a list, basic list operations. Tuple- creating and accessing tuples in python, basic tuple operations. Dictionary, built in methods to access, update and delete dictionary values. Set and basic operations on a set.

**A12-Sensors and Transducers**

**No. of sessions: 64**

<b>Course Objectives</b>									
1. To learn basics of transducers									
2. To learn construction and working of transducers									
3. To understand various types of transducers									
<b>Course Outcomes</b>									
CO1: Explain resistance, inductance and capacitance transducers.									
CO2: Perceive the concepts of temperature and pressure transducers.									
CO3: Perceive the concepts level transducers such as and flow transducers									
CO4: Explain Electromagnetic transducers and radiation sensors.									
CO5: Explain force and torque transducers and sound transducers									

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	1	2	3	0	1	2	0	2	2
CO2	3	0	1	2	0	2	2	1	2
CO3	0	1	2	0	2	3	1	2	3
CO4	2	2	1	2	3	0	1	2	2
CO5	2	0	1	2	3	2	2	2	2

### Unit I [16T]

Transducers: Definition, Principle of sensing & transduction, Classification, Characteristics of transducers. Basic requirement of transducers. Resistance Transducer: Basic principle – Potentiometer –Loading effects, Resistance strain gauge– Types. Inductance Transducer: Basic principle – Linear variable differential transformer – RVDT-types. Capacitance Transducer: Basic principle-transducers using change in area of plates– distance between plates- variation of dielectric constants–Types

## Unit II [16T]

Thermal sensors: Resistance change type: RTD - materials, types, working principle, Thermistor - materials, types, working principle, Thermo emf sensors: Thermocouple – Principle and types, Radiation sensors: Principle and types.

## Unit III [16T]

Pressure Transducers: basic principle- different types of manometers-u tube manometer-well type manometers. Level transducer-continuous level measurement-discrete level measurement-mass –capacitive level gauges

## Unit IV [16T]

Flow Transducers: Bernoulli’s principle and continuity, Orifice plate, nozzle plate, venture tube, Rotameter, anemometers, electromagnetic flow meter. Radiation sensors: LDR, Photovoltaic cells, photodiodes, photo emissive cell types. Sound Transducers: Sound level meter, Microphone. Hall Effect transducers

## BIT3B04 – Database Design & RDBMS

No. of sessions: 80

Course Objectives
1. To learn the basic principles of database and database design
2.To learn the basics of RDBMS
3.To learn the concepts of database manipulation SQL
4.To study PL/SQL language
Course Outcomes
CO1:To learn the basic concepts of databases and data models and explains the features of database management systems, architecture of database systems, and the role of database users.

CO2: Develops an Entity-Relationship model based on user requirements and Convert an Entity-Relationship diagram to Relational Schema.

CO3: Learn Functional Dependency and Functional Decomposition and Applies various Normalization techniques for database design improvement.

CO4: Use the basics of SQL and construct queries using SQL in database creation and interaction.

CO5: To understand the principle of transaction management design and Design a commercial relational database system (Postgres) by writing SQL using the system.

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	0	0	2	1	1	1	2	3	
CO2	0	0	2	1	1	1	2	2	
CO3	0	0	2	1	1	1	2	2	
CO4	0	0	2	1	1	1	2	3	
CO5									

## UNIT I

Introduction: Purpose of database systems, View of data - Data abstraction, Instances and Schemas, Data models, Database languages, Database administrator, Database users, Database architecture. The Entity-Relationship model: Entity sets, Relationship sets, Attributes, Constraints, Mapping Cardinalities, Keys, ER diagrams, Weak entity sets, Strong entity sets.

## UNIT II

Relational Database Design: First, Second, Third, BCNF, Fourth and Fifth Normal forms. Transactions: ACID properties, States, Concurrent executions.

## UNIT III

Data Definition in SQL: Data types, Creation, Insertion, Viewing, Updation, Deletion of tables, Modifying the structure of the tables, Renaming, Dropping of tables. Data Constraints - I/O constraints, Primary key, foreign key, unique key constraints, ALTER TABLE command

## UNIT IV

Database Manipulation in SQL: Computations done on table data: Select command, Logical operators, Range searching, Pattern matching, Grouping data from tables in SQL, GROUP BY, HAVING clauses, Joins -Joining multiple tables, Joining a table to itself. Views: Creation, Renaming the column of a view, destroys view, Granting and revoking permissions:Granting privileges, Object privileges, Revoking privileges.

## UNIT V

Programming with SQL: Data types, Using set and select commands, procedural flow, if, if /else, while, goto, global variables, Security:Locks, typesoflocks,evelsoflocks.Cursors:Workingwithcursors,ErrorHandling, Developing stored procedures, create, alter and drop, passing and returning data to stored procedures, using stored procedures within queries, building user defined functions, creating and calling a scalar function, implementing triggers, creating triggers, multiple trigger interaction.

## BIT3B05 – Data Structures UsingC++

**No. of sessions: 80**

Course Objectives
To learn the contiguous and non-contiguous data structures and their implementation
To learn linear and non-linear data structures and their implementation
To learn the methods of searching, sorting and hashing techniques

<b>Course Outcomes</b>
CO1:Recognize and recall the basic concepts of data structures and algorithms
CO2:Explain how arrays are represented in memory and describe common applications for arrays.
CO3:Use algorithms to implement and manipulate stacks and linked list
CO4:Analyze different methods for traversing trees and evaluate how queues are represented in memory.
CO5:Familiarize hashing function, searching and sorting techniques

<b>PO→</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO ↓</b>									
<b>CO1</b>	2	0	0	3	3	2	3	2	1
<b>CO2</b>	2	0	0	3	3	3	3	2	3
<b>CO3</b>	3	0	0	3	3	3	2	2	3
<b>CO4</b>	3	0	0	3	3	2	3	2	3
<b>CO5</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>

## UNIT I (10T)



Algorithms (Analysis and Design): Problem solving - Procedure - Top-Down and Bottom-up approaches to algorithm design - Use of algorithms in problem solving: Developing an algorithm - Characteristics of algorithmic language - Design of algorithms - Implementation of algorithm - Verification of algorithm - Efficiency analysis of algorithms: Space, Time complexity, Frequency count - Simple algorithms. Data Representation: Abstract data type (ADT) - Fundamental and derived data types: Declaration - Representation - Primitive data structures: Symbol table - Recursion.

#### **UNIT II (10T)**

Arrays: Definition - Terminology - One dimensional array - Memory allocation, Operations, Application - Multidimensional Arrays: Two dimensional Arrays - Sparse matrices - Three dimensional and n-dimensional Arrays - Pointer Arrays.

#### **UNIT III (20T)**

Stacks: Introduction - Definition - Representation of stacks - Operations on stacks - Applications of stack. Linked List: Definition - Single Linked List: Representation, Operations - Circular Linked List - Double Linked List: Operations - Circular Double Linked List - Operations Application of Linked Lists: Sparse Matrix Manipulation - Polynomial Representation - Dynamic Storage Management

#### **UNIT IV (20T)**

Queues: Introduction - Definition - Representation of Queues - using Arrays, Linked list. - Various Queue structures: Circular Queue - De-queue - Priority Queue - Applications of Queues. Trees: Concepts - Representation of Binary tree - Operations on Binary Tree - Types of Binary Trees. Graphs: Introduction - Graph terminologies - Representation of Graphs - Operations on Graphs - Application of Graph Structures.

#### **UNIT V (20T)**

Searching and Sorting: Searching - Sequential and Binary Search - Indexed Search - Hashing Schemes - Hashing functions: Division/ Remainder methods - Mid Square method - Folding method - Hash Collision: linear probing - Chaining - Bucketing - Sorting: Selection sort - Bubble sort - Insertion sort - Quick sort - Merge sort - Radix sort - Shell sort - Heap sort - Comparison of time complexity.

### **BIT3C05 – Discrete Mathematics**

Course Objectives
1. To learn about mathematical logic and Boolean algebra and to design logic circuits
2. To learn about set theory and applications of set theory in Computer science
3. To learn about the concepts of graphs and trees in Computer Science applications
Course Outcomes
CO1: To explain and apply basic notions of symbolic logic and circuit design

CO2: To Perform the operations on sets , types of relations , equivalence relation, and partial order relation
CO3: To define the basic concepts of graphs, directed graphs, and weighted graphs
CO4: To know the concept of walk , path and circuit in a graph , Eulerian and Hamiltonian graphs
CO5: Students will understand various types of trees , spanning tree algorithms , Travelling Sales man problem

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	3	1	0	2	0	0	0	0	0
CO2	3	1	0	2	0	0	0	0	0
CO3	3	1	0	2	0	0	0	0	0
CO4	3	1	0	2	0	0	0	0	0
CO5	3	1	0	2	0	0	0	0	0

### UNIT I (12T)

Mathematical Logic: Propositions and logical operators, Truth tables, equivalence and implementation, Laws of logic, Quantifiers. Set theory: Introduction, concept of set of theory relation, types of relation, equivalence relation.

### UNIT II (12T)

Boolean Algebra and its properties, Algebra of propositions & examples, DeMorgan's Laws, Partial order relations, greatest lower bound , least upper bound, Algebra of electric circuits & its applications.

### UNIT III (12T)

Graph: Simple and multigraph, Incidence and degree, Isomorphism, Sub graphs and Union of graphs, connectedness, Walks, Paths and Circuits, Euler’s Formula, Eulerian graph, Hamiltonian graph, Complete, Regular and Bipartite graphs.

**UNIT IV (12T)**

Trees: Properties of trees, pendant vertices. Centre of a tree, rooted and binary trees, spanning trees, spanning tree algorithms, fundamental circuits; spanning trees of a weighted graph: cutsets and cut-vertices; fundamental cutsets; connectivity and separativity.

**UNIT V (12T)**

Planar Graphs, Chromatic Graphs, Travelling salesman problem, dual graphs, Kuratowski's two graph, matrix representation of graphs, incidence matrix, directed graphs, digraphs, directed paths and connectedness. Euler digraphs

**BIT3C06 – Fundamentals of Digital Electronics**

Course Objectives
To learn number systems and boolean algebra
To learn combinational and sequential circuits
To learn A/D and D/A converters
Course Outcomes
CO1: Explain and apply the basic concepts of number systems and the use of Binary, Decimal and Hexadecimal number systems, and demonstrate competence in the conversion of numbers from one representation to another.
CO2: Demonstrate familiarity with Boolean Operations, the Laws of Boolean Algebra, DeMorgan Theorems and the application of Boolean Algebra and Karnaugh Maps to simplify logic circuits.
CO3: To understand combinational logic circuits and implementing logic function
CO4: Enable to understand sequential logic design
CO5: To understand analog to digital converter and vice versa

<b>PO→</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
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<b>CO ↓</b>									
<b>CO1</b>	2	0	1	2	1	0	2	1	0
<b>CO2</b>	2	0	1	3	1	1	1	0	2
<b>CO3</b>	2	0	1	3	1	0	2	1	2
<b>CO4</b>	1	0	1	3	2	0	1	2	0
<b>CO5</b>	2	0	1	3	1	1	1	1	2

### UNIT I (12T)

Number Systems and Codes, Decimal numbers, binary numbers, binary arithmetic, 1's and 2's complements, octal numbers, hexadecimal numbers, interconversions of number systems, Digital codes: Binary coded decimal(BCD), Gray code, Excess-3 code, ASCII code, error detection and error correction codes, Hamming code.

### UNIT II (12T)

Logic Gates Positive and negative logic, NOT gate, OR gate, AND gate, NAND gate, NOR gate, EX-OR and EX-NOR gates, Universal gates. Boolean Algebra: Boolean operations, logic expressions, rules and laws of Boolean algebra, DeMorgan's theorems, minterms, maxterms, SOP and POS form of Boolean expressions for gate network, simplification of Boolean expressions using Boolean algebra and Karnaugh map techniques(up to 4 variables)

### UNIT III (12T)

Arithmetic and Combinational Logic Circuits Half adder, full adder, parallel binary adder, decoders, BCD to 7-segment decoder, multiplexers and demultiplexers, multiplexer and demultiplexer trees.

### UNIT IV (12T)

Sequential Logic Circuits: SR latch, SR flip flop, JK flip flop, Master Slave JK flip flop, D type flip flop, T type flip flop. Shift register: serial in - serial out, serial in - parallel out, parallel in - serial out, parallel in-parallel out

configurations. Ring counter, Johnson’s counter, asynchronous counters, synchronous counters, up/down asynchronous counter,

### UNIT V (12T)

A/D and D/A converters: D/A conversions – Weighted-Register D/A converter, R-2R ladder D/A converter, A/D conversions-Counter type method using D/A, dual slope integrator method, successive approximation method, simultaneous method.

### NCSACT06-Mini Project-Python

**Description:**It provides a fundamental understanding of the Python programming language and enables one to have the skills and understanding of Python to confidently apply for Python programming jobs.It also acquire the prerequisite Python skills to move into specific branches - Machine Learning, Data Science, etc..

Course Objectives	
1. To understand the real time software development environment. The student can gain a thorough knowledge in developing a application using python	
Course Outcomes	
CO1: To acquire programming skills in core Python and Object Oriented Skills in Python	
CO2: To develop the skill of designing Graphical user Interfaces in Python	

### CO-PO/PSO Mapping

PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO									
CO1	3	2	3	0	3	3	3	3	3
CO2	3	2	3	0	3	3	3	3	3

### NCSACC1-Add on Course -Python Programming

Description:An add on course on Python Programming will be provided to students.All the students should register for the course via Coursera. The duration of the course will be 30 hours.The course aims to increase the

basic knowledge of Python and to improve the problem solving skills of students through the implementation programs using Python.

<b>Course Objectives</b>
This course aims to teach everyone the basics of programming computers using Python.. The course has no pre-requisites and avoids all but the simplest mathematics. Anyone with moderate computer experience should be able to master the materials in this course.The course is designed to provide Basic knowledge of Python and to develop the skill of designing Graphical user Interfaces in Python
<b>Course Outcomes</b>
CO1: To cover the basics of how one constructs a program from a series of simple instructions in Python.
CO2: To prepare students to take more advanced programming courses.
CO3: To develop the ability to write applications in Python

### CO-PO/PSO Mapping

<u>PO</u>	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO									
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	3	3	3	2
CO3	2	2	3	0	3	3	3	3	3

#### UNIT I

Introduction to python, features, IDLE, python interpreter, Writing and executing python scripts, comments, identifiers, keywords, variables, data type, operators, operator precedence and associativity, statements, expressions, user inputs, type function, eval function, print function.

#### UNIT II

Boolean expressions, Simple if statement, if-elif-else statement, compound boolean expressions, nesting, multi way decisions. Loops: The while statement, range functions, the for statement, nested loops, break and continue statements, infinite loops.

UNIT III Functions, built-in functions, mathematical functions, date time functions, random numbers, writing user defined functions, composition of functions, parameter and arguments, default parameters, function calls, return statement, using global variables, recursion.

#### UNIT IV

String and string operations, List- creating list, accessing, updating and deleting elements from a list, basic list operations. Tuple- creating and accessing tuples in python, basic tuple operations. Dictionary, built in methods to access, update and delete dictionary values. Set and basic operations on a set, Practicing lab programs

### NCSACT05-Workshop-Introduction to system hardware

**Description:** The objective of this workshop is to acquaint the students with the basic principles, developments and research trends in the area of Computer Hardware. The workshop covers the perfect combination of theory and practical sessions in the well balanced manner. This workshop will certainly help students to improve technical skill set and hence employability, and the faculty members to improve teaching methodology and efficiency.

<b><u>Course Objectives</u></b>
<b>1.</b> To impart the skills needed to assemble a PC, PC troubleshooting, installation of system/application software. Student will be able to prepare cables for LAN, assemble a PC
<b><u>Course Outcomes</u></b>
CO1: To acquire knowledge about Computer Hardware components
CO2: To develop the skill of assembling a PC

<u>PO</u>	<u>PO1</u>	<u>PO2</u>	<u>PO3</u>	<u>PO4</u>	<u>PO5</u>	<u>PSO1</u>	<u>PSO2</u>	<u>PSO3</u>	<u>PSO4</u>
<u>CO</u>									
<u>CO1</u>	<u>3</u>	<u>2</u>	<u>3</u>	<u>0</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>
<u>CO2</u>	<u>3</u>	<u>2</u>	<u>3</u>	<u>0</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>

#### Semester 4

#### **1. A13 – Data Communication and Optical Fibers**

**No. of sessions: 64**

<b>Course Objectives</b>
1. To learn basics of data communication, Networking architectures and applications.
2. Expose the students to the basic of signal propagation through optical fibers, fiber impairments, components and devices and system design
<b>Course Outcomes</b>
CO1: Identify and understand processes to communicate with each other across a computer network.
CO2: Able to understand the concept of network topology
CO3: Understand the concept of multiplexing, GSM and its applications.
CO4: Analyze the services, roles and features of the data link control of data networks
CO5: Identify and understand the fundamental knowledge about optical fiber communication systems.

#### **CO-PO/PSO Mapping**



PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	3	2	2	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3
CO3	3	2	2	3	2	2	3	3	3
CO4	3	2	2	3	2	3	3	3	3
CO5	3	2	2	3	3	3	3	3	3

### Unit I

Introduction- Components, Networks, Protocols and standards, Basic Concepts: Line Configuration, Topology Transmission mode, analog and digital signals, Encoding and modulating analog- to-digital conversion, digital to analog conversion, digital data transmission, DTE-DCE interface, modems, cable modems. Transmission media: guided media, unguided media, and transmission impairment.

### Unit II

Multiplexing: Many to one/ one to many, frequency division multiplexing, wave division multiplexing, TDM, multiplexing applications: the telephone system, Cellular System, Mobile Communication-GSM, Mobile Services, GSM system Architecture, Radio Interface in GSM

### Unit III

Data link Control: Line Discipline, flow control, error control, Data link Protocols: Asynchronous Protocols, synchronous protocols, character oriented protocols, bit – oriented protocols, link access procedures. Local Area Networks: Ethernet, token bus, token ring, FDDI, Comparison, Switching Circuit switching, packet switching, message switching, integrated services digital networks (ISDN): services, history, subscriber access to ISDN.

### Unit IV

Overview of Optical Fiber Communication - Introduction, historical development, general system, advantages, disadvantages, and applications of optical fiber communication, optical fiber waveguides, fiber materials, Optical Sources And Detectors- Introduction, LED's, LASER diodes, Photo detectors. Ray theory, cylindrical fiber, single mode fiber, cutoff wavelength, mode field

### **A14 Microprocessors-Architecture and Programming**

**Number of Contact Hours: 64 Hrs.**

<b>Course Objectives</b>	
1.	To understand internals of Microprocessor
2.	To learn architecture of 8085 Microprocessor
3.	To learn instruction set of 8085 Microprocessor
<b>Course Outcomes</b>	
CO1:	Enable students to understand internals of Microprocessor
CO2:	Enable students to understand architecture of 8085 Microprocessor
CO3:	Enable students to understand instruction set of 8085 Microprocessor
CO4:	Enable students to program a Microprocessor
CO5:	Enable students to understand basics of 8086 microprocessor

### **CO-PO/PSO Mapping**

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	3	3	0	0	3	3	3	3	3

CO2	3	3	1	1	3	3	3	3	3
CO3	3	3	2	3	3	3	3	3	3
CO4	3	3	1	3	3	3	3	3	3
CO5	3	3	0	3	3	3	3	3	3

### Module I

General architecture of computer, Introduction to Microprocessor, Memory classification, Introduction to 8085, Microprocessor bus organizations, data bus, address bus, control bus. Memory addressing, memory mapping. 8085 architecture in detail. General purpose registers and special purpose registers, flag register -8085 pins and signals.

### Module II

Assembly language programming basics. Opcode, Mnemonics etc. 8085 instruction set, Data transfer, Arithmetic and Logic, Shifting and rotating, Branching/Jump, Program control. Addressing modes. Memory read and write cycle. Timing diagram. Instruction cycle, machine cycle and T-states. Types of I/O addressing. Simple programs.

### Module III

Types of programming techniques looping, indexing (pointers), delay generation. Stack in 8085, call and return Instructions. Data transfer between stack and microprocessor. Subroutine and delay programs. Interrupts in 8085. Interrupt driven programs. Interfacing - Programmable peripheral devices - 8255A, 8254, 8237.

### Module IV

Introduction to 8086/88 microprocessors – overview, 8086 internal architecture. The execution unit, BIU, Registers, Flags, Segmentation, physical address calculation, addressing modes.

**BIT4B06– Visual Programming Using VB.NET**

**No. of sessions: 112**

<b>Course Objectives</b>
To get a general understanding on .Net Frame Work
To get a general understanding on ADO.Net
Prerequisites: Basic knowledge of OOP
<b>Course Outcomes</b>
Learn the basics of the Visual Basic .NET language, including syntax, programming structures, and the integrated development environment
Store, manipulate, and evaluate data using variables, data types, and operators
Manage the flow of execution and perform repetitive tasks efficiently using control structures and loops
Organize code into reusable blocks to enhance modularity and readability
Create scalable and maintainable code using principles like encapsulation, inheritance, and polymorphism

### CO-PO/PSO Mapping

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	1	1	0	2	2	3	3	2	3
CO2	2	1	1	3	2	2	2	3	2
CO3	1	2	1	3	1	3	3	3	3
CO4	2	1	1	2	2	2	2	3	3

CO5	3	2	1	2	1	2	3	3	3
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### UNIT I (15T)

Introduction to visual programming - Concept of event driven programming - Introduction to VB.Net environment, The .NET Framework and the Common Language Runtime. Building VB.NET Applications, The Visual Basic Integrated Development - Basic Language - Console application and windows application, Data types, Declaring Variables, scope of variables, operators and statements.

### UNIT II (15T)

Making Decisions with If . . . Else Statements, Using Select Case, Making Selections with Switch and Choose, Loop statements - Do Loop, for, while - The With Statement - Handling Dates and Times - Converting between DataTypes - Arrays - declaration and manipulation - Strings & string functions - Sub Procedures and Functions.

### UNIT III (15T)

Windows Applications - Forms - Adding Controls to Forms, Handling Events, MsgBox , InputBox , Working with Multiple Forms, Setting the Startup Form, SDI & MDI Forms, Handling Mouse & Keyboard Events, Common controls (Text ersBit ox es, Rich Text Boxes, Labels, Buttons, Checkboxes, Radio Buttons, Group Boxes, List Boxes, Checked List Boxes, Combo Boxes, Picture Boxes, Scroll Bars, Tool Tips, Timers properties - methods

### UNIT IV (15T)

Object-Oriented Programming - Creating and using Classes & objects - Handling Exceptions - On Error GoTo - Raising an Exception - Throwing an Exception - Using Structured Exception Handling - Debugging and tracing.

### UNIT V (15T)

Data Access with ADO.NET - Accessing Data with the Server Explorer - Accessing Data with Data Adaptors and Datasets - Creating a New Data Connection - Creating and populating Dataset - Displaying Data in a Data Grid - Selecting a Data Provider - Data Access Using Data Adapter Controls - Binding Data to Controls - Handling Databases in Code - Binding to XML data

## BIT4B07 – Programming Laboratory II: Data Structure Using C++ and RDBMS

No. of sessions: 80

<b>Course Objectives</b>
To provide the students with hands on experience on OOP,data structures and databases

To get used to the implementation of various data structures
To get implementation skill on OOP. and get acquainted with DBMS basics
To attain skill in application of SQL .
<b>Course Outcomes</b>
Ability to implement sorting and searching algorithms using relevant data structures
Ability to solve problems implementing appropriate data structures
To enhance knowledge to create ,update,&manipulate tables.
To attain skill to use SQL.

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	0	0	0	1	2	2	2	2	3
CO2	0	0	0	1	2	2	2	3	2
CO3	0	0	0	2	2	2	2	2	3
CO4	0	0	0	2	2	2	2	2	3
CO5									

Part A:

1. Data Structure using C++ 1. Simple C++ Programs to implement various Control Structures such as if, switch,do while, for, while, etc

2. Programs to understand Structure & Unions
3. Programs to understand Pointer Arithmetic
4. Programs to understand Functions & Recursion
5. Programs to understand Inline Functions
6. Programs to understand different function call mechanism such as Call by reference & Call by Value
7. Programs to understand Storage Specifiers
8. Use of Constructors & Destructors
9. Use of “this” Pointer
10. Programs to implement inheritance and function overriding such as multiple inheritance and hierarchical inheritance
11. Programs to overload unary & binary operators as member function & non-member function
12. Programs to understand friend function & friend class
13. Programs on Class Templates
14. Operation on dynamic array such as – Creation – Passing to function – Insertion Implementation – Delete Implementation – Search Implementation – Sort Implementation – Separation implementation – Merge Implementation
15. Operation on linked list such as – Creation – Passing to function – Insertion Implementation – Delete Implementation – Search Implementation – Sort Implementation
16. Operation on doubly linked lists such as – Creation – Passing to function – Insertion Implementation – Delete Implementation – Search Implementation – Sort Implementation – Separation implementation – Merge Implementation
17. Implementing basic operation of stack (push, pop) using array implementation.
18. Implementing basic operation of stack (push, pop) using linked list implementation
19. Implementing basic operation of Queue (Enqueue, Dequeue) using array implementation
20. Implementing basic operation of Queue (Enqueue, Dequeue) using linked list implementation
21. Implement Binary tree traversal methods: Preorder, In-order, Postorder traversal. Recursive Algorithms for above mentioned Traversal methods
22. Implementing Binary search tree operation (search, addition, deletion).
23. Implementing various searching and sorting techniques

#### Part B: RDBMS

1. SQL\*Plus/MySQL and SQL: (a). Introduction (b). Logging on to SQL\*Plus/MySQL and Leaving SQL\*Plus/MySQL (c). Choosing and Describing Tables (d). Elements of the SQL Query (e). Editing SQL Statements (f). The System Dummy Table (g). Selecting Columns (h). Duplicate Information (DISTINCT) (i). Sorting Information

2. SQL Functions: (a). The Concatenation Operator (b). Elements of the SQL Query: Arithmetic (c). Column Aliases (d). String Functions (e). Arithmetic Functions (f). Date Functions (g). Mixed Functions (h). Operator precedence
3. Advanced SQL Functions: (a). Nesting Different Functions (b). Decode Crosstab (c). Decode with ">", "<" & "=" (d). Select with Minus Union and Intersect (e). Handling NULL
4. Filtering Data Using Where: (a). Where Operators (b). Where with Keywords (c). Where and Logical Operators (d). Where and Soundex
5. Retrieving Data from Multiple Tables: (a). Joining Tables (Equi-Joins) (b). Aliases for Table Names (c). Joining Tables (Non-Equi-Joins) (d). Joining Tables (Outer Joins) (e). Joining Tables (Inner Joins) (f). Virtual table
6. Group By and Group By Functions: (a). Group Function Examples (b). Group Function with Having
7. Sub-Queries: (a). Basic Subqueries (b). Multiple Column Subqueries (c). Subqueries with Having (d). Correlated Subqueries
8. Data Definition Language (DDL): (a). Create, Drop Alter Keywords (b). Tables (c). Column (d). Views (e). Synonyms (f). Sequences (g). Object (h). Alter table
9. Integrity Constraints: (a). Types of Constraint (b). Referential Integrity (c). Defining Constraints (d). Integrity Constraints and Data Dictionary (e). Disabled constraints
10. Indexes: (a). Create Index (b). Unique Option (c). When and What to Index (d). Drop Index (e). Validate Index (f). Index Type Overview
11. Data 4M 7 an Bi Sp c u l i a n t i I o n n foL r a m n a g t u i o a n g e T ( eD chM nL o ) l : og ( a y ). (UIn Gs ) e , rt U( n b i ) v . e rU s p it d y a o t e f C( c a ) . licD u e t lete ( d ). OP S Commands (Commit, Rollback and Savepoints) (e). Locking tables
12. Data Control Language (DCL): (a). Data Security (b). Grant and Revoke (c). Session control statements (d). System control statements

## BIT4C07 – Numerical Methods & Operation Research

No : of sessions :80

<b>Course Objectives</b>
To learn methods for finding solutions to linear and nonlinear equations.
To learn methods for finding solutions to differentials equations.
To learn methods for finding solutions to linear programming problems.
<b>Course Outcomes</b>



CO1:- To comprehend the meaning of Operations Research (OR) and its various applications in decision making and problem-solving
CO2: To apply graphical and simplex methods to solve Linear Programming Problems (LPP), demonstrating practical problem-solving skills in Operations Research.
CO3: To apply Operations Research techniques to solve transportation problems, showcasing the ability to use quantitative methods in logistics and distribution
CO4: To apply Operations Research methodologies to solve assignment problems and sequencing problems, demonstrating proficiency in optimization and decision-making.
CO5: - To analyze and construct network diagrams, as well as determine critical paths for finding project durations, showcasing higher-order thinking skills in Operations Research

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	2	0	0	1	1	1	2	1	1
CO2	3	1	1	1	1	0	1	1	1
CO3	3	1	1	1	1	0	1	1	1
CO4	2	1	1	1	1	1	1	1	1
CO5	2	1	1	1	1	1	1	1	1

## UNIT I

Errors in Computing: Introduction, Significant digits inherent. Roots of Non- Linear Equations: Introduction, iterative methods, Bisection, False position, Newton – Raphson’s, Secant.

## UNIT II

Solution of Linear Equations: Gauss Elimination, Gauss-Jordan method, Jacobi iteration method, Gauss-Seidal methods, Interpolation: Linear interpolation, Newtons forward backward & divided difference interpolation methods – lagrangian’s method.

## UNIT III

Numerical differential equation: ordinary differential equation: single step methods, Taylor series methods, Eulers method, modified Eulers method, Picards iteration method, Runge- Kutta methods

## UNIT IV (17T)

Linear programming Problem: Mathematical formulation, graphical method of solution, Simplex method. Duality – Dual simplex

## UNIT V (15T)

Transportation problem: General transportation problem, Duality in transportation, LP formulation, Solution of TP, Test for optimality. Assignment problem: Mathematical formulation, Assignment method, Special cases, Typical AP.

## BIT4C08 -- Computer Organization and Architecture

No : of sessions :80

Course Objectives
1. To learn logic gates, combinational circuits and sequential circuits
2.To learn basics of computer organization and architecture
3.To equip the students to understand the method of program execution in computers
4.To learn the basics of memory organization
Course Outcomes
CO1:Students will be able to learn the basics of digital circuits,logic gates and combinational circuits
CO2: Students will be able to learn the basics of flip flops and its applications
CO3: Students will be able to understand the basics of computer organization
CO4: Students will be able to understand the basics of microprogramming and addressing modes

CO5: Students will be able to understand the basics of memory organization

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	3	3	2	3	3	3	3	3	3
CO2	3	3	1	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3
CO4	3	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

## UNIT I

Digital Logic - Positive and negative logic, logic gates ,NOT gate, OR gate, AND gate, XOR and XNOR gates, Universal gates- NAND gate, NOR gate,. Combinational circuits- Half adder, half subtractor, full adder, full subtractor, ripple carry adders, look-ahead carry adders, decoders, BCD to 7-segment decoder, encoders, multiplexers and demultiplexers.

## UNIT II

Sequential Logic Circuits: Edge triggering, Pulse triggering ,SR latch, SR flip flop, JK flip flop, Master Slave JK flip flop, D flip flop, T flip flop. Shift register: serial in - serial out, serial in - parallel out, parallel in - serial out, parallel in-parallel out configurations. counters (asynchronous & synchronous), up/down counter, decade counter, mod N counter, Ring counter, Johnson's counter.

### UNIT III

Basic Computer Organization and Design: Instruction Codes , Computer Registers, Computer Instructions, Instruction types, Timing and Control, Instruction Cycle, Memory reference Instructions, Register reference instructions, Input, Output and Interrupt Design of Basic Computer, Design of Accumulator logic.

### UNIT IV

Micro programmed Control: Control Memory, Address sequencing, Micro program Example, Design of control unit. Processor Organization: general register organization, stack organization, instruction formats, addressing modes, data transfer and manipulation, program control

### UNIT V

Memory Organization: Memory mapping, Associative memory, Cache memory, Virtual Memory, Memory Management Hardware, hit/miss ratio, Input-Output Organization: Peripheral devices, I/O interface, Modes of Transfer-asynchronous and synchronous, Priority Interrupt, Strobe Control, Handshaking. Direct Memory Access, Input-Output Processor, Serial Communication. I/O Controllers

## NCSBC01-Bridge Course-Introduction to Object Oriented Programming

Course Objectives	
1. To provide students the confidence and skills to successfully transition to new system	
Course Outcomes	
CO1: To define the basic concepts in object oriented programming.	
CO2: To develop academic skills and assist the students in object oriented programming.	

<u>PO</u>	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO									
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	2	3	3	2

### Unit I

Introduction to Object Oriented Programming: Characteristics of OOPS, Object oriented languages, comparison between procedural and object oriented programming.

### Unit II

Basic principles of Object Orientation-class, object,abstraction, encapsulation, inheritance, polymorphism, modularity, and message passing.

### Unit III

Features of object orientation - attributes, state, identity, operation, behaviour.Access specifiers-private,public,protected

### Unit IV

Classes and Objects:Introduction,class fundamentals,Defining a class,Creating objects,Accessing class members.

### Unit V

Inheritance and polymorphism - Introduction - Defining derived classes - Types of inheritances,Compile time and Runtime polymorphism(concepts only)

## NCAWWS02-Walk with the Scholar-Research Writing

<b>Course Objectives</b>
1. To help the students to to learn basics of research.
<b>Course Outcomes</b>
CO1: To develop certain generic skills, non-technical competencies, attitudes and behaviours
CO2:To provide necessary orientation,guidance ,motivation and support to enrich and nourish their talents.

Overview of Research,Overview of Literature Survey: Literature Survey using Web of Science, Literature Survey using Scopus,Data Analysis,How to make Technical presentation – Technical Writing,Intellectual property,Research in Computer Science & Engineering

## NCSACT06- Industrial Interaction-Industry Ethics & Practices

**Description:**The main purpose is to give students an insight into the regular, internal workings of a company.It gives good understanding of the industry and helps in building up useful case studies for improving the quality of future teaching. It provides an ability to identify research programmes of industrial importance.

<b>Course Objectives</b>
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To make students aware about the ethics and practices in the industry
<b>Course Outcomes</b>
CO1: To learn as to how theatrical concepts are put into action, thereby aiding their practical learning.
CO2: To enhance interpersonal skills and communication techniques and to become more aware of industry practices and regulations

<b>PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO</b>									
<b>CO1</b>	3	2	3	3	3	3	3	3	3
<b>CO2</b>	3	2	3	2	3	3	3	3	3

### NCSACT07-Mini Project-Computer Graphics

**Description:** The main aim is to illustrate the concepts and usage of pre-built functions in OpenGL. Creating Figures and the surrounding environment using inbuilt functions provided by the glut library.

<b>Course Objectives</b>
1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
2. Render projected objects to naturalize the scene in 2D view and use of illumination models for this.
<b>Course Outcomes</b>
CO1: To acquire programming skills in developing graphics based applications
CO2: To develop the skill of animation

<u>PO</u>	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
<b>CO</b>									
<b>CO1</b>	3	2	3	0	3	3	3	3	3
<b>CO2</b>	3	2	3	0	3	3	3	3	3

#### NCSACC4-Additional Certification Course

Description: An additional Certification Course on “Research Paper Writing and Publication” will be provided to students. The duration of the course will be 5 hours. Faculties of Computer Science Department will handle the session. The session will provide more insight towards research paper writing skills and publication of papers by the students.

<b>Course Objectives</b>
1. The major purpose of this course is to provide you with technical knowledge and skills necessary to write and to publish professional papers.
2. Understand research terminology
3. Be aware of the ethical principles of research
<b>Course Outcomes</b>
CO1: To learn and synthesize new concepts in writing a research paper

<u>PO</u>	PO1	PO2	PO3	PO2	PO5	PSO1	PSO2	PSO3	PSO4
CO									
CO1	3	3	3	3	3	3	3	3	2

### Topics:

- Overview of Research
- Overview of Literature Survey: Literature Survey using Web of Science, Literature Survey using Scopus, Writing Up, Tutorial on using BibTeX with LaTeX to add references to a document, Tutorial on using Microsoft Word with Bibliographic Sources, Tutorial on using Microsoft Word with endnote entries
- Data Analysis
- How to make Technical presentation – Technical Writing
- Intellectual property
- Research in Computer Science & Engineering

### Semester 5

**BIT5B08 – Computer Networks**

**No. of sessions: 64**

<b>Course Objectives</b>
To learn about transmissions in Computer Networks.
To learn various Protocols used in Communication.
To have a general idea on Network Administration.
Knowledge in data structure.
Knowledge in Operating System.
<b>Course Outcomes</b>
CO1 To understand about different network terminologies
CO2 To familiarize with different layers of network
CO3 To understand the functions of data link layer and network layer



CO4 To familiarize with the functions of Transport layer

CO5 To understand the concept of network security and Cryptography

PO →	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4
CO ↓									
CO1	1	3	1	3	1	3	1	3	2
CO2	2	2	2	2	2	1	2	1	2
CO3	1	3	1	2	1	0	1	2	3
CO4	3	2	1	3	0	2	3	1	2
CO5	2	3	3	2	2	3	1	3	3

### UNIT I (12T)

Introduction to Computer networks, Topology, categories of networks, Internetwork, Internet, Network Models, Layered model, OSI and TCP/IP models, Physical layer, Switching - Circuit switching, Packet Switching and Message Switching, DTE - DCE Interface, EIA - 232 interface, X.21 modems.

### UNIT II (12T)

Data link layer, Error detection and correction, Types of errors, Single biterror and Burst error, Vertical redundancy check (VRC), longitudinal redundancy Check (LRC), Cyclic Redundancy Check (CRC), Errorcorrection - Single bit error correction, Hamming code Data compression - Huffman code, data link control, Line discipline, Flow control, Error control, Multiple Access, Random Access, ALOHA, pure ALOHA and slotted ALOHA, CSMA/CD and SCMA/CA, Polling, Wired LANs, Ethernet - IEEE standards, Wireless LANs - IEEE - 802.11, Bluetooth

### UNIT III (12T)

Network layer, Networking and Internetworking devices - Repeaters, Bridges, Routers, Gateways, Logical addressing - IPv4 & IPv6 addresses, Network Address Translation(NAT), Internet protocols, internetworking, Datagram, Transition from IPv4 to IPv6, Address Mapping-Error reporting and multicasting - Delivery, Forwarding and Routing algorithms, Distance Vector Routing, Link State Routing, Multicast routing protocols, The Dijkstra Algorithm.

### UNIT IV (12T)

Transport layer, Process-to-process Delivery: UDP, TCP and SCTP, Congestion control and Quality of Service, Application Layer, Domain Name Systems-Remote Login-Email-FTP, WWW, HTTP; Network management: SNMP, Network security, Cryptography

### UNIT V (12T)

Network Administration, IP address - Configuring network host - setting hostname-assigning IP address, configuring the Network Interface card, Setup a LAN with more than two systems, Setting up Internet services File Transfer Protocol (FTP), Trivial File Transfer Protocol (TFTP), Simple Mail Transfer Protocol (SMTP) and Post Office Protocol (POP), Setting up Intranet Services, Network File System (NFS), Network Information Service (NIS) and Dynamic Host Configuration Protocol (DHCP), Samba printing and Web server.

## BIT5B09 – Software Engineering

No. of sessions: 96

<b>Course Objectives</b>
To learn engineering practices in Software development
To learn various software development methodologies and practices
To learn and study various evaluation methods in Software Development
<b>Course Outcomes</b>
CO1 To learn engineering practices in Software Development.
CO2 Select and implement different software development process models.
CO3 Extract and analyse software requirements specifications for different projects.
CO4 Develops some basic level of software architecture/design.
CO5 Define the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.

### CO-PO/PSO Mapping

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	3	2	2	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3
CO3	3	2	2	3	3	3	3	3	3
CO4	3	2	3	3	3	3	3	3	3
CO5	3	2	3	3	3	3	3	3	3

### Unit I

Introduction, Software Engineering Discipline, Evolution and Impact, Programs Vs Software Products, Emergence of Software Engineering, Changes in Software Development Practices, Computer Systems Engineering. Software LifeCycle Models: Use of a Life Cycle Models, Classical Waterfall Model, Iterative Waterfall Model, Prototyping Model, Evolutionary Model, Spiral Model. Software Project Management: Responsibilities of a Software Project Manager, Project Planning, Metrics for Project Size Estimation, Project Estimation Techniques, COCOMO, A Heuristic Estimation Technique, Staff Level Estimation, Scheduling, Organization and Team Structures, Staffing, Risk Management, Software Configuration Management.

### UNIT II (12T)

Requirements Analysis and Specification: Requirements Gathering and Analysis, Software Requirements Specification (SRS), Formal System Development Techniques. Software Design: Characteristics of a Good Software Design, Cohesion and Coupling, Neat Arrangement, Software Design Approaches, Object-Oriented Vs Function, Oriented Design.

### **UNIT III (12T)**

Function-Oriented Software Design: Overview of SA/SD Methodology, Structured Analysis, Data Flow Diagrams(DFDs), Structured Design, Detailed Design, Design Overview. Object Modelling Using UML: verview of Object- Oriented Concepts, UML, UML Diagrams, Use Case Model, Class Diagrams, Interaction Diagrams, Activity Diagrams, State Chart Diagram. Object- Oriented Software Development: Design Patterns, Generalized OOAD Process.

### **UNIT IV (12T)**

User Interface Design: Characteristics of a User Interface, Basic Concepts, Types of User Interfaces, Component-Based GUI Development, User Interface Design Methodology. Coding and Testing: Coding, Code Review, Testing, UNIT Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tools, Integration Testing, System Testing

### **UNIT V (12T)**

Software Reliability and Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000,SEI Capability Maturity Model. Computer Aided Software Engineering: CASE Environment, CASE support in Software Life Cycle, Characteristics of CASETools, Second Generation CASE Tool, Architecture of a CASE Environment. Software Maintenance: Characteristics of Software Maintenance, Software Reverse Engineering ,Software Maintenance,Models,Estimation of Maintenance Cost Software Reuse: Introduction, Issues in any Reuse Program, Reuse Approach, Reuse at Organization Level.

## **BIT5B10 – Java Programming**

**No. of sessions: 96**

<b>Course Objectives</b>
1.To understand the concepts and features of object oriented programming
2.To examine key aspects of java Standard API library such as util, io
3.To provide basics of multithreading, exception handling and database connectivity etc
4 To impart the techniques of creating GUI based applications.
<b>Course Outcomes</b>
CO1:Apply object oriented programming features and concepts for solving given problems.
CO2: Able to use java standard API library to write complex programs .

CO3:Implement object oriented programming concepts
CO4:Implement Exception Handling and database connections in java.
CO5: Use graphical user interface and Event Handling in java

### CO-PO/PSO Mapping

PO →	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4
CO ↓									
CO1	2	2	1	3	1	3	3	3	3
CO2	3	1	1	3	2	3	2	3	1
CO3	2	2	1	2	1	2	3	2	2
CO4	2	3	1	2	3	3	2	2	2
CO5	3	2	1	3	1	3	3	3	3

### UNIT I (6T+12L)

Principles & Concepts of Object Orientation - Basic Principles of Object Orientation Abstraction, Encapsulation, Modularity, Hierarchy, Typing, Concurrency, Persistence), Basic Concepts of Object Orientation (Object, Class, Attribute, Operation, State, Behaviour, Identity, Relationships/Association, Polymorphism, Message Passing), Introduction to Java: History, Versioning, The Java Virtual Machine, Writing a Java Program, Packages, Simple Java Programs. Language Components: Primitive Data Types, Comments, The for Statement, The if Statement,

The while and do... while Statements, the switch statement, the break statements, The continue Statement, Operators - Casts and Conversions, Keywords.

#### UNIT II (6T+12L)

Object-Oriented Programming: Defining New Data Types, Constructors, The String Class, String Literals, documentation, Packages, The StringBuffer Class, Naming Conventions, The Date Class, The import statement, Deprecation, The String Tokenizer Class. Methods: Introduction - Method Signatures, Arguments and Parameters, Passing Objects to Methods, Method Overloading, Static Methods, The Math Class, The System Class, Wrapper Classes Arrays: Processing Arrays, Copying Arrays, Passing Arrays to Methods, Arrays of Objects, The Arrays Class, Command Line Arguments, Multidimensional Arrays. Encapsulation: Constructors, The this Reference, Data Hiding, public and private Members, Access Levels, Static Data Members Inheritance & Polymorphism: Inheritance, extends keyword, Polymorphism, The Object Class, Method Overloading & Overriding. Abstract Classes and Interfaces: Abstract Classes, Abstract Class Example, Extending an Abstract Class, Interfaces.

#### UNIT III (6T+12L)

Exceptions, I/O and Threads Input and Output in Java: The File Class, Standard Streams, Keyboard Input, File I/O Using Byte Streams, Character Streams, File I/O Using Character Streams - Buffered Streams, File I/O Using a Buffered Stream, Keyboard Input Using a Buffered Stream, Writing Text Files. Threads: Threads vs. Processes, Creating Threads by Extending Thread, Creating Threads by Implementing Runnable, Advantages of Using Threads, Daemon Threads, Thread States, Thread Problems, Synchronization. Exceptions: Exception Handling, The Exception Hierarchy, Triggering Exceptions with throws, Suppressing Exceptions with throw, Developing user defined Exception Classes-The finally Block.

#### UNIT IV (6T+12L)

Collections & Database Connectivity Collections: Vectors, Hash tables, Enumerations, Properties, Collection, Framework Hierarchy, Lists, Sets, Maps, The Collections Class. Networking: Networking Fundamentals, The Client/Server Model, Internet Address, URLs, Sockets, Writing Servers, Client/Server Example. Introduction to JDBC: The JDBC Connectivity Model, Database Programming, Connecting to the Database, Creating a SQL Query, Executing SQL Queries, Getting the Results, Updating Database Data, Executing SQL Update/Delete, Error Checking and the SQL Exception Class, The Statement Interface, The ResultSet Interface, Result SetMetaData, Transaction Management.

#### UNIT V (6T+12L)

Applets, Events and GUI Applications: Introduction to GUI Applications - Applets - Types of Applet, Applet Skeleton, Update Method, Html Applet tag and passing parameter to applet. Event Handling: The Delegation Event Model, Event Classes, Event Listener Interfaces, Adapter Classes, Inner Classes. Java Desktop Applications, Introduction to the AWT, Overview of the AWT, Structure of the AWT, The AWT hierarchy, Working with: Color, Button, Canvas, Checkbox, Choice, Frame, Label, List, Scroll bar, TextArea, TextField, Font, FontMetrics, Graphics, Image, Menu Component, MenuBar, MenuItem, Checkbox MenuItem, Menu, Point, Polygon, Rectangle, Layout Manager, Menu Component, Containers, Components, Event handling, Simple Graphics Drawing Lines, Rectangles, etc.

**BIT5B11 – Computer Graphics**  
**sessions: 96**

**No. of**

<b>Course Objectives</b>
1. To learn the basics of computer graphics
2. To learn the applications of Computer graphics in various contexts
3. To equip the students to execute graphics algorithms and solve simple problems
4. To learn the basics of GIMP
<b>Course Outcomes</b>
CO1: Students will be able to learn the basics and applications of computer graphics
CO2: Students will be able to understand line drawing and filling algorithms
CO3: Students will be able to understand various 2D transformations
CO4: Students will be able to understand line and polygon clipping algorithms
CO5: Students will be able to learn the basics of color models and GIMP

### **CO-PO/PSO Mapping**

PO →	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4
CO ↓									
CO1	1	0	1	2	2	1	1	1	1
CO2	3	2	2	1	1	1	2	2	1
CO3	3	2	0	2	2	2	2	2	1
CO4	3	2	2	1	1	1	2	2	1
CO5	3	2	2	3	3	3	3	3	3

#### UNIT I (12T+3L)

Overview of Computer Graphics: Historical background of Computer Graphics; Applications of Computer Graphics; Popular Graphics Software; Display devices: Pixel, Resolution, Aspect Ratio; Raster-Scan Systems and Display : CRT, Refresh Rate and Interlacing; Bit Planes, Colour Depth and Colour Palette, Frame Buffer, Video Controller, Raster-Scan Display Processor, Lookup Table, RGB Colour Model, Colour CRT monitors; Random-Scan Displays; Flat Panel Display: LCD, Plasma Panel; Graphics Monitors and Workstations; Popular Graphics Input Devices; Hard- Copy Devices

#### UNIT II (12T+3L)

Coordinate Representations; Graphics Primitives: Line Drawing Algorithms- DDA Algorithm, Bresenham's Algorithm; Different Line Styles; Circle- Generating Algorithms - Properties of Circles, Circle Drawing using Polar Coordinates, Bresenham's Circle Drawing Algorithm; Ellipse Generating Algorithms; Anti-aliasing;

#### UNIT III (12T+3L)



Geometric Transformations: Scaling, Translation, Rotation; Matrix Representations and Homogeneous Coordinates; Rotation Relative to an Arbitrary Point; Reflection; Shearing; Coordinate Transformation; Inverse Transformation; Affine Transformation; Raster Transformation; Composite Transformations; Fixed-point Scaling; Input Techniques: Pointing, Positioning, Rubber-band method, Dragging;

#### UNIT IV (12T+3L)

Two-Dimensional Viewing: Window-to-Viewport Coordinate Transformation; Zooming; Panning; Clipping: Point Clipping, Line Clipping- Cohen-Sutherland line clipping, Mid-point Subdivision Line Clipping; Polygon Clipping – Sutherland-Hodgeman Polygon Clipping; Text Clipping;

#### UNIT V (12T+3L)

Graphics in Three Dimensions: Displays in Three Dimensions, 3-D Transformations; 3-D Viewing: Viewing Parameters, Projections, Parallel and Perspective projection; Hidden Surfaces-Z-Buffer Method Painter's Algorithm

### NCSACT11-Industrial Interaction-Getting ready for placements

**Description:** The main purpose is to give students an insight into the regular, internal workings of a company. It gives good understanding of the industry and helps in building up useful case studies for improving the quality of future teaching. It provides an ability to identify research programmes of industrial importance.

Course Objectives	
To prepare students for jobs in multinational companies, by exposing them to newer technologies and development methodologies.	
Course Outcomes	
CO1: To learn as to how theatrical concepts are put into action, thereby aiding their practical learning.	
CO2: To enhance interpersonal skills and communication techniques and to become more aware of industry practices and regulations	

PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	3	3	3	3	3	3

CO2	3	2	3	2	3	3	3	3	3
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### NCSACT10- Seminar- How to become an Entrepreneur

**Description:** It supports the students to become an **entrepreneur** to develop their ideas and earn money. It focuses on the basics of **entrepreneurship** or how to start a sustainable company.Helps them to set long term goals and short term goals for their business.

<b>Course Objectives</b>
1. To get basic knowledge about starting and running a company/organization
<b>Course Outcomes</b>
CO1: Set targets /goals themselves for their business to achieve over a period of time
CO2:.To acquire knowledge about financial growth

PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
<b>CO</b>									
<b>CO1</b>	3	2	3	0	3	3	3	3	3
<b>CO2</b>	3	2	3	0	3	3	3	3	3

### NCSA0C3-Add On Course-Introductory Concepts of Digital Computing

90

Description: In semester 5, all the students should enroll for any one of the MOOC COURSE provided by NPTEL. The list of courses will be provided from department. From the list of courses provided, students may choose any one course. The duration of the course will be minimum of 30 hrs.

### Course Objectives

1. Introductory Concepts of Digital Computing, presents the fundamental concepts and techniques used in the designing process of digital computing devices
2. The main focus is to expose learners to the designing of combinational and sequential logic circuits.
3. This course lays a strong foundation to make a big move in the core subjects like Digital Electronics, Computer Organization, Computer Architecture etc and it forms the basics of many of the next level courses

### Course Outcomes

CO1: To enable the learners to acquire basic knowledge about digital logic and digital electronic circuits.

CO2: To understand different number systems and conversions between numbers of different bases .

### PO-CO-PSO Mapping

PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	2	3	3	2

## Course Layout/Syllabus

Week : 1

Mod 1 : Introduction to Digital Computing

Mod 2 : Number Systems : Introduction

Mod 3 : Number Systems : Conversions

Discussion

Assignment 1

Week : 2

Mod 4 : Binary Data Representation

Mod 5 : Binary Arithmetic : Addition and Subtraction

Mod 6 : Binary Arithmetic : Multiplication and Division

Discussion

Assignment 2

Week : 3

Mod 7 : Binary Codes : Part 1

Mod 8 : Binary Codes : Part 2

Mod 9 : Error Correcting and Detecting Codes

Discussion

Assignment 3

Week : 4

Mod 10 : Basic Logic Gates

Mod 11 : Universal Gates

Mod 12 : Boolean Algebra : Part 1

Discussion

Assignment 4

Week : 5

Mod 13 : Boolean Algebra : Part 2

Mod 14 : Simplification of Boolean Expressions

Mod 15 : K-Map : Part 1

Discussion

Assignment 5

Week : 6

Mod 16 : K-Map : Part 2

Mod 17 : Combinational Circuits : Adders - Part 1

Mod 18 : Combinational Circuits : Adders - Part 2

Discussion

Assignment 6

Week : 7

Mod 19 : Combinational Circuits : Subtractors

Mod 20 : Combinational Circuits : Magnitude Comparators

Mod 21 : Combinational Circuits : Encoder

Discussion

Assignment 7

Week : 8

Mod 22 : Combinational Circuits : Decoder

Mod 23 : Combinational Circuits : Multiplexer

Mod 24 : Combinational Circuits : Demultiplexer

Discussion

Assignment 8

Week : 9

Mod 25 : Sequential Circuits : Introduction

Mod 26 : Sequential Circuits : Latches

Mod 27 : Sequential Circuits : Flip flops - Part 1

Discussion

Assignment 9

Week : 10

Mod 28 : Sequential Circuits : Flip flops - Part 2

Mod 29 : Sequential Circuits : Flip flops - Part 3  
Mod 30 : Sequential Circuits : Flip flops - Part 4  
Discussion  
Assignment 10

Week : 11  
Mod 31 : Sequential Circuits : Flip flops - Part 5  
Mod 32 : Sequential Circuits : Registers – Part 1  
Mod 33 : Sequential Circuits : Registers – Part 2  
Discussion  
Assignment 11

Week : 12  
Mod 34 : Sequential Circuits : Counters – Part 1  
Mod 35 : Sequential Circuits : Counters – Part 2  
Mod 36 : Sequential Circuits : Counters – Part 3  
Discussion  
Assignment 12

## **Semester 6**

1. BIT6B13 – Android Programming

**No. of sessions: 80**

Course Objectives
1. Understand the basic concepts of Android programming.

2. Understand the different types of resources in Android.
3. Develop user interface for Android application.
4. Understand the concept of Menu, Fragment and ActionBar in Android.
5. Understand the concept of persisting data in files and SQLite databases.
<b>Course Outcome</b>
1. Explain the basic concepts of Android programming.
2. Identify the different types of resources in Android.
3. Design user interface for Android application.
4. Explain the concept of Menu, Fragment and ActionBar in Android.
5. Develop an application with database connectivity using Android.

### CO-PO/PSO Mapping

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	3	2	1	3	3	3	3	3	3
CO2	3	2	1	3	3	3	3	3	3
CO3	3	2	1	3	3	3	3	3	3

<b>CO4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>
<b>CO5</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>

## Syllabus

### Unit I

Introducing the android computing platform, History of android, android software stack, Developing end user application using Android SDK, Android java packages, Setting up the development environment, Installing android development tools(ADT), Fundamental components, Android virtual devices, Running on real device, Structure of android application, Application life cycle..

### Unit II

Understanding android resources - String resources, Layout resources, Resource reference syntax, Defining own resource IDs - Enumerating key android resources, string arrays, plurals, Colour resources, dimension resources, image resources, Understanding content providers - Android built in providers, exploring databases on emulator, architecture of content providers, structure of android content URIs ,reading data using URIs, using android cursor, working with where clause, inserting updates and deletes, implementing content, Understanding intents basics of intents, available intents, exploring intent composition, Rules for Resolving Intents to Their Components, ACTION PICK, GET CONTENT, pending intents.

### Unit III

User interfaces development in android - building UI completely in code, UI using XML, UI in XML with code, Android's common controls - Text controls, button controls, checkbox control, radio button controls, image view, date and time controls, map view control, understanding adapters, adapter views, list view, gridview, spinner control, gallery control, styles and themes, Understanding layout managers - linear layout manager, table layout manager, relative layout manager, frame layout manager, grid layout manager.

### Unit IV



Android menus - creating menus, working with menu groups, responding to menu items, icon menu, sub menu, context menu, dynamic menus, loading menu through XML, popup menus, Fragments in Android structure of fragment, fragment life cycle, fragment transaction and back stack, fragment manager, saving fragment state, persistence of fragments, communications with fragments, startActivity() and setTargetFragment(), using dialogs in android, dialog fragments, working with toast, Implementing action bar - tabbed navigation action bar activity, implementing base activity classes, tabbed action bar and tabbedlistener, debug text view layout, action bar and menu interaction, list navigation action bar activity, spinner adapter, list listener, list action bar, standard navigation action bar activity, action bar and search view, action bar and fragments.

## Unit V

Persisting data - Files, saving state and preferences - saving application data, creating, saving and retrieving shared preferences, preference framework and preference activity, preference layout in XML, native preference controls, preference fragments, preference activity, persisting the application state, including static files as resources, Working with file system, SQLite - SQLite types, database manipulation using SQLite, SQL and database centric data model for Android, Android database classes.

### References:

1. Satya Komatineni & Dave MacLean, Pro Android 4, Apress.
2. Retomeier, Professional Android 4 Application Development, Wrox.
3. Zigurd Mednieks, Laird Dornin, G. Blake Meike, and Masumi Nakamura, Programming Android, O'Reilly

## BIT6B14 Web Programming

**No. of sessions: 96**

Course Objectives
1. To learn html concept
2. To learn the basics server side programming using Javascript
3. To study PHP language concepts
4. To study database connectivity using PHP and Postgres
Course Outcomes

CO1: To learn the basic concepts of creating web pages using HTML
CO2: write server side scripting programs using java script
CO3: Learn basics of PHP programming language
CO4: Create PHP programs that use various PHP library functions, and that manipulate files and directories.
CO5: Analyze and solve various database tasks using the PHP language.

### CO-PO/PSO Mapping

PO →	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4
CO ↓									
CO1	1	1	0	2	2	3	3	2	3
CO2	2	1	1	3	2	2	2	3	2
CO3	1	2	1	3	1	3	3	3	3
CO4	2	1	1	2	2	2	2	3	3
CO5	3	2	1	2	1	2	3	3	3

### **Unit I [9 T + 9L]**

Introduction web-documents: Static, Dynamic, Active - Web programming: client side and server side scripting. HTML 5: Document Structure, Elements, Attributes, Types of Elements and Attributes, Basic HTML Data types. Using HTML5 form elements: datalist, keygen, output, progress, meter. File uploading using forms -

Frameset and frames. CSS: External CSS, CSS3 Syntax, Selector: Universal, Class, ID. Working with Lists and Tables, CSS ID and Class – Navigation Bar - Image Gallery – Image Opacity.

### **Unit II [9 T + 9L]**

Javascript: Introduction, Client side programming, script tag, comments, variables. Including JavaScript in HTML: head, body, external. Data types. Operators: Arithmetic, Assignment, Relational, Logical. Conditional Statements, Loops, break and continue. Output functions: write, writeln, popup boxes: prompt, alert, confirm. Functions: Built-in Global Functions: alert(), prompt(), confirm(), isNaN(), Number(), parseInt(). User Defined Functions, Calling Functions with Timer, Events Familiarization: onLoad, onClick, onBlur, onSubmit, onChange, Document Object Model (Concept). Objects: String, Array, Date.

### **Unit III [10 T + 10 L]**

PHP: Introduction, Server side programming, Role of Web Server software, Including PHP Script in HTML: head, body, external. Comments, Data types, variables and scope, echo and print. Operators: Arithmetic, Assignment, Relational, Logical. Conditional Statements, Loops, break and continue. User Defined Functions.

### **Unit IV [10 T + 10 L]**

Working with PHP: Passing information between pages, HTTP GET and POST method, Cookie, Session. String functions: strlen, strpos, strstr, strcmp, substr, str\_replace, string case, Array constructs: array(), list() and foreach(). Header().

### **Unit V [10 T + 10 L]**

PHP & PostgreSQL: Features of PostgreSQL, data types, PostgreSQL commands – CREATE DATABASE, CREATE TABLE, DESCRIBE TABLE (\d table\_name or using usinginformation\_schema), SELECT, SELECT INTO, CREATE AS, DELETE, UPDATE, INSERT. PHP - PostgreSQL Integration: Establishing Database Connection (pg\_connect(), pg\_connection\_status(), pg\_dbname()), Getting Error String (pg\_last\_error()), Closing database Connection (pg\_close()), Executing SQL statements (pg\_query(), pg\_execute()), Retrieving Data (pg\_fetch\_row(), pg\_fetch\_array(), pg\_fetch\_all(), pg\_fetch\_assoc(), pg\_fetch\_object(), pg\_num\_rows(), pg\_num\_fields(), pg\_affected\_rows(), pg\_num\_rows(), pg\_free\_result()), Insertion and Deletion of data using PHP, Displaying data from PostgreSQL database in webpage. Introduction to AJAX - Implementation of AJAX in PHP - Simple example for partial page update.

<b>Course Objectives</b>
1.To learn objectives & functions of Operating Systems
2.To understand processes and its life cycle.
3.To learn and understand various Memory and Scheduling Algorithms.

4.To have an overall idea about the latest developments in Operating Systems

<b>Course Outcomes</b>
CO1: Learn the basic concepts of operating systems. and about process management
CO2: Understand and experience the UNIX commands and language constructs in building shell scripts
CO3:Able to compare different process scheduling algorithms and process synchronization
CO4: Learn and apply different memory management techniques
CO5: Explain the basic concepts of mobile operating systems.

### **CO-PO/PSO Mapping**

<b>PO →</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>
<b>CO ↓</b>									
<b>CO1</b>	2	2	0	3	2	3	2	2	3
<b>CO2</b>	3	2	1	3	3	2	3	3	3
<b>CO3</b>	3	2	1	2	3	2	2	3	3

CO4	3	3	0	2	2	3	2	2	2
CO5	2	3	1	3	2	2	2	3	3

#### UNIT I (15T)

What is an OS, Functions, Structure, Types: Batch, Multiprogramming, Timesharing, Real time, Multiprocessor system, Distributed system, OS as Resource manager, Booting process, POST.

#### UNIT II (15T)

Processor Management: Functions, Process, Process states, State transition, PCB, Events related to process, Process scheduling, Scheduling objectives, Scheduling levels, Pre-emptive and non-pre-emptive scheduling algorithms, Concurrent processes, Process synchronization, Mutual exclusion and critical section, Solution to mutual exclusion problem: Software, Hardware & Semaphore Solutions, Classical problems of mutual exclusion, Deadlock: Handling deadlock, Prevention, Avoidance, Detection and Recovery.

#### UNIT III (15T)

Memory Management: Functions, Contiguous: State and Dynamic, Non-contiguous: Segmentation and Paging, Virtual memory, Demand paging, Page replacement policies, Working set principle.

#### UNIT IV (15T)

File Management: Information management: File system, Functions, File directory, File system structure, File system design: Symbolic, Basic, Logical and Physical file system layers, File organization, File allocation, Free space management, File protection and security.

#### UNIT V (15T)

Device Management: Disk scheduling, Disk scheduling policies, Device management: Functions, Techniques for device management: Dedicated, Shared, Virtual, Spooling, Channels and Control unit.

### **BIT6B16 -- Programming Laboratory III - Java & Web Programming**

#### **Programming with JAVA: Lab Exercises**

1. Programs to demonstrate the usage of all primitive data types and operators of Java
2. Programs to demonstrate the usage of control statements in Java
3. Programs to demonstrate the usage of arrays in Java
4. Programs to demonstrate the usage of command line arguments
5. Programs to demonstrate the usage of constructors
6. Programs to demonstrate the usage of call by value and call by reference
7. Programs to demonstrate the usage of 'this' operator. Also use the 'this' keyword as return statement.
8. Programs to demonstrate the usage of static variables, methods and blocks.
9. Programs to demonstrate the reuse class.
10. Programs to demonstrate the usage of method overriding concepts.
11. Programs to demonstrate the usage of 'super' keyword.
  
12. Programs to demonstrate the usage of abstract class.
13. Programs to demonstrate the usage of interface
14. Programs to demonstrate the usage of multiple inheritance
15. Programs to demonstrate the usage of recursion
16. Programs to demonstrate the usage of package
17. Programs to demonstrate the usage of automatic type conversions apply to overriding.
18. Programs to demonstrate the usage of try and catch block.
19. Programs to demonstrate the usage of multiple catch statements
20. Programs to demonstrate the sub class exception precedence over base class
21. Programs to demonstrate the usage of try/catch with finally clause
22. Programs to demonstrate the usage of throws clause
23. Program for creation of user defined exception
24. Program to create a text file and check whether that file exists.
25. Program to rename the given file, after renaming the file delete the renamed file.  
(Accept the file name using command line arguments.)
26. Program to create a directory and check whether the directory is created
27. Program to open one application using process class
28. Program using modifiers
29. Program to illustrate creation of threads using runnable class.
30. Program to get the reference to the current thread by calling `currentThread()` method.

31. Program to create two threads. In this class use one constructor to start the thread and run it. Check whether these two threads are run or not.
32. Create a multithreaded program by creating a subclass of Thread and then creating, initializing, and starting two Thread objects from your class. The threads will execute concurrently and display Java is hot, aromatic, and invigorating to the console window.
33. An applet program to display the "Hello World " in the browser.
34. An Applet program that automatically displays the text with Font Style, Font type
35. An Applet program that automatically displays the text with Font Style,

Font type Using getParameter Method.

36. Program that displays the menu bar and when You click the options it has to display a dialog box stating which option has been clicked.
37. Program that has menu bar and also a quit option and if the user clicks the quit option the applet should quit.
38. Program to create a dialog box and menu
39. Program to create a grid layout control
40. Program to create a border layout control
41. Program to create a padding layout control
42. Program to give the example for button control
43. Program to give the example for panel control.
44. Program that will display check boxes and option buttons they are numbered from 1 to 10. Use a text box to display the number those corresponding boxes or button checked.
45. Program to create a simple calculator
46. Program as above with combo box and list boxes instead
47. Program that displays the x and y position of the cursor movement using Mouse
48. Program to create a canvas
49. Program that displays the x and y position of the cursor movement using Keyboard
50. Program to create a text box control
51. Program to create an analog clock.
52. Program to create a Applet life cycle

Web Programming: Lab Exercises

53. Program to demonstrate different formats of text in XHTML
54. Program to demonstrate Anchor Tag in XHTML
55. Program to demonstrate Tables in XHTML
56. Program to demonstrate Cell Spacing and Cell Padding in a XHTML Table

57. Program to demonstrate different forms of Lists- Ordered, Unordered, Nested and description lists
58. Program to demonstrate Simple Frame using XHTML
59. Program to demonstrate Mixed Frames( combining Horizontal & Vertical frames)
60. Demonstration of Navigation through various frames
61. Program to demonstrate Form Fields
62. Program to demonstrate Character Entities
63. Program to demonstrate Internal Style Sheet
64. Program to demonstrate External CSS
65. Program to demonstrate Inline CSS
66. Program to demonstrate Border Colors using CSS
67. Program to demonstrate Text Alignments using CSS
68. HTML program to give different colours for different heading tags.
69. Using CSS invert the behaviour of the <h1> to <h6> tags.
70. Create a sample code to illustrate the procedure of creating user defined classes in CSS.
71. Demonstration of Simple Java Script program to display Date
72. Program to demonstrate Alert, Confirm and Prompt Message Boxes
73. Program to handle various events using Java Script
74. Program to handle Form Validation using Java Script
  
75. Create a java script program to accept the first, middle, last names of user and print them.
76. Write a java script program to add two number
  
77. Write a java script program to find the factorial of given number.
78. Write a java Script program to print all prime numbers.
79. Write a java script program to sort the array (Bubble Sort).
80. Write a java script program to “Wish a user” at different hours of a day.
81. Prompt a user for the cost price and selling price of an article and output the profit and loss percentage.
82. Create a web page of customer profile for data entry of customer’s in a Hotel. The profile should include Name, Address, Age, gender, Room Type (A/C, Non-A/C or Deluxe), Type of payment (Cash, Credit/Debit Card or Coupons).
83. Create an Online Bio-Data Form for the Current Employees in the organization.
84. Design the simple Calculator.
85. HTML program using FRAMESET Tag to first divide the web page into two columns, and right column bottom row having the main page with text . The left host column with some other images.



86. HTML program using Java script to analyse examination result of a class of 10 students.If no. of students passed in that class in greater than no. of students failed then display the text 'Good Result'.
87. HTML program using Java script to demonstrate (a) Alert Box (b) Prompt dialogue
88. HTML program using Java script to perform comparison between twonumbers entered by user, using relational operators.
89. HTML program using Java script to calculate the product of 3 integers.
90. PHP programs involving various control structures like: if, else, elseif/else if, while, do-while, for, foreach, switch, break, continue,etc
91. PHP programs involving the following: declare, return, require, include, require-once, include\_once and goto.
92. Programs to demonstrate PHP Array functions such as PHP Array Sorting, PHPKey Sorting, PHP Value Sorting, PHP

MultiArray Sorting, PHP Array Random Sorting, PHP Array Reverse Sorting, Array to String Conversion, Implode() function, String to Array, Array Count, Remove Duplicate Values, Array Search, Array Replace, Array Replace Recursive, Array Sub StringSearch

93. PHP programs to demonstrate the following (a) use of regular expression to compare two strings, (b) Extract domain name from URL and (c) Find the number of rows from a mysql database for your query.
94. PHP program to generate a Guestbook which will allow your website visitor to enter some simple data about your website.
95. PHP program for Email Registration
96. PHP program for making application form and performing degree admission on-line.

### **BIT6B18c- Software testing & Quality Assurance**

<b>Course Objectives</b>
1. Introduce basic concepts of software testing
2. Understand white box, block box, functional and non functional testing
3.Know in details automation testing and tools used for automation testing
4.Understand the importance of software quality and assurance software systems development.
<b>Course Outcomes</b>

CO1 - Analyze the different lifecycle models of software development
CO2 - Identify major types testing
CO3 - Enable students to implement the process that should be followed in building an E-commerce presence
CO4 - Helps the students to implement Integration testing and System testing to verify requirements specifications
CO5-Demonstrate the best practices in testing

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	1	3	1	3	3	3	3	3	3
CO2	1	3	0	1	2	3	3	3	3
CO3	1	3	0	1	2	3	3	3	3
CO4	3	2	2	2	3	3	3	3	3
CO5	3	2	2	2	3	3	3	3	3

#### UNIT I (12T)

Phases of Software project - Quality Assurance, Quality control - Testing, Verification and Validation - Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing - Structural Testing Challenges in White-Box Testing.

## UNIT II (12T)

Black-Box Testing: What is Black, Box Testing?, Why Black, Box Testing?, When to do Black, Box Testing?, How to do Black, Box Testing?, Challenges in White Box Testing, Integration Testing: Integration Testing as Type of Testing, Integration Testing as a phase of Testing, Scenario Testing, Defect Bash.

## UNIT III (12T)

System and Acceptance Testing: system Testing Overview, Why System testing is done? Functional versus Non, functional Testing, Functional testing, Non, functional Testing, Acceptance Testing, Summary of Testing Phases.

## UNIT IV (12T)

Performance Testing: Factors governing Performance Testing, Methodology of Performance Testing, tools for Performance Testing, Process for Performance Testing, Challenges.

Regression Testing: What is Regression Testing? Types of Regression Testing, When to do Regression Testing, How to do Regression Testing, Best Practices in Regression Testing.

## UNIT V (12T)

Test Planning, Management, Execution and Reporting: Test Planning, Test Management, Test Process, Test Reporting, Best Practices. Test Metrics and Measurements: Project Metrics, Progress Metrics, Productivity Metrics, Release Metrics.

## 9. Detailed Description of Activities

### NCSACT13 -Industrial visit-visit to an IT Industry

**Description:** The main purpose is to give students an insight into the regular, internal workings of a company. It gives good understanding of the industry and helps in building up useful case studies for improving the quality of future teaching. It provides an ability to identify research programmes of industrial importance.

<b>Course Objectives</b>
To prepare students for jobs in multinational companies, by exposing them to newer technologies and development methodologies.
<b>Course Outcomes</b>
CO1: To learn as to how theatrical concepts are put into action, thereby aiding their practical learning.
CO2: To enhance interpersonal skills and communication techniques and to become more aware of industry

practices and regulations

<u>PO</u>	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO									
CO1	3	2	3	3	3	3	3	3	3
CO2	3	2	3	2	3	3	3	3	3

### NCSACT12-Workshop- Introduction to Manual & Automation testing

**Description:** It aims to find the bugs in the application under test. It is preliminary testing, must be carried out prior to start automating the test cases and also needs to check the feasibility of automation testing. The Test Plan is created & followed by the tester to ensure that the comprehensiveness of testing while executing the test cases manually without using automation testing tool. It is not necessary to have knowledge of any testing tool for manual software testing.

<b>Course Objectives</b>
1. To get basic knowledge to find the bugs in an application by providing testcases
<b>Course Outcomes</b>
<b>CO1: To acquire knowledge manual and automation testing</b>
<b>CO2: To acquire knowledge about testing tools</b>

PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
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<b>CO</b>									
<b>CO1</b>	3	2	3	0	3	3	3	3	3
<b>CO2</b>	3	2	3	0	3	3	3	3	3

### NCSACC5-Additional Certification Course

An additional certification course on “An Introduction to Image processing and Machine Learning” will be provided to students. The duration of the course will be 5 hours. The faculties from the Department of Computer Science will handle sessions.

<b>Course Objectives</b>
To be familiar with processing of the images, recognition of the pattern and their applications.
To introduce Machine Learning and enable students to think more scientifically
<b>Course Outcomes</b>
CO1: Enhance knowledge in understanding and analyzing problems

<b>PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO</b>									
<b>CO1</b>	3	2	3	0	3	3	3	3	3
<b>CO2</b>	3	2	3	0	3	3	3	3	3

## Topics:

1. Introduction to Image Processing
2. Libraries involved for an Image Processing
3. Why do we need Image Processing?
4. Steps in Image Processing
5. Introduction to Machine Learning : Basic definitions, types of learning

## 10. Course Evaluation and CIE

Total marks for each core, elective course is 75 and lab courses shall be 100 marks and Industrial Visit & Project Evaluation cum Programme viva- voce shall be 100 marks and open course shall be 75 marks. The evaluation scheme for each course shall contain two parts (1) Internal evaluation (2) external evaluation. 20% weight shall be given to the internal evaluation. The remaining 80% weight shall be for the external evaluation.

### EXTERNAL EVALUATION

There shall be University examinations for each course at the end of each semester. Practical examinations shall be conducted by the University at the end of second, fourth and sixth semesters. External evaluation of Project, Industrial Visit Report and Programme viva-voce shall be conducted along with the project evaluation at the end of the sixth semester. External evaluation carries 80% of marks, i.e., 60 marks, for each theory course. The model of the question paper for external examination for theory courses of 2Hours duration:

The students can answer all the questions in Sections A and B. But there shall be Ceiling in each section.

**1. Section A:** Short answer type carries 2 marks each - 12 questions (Ceiling - 20)

**2. Section B:** Paragraph/ Problem type carries 5 marks each - 7 questions (Ceiling - 30)

**3. Section C:** Essay type carries 10 marks (1 out of 2)- (Ceiling - 10)

The external examination in theory courses is to be conducted with question papers set by external experts. The evaluation of the answer scripts shall be done by examiners based on a well-defined scheme of valuation and answer keys shall be provided by the University. The external examination in practical courses shall be conducted by two examiners, one internal and an external, appointed by the University. The project evaluation with Programme viva voce will be conducted by two examiners, one internal and an external (appointed by the

University), at the end of the sixth semester. No practical examination will be conducted in the odd semester. Practical examinations for BCA Programme shall be conducted in the even semesters 2, 4 and 6.

The model of the question paper for external examination (lab courses) of 3 Hours duration shall be:

1. **Section A:** One marked question of 30 Marks from Programming Lab Part A is to be attempted (Design Algorithm/Flowchart/Interface: 10 Marks, Code: 10 Marks Result: 10 Marks. Total 30 Marks)
2. **Section B:** One marked question of 30 Marks from Programming Lab Part B is to be attempted (Design Algorithm/Flowchart/Interface: 10 Marks, Code: 10 Marks Result: 10 Marks. Total 30 Marks)
3. **Section C:** Lab viva voce (Total 10 Marks)
4. **Section D:** Lab Record (Total 10 Marks)

**Project guidelines** – Students must be encouraged to do projects in the latest tools or tools appropriate for their topic. Department should conduct a monthly evaluation of the project and give necessary instructions to the students as and when required. Number of students in a project group must be limited to 4. The scheme of evaluation for project cum Programme viva voce shall be

1. Relevance of the Topic, Statement of Objectives (Total 15 Marks )
2. Methodology (Reference/ Bibliography, Presentation, quality of Analysis/Use of Statistical Tools) (Total 15 Marks)
3. Findings and recommendations (Total 20 Marks)
4. Project cum Programme Viva Voce (Total 20 Marks)
5. Report of Industrial visit (Total 10 Marks)

**Audit course:** The students can attain only pass (Grade P) for these courses. At the end of each semester (up to fourth semester) there will be an examination conducted by the college from a pool of questions set by the University. The students can also attain the credits through online courses like SWAYAM, MOOC etc. The College will send the list of passed students to the University at least before the commencement of fifth semester examination.

## EVALUATION AND GRADING

Evaluation (both internal and external) is carried out using Mark system. The Grade on the basis of total internal and external marks will be indicated for each course, for each semester and for the entire programme. Indirect Grading System in 10-point scale is as below:

## Ten Point Indirect Grading System

<b>Percentage of Marks (Both Internal &amp; External put together)</b>	<b>Grade</b>	<b>Interpretation</b>	<b>Grade point Average ( G)</b>	<b>Range of grade points</b>	<b>Class</b>
95 and above	O	Outstanding	10	9.5 -10	First Class with Distinction
85 to below 95	A+	Excellent	9	8.5 -9.49	
75 to below 85	A	Very good	8	7.5 -8.49	
65 to below 75	B+	Good	7	6.5 -7.49	First Class
55 to below 65	B	Satisfactory	6	5.5 -6.49	
45 to below 55	C	Average	5	4.5 -5.49	Second Class
35 to below 45	P	Pass	4	3.5 -4.49	Third Class
Below 35	F	Failure	0	0	Fail
Incomplete	I	Incomplete	0	0	Fail
Absent	Ab	Absent	0	0	Fail