

**Don Bosco College (Co-Ed)**  
**Department of Computer Science**  
**Guezou Nagar, Athanavur, Yelagiri Hills – 635 853.**



**B.SC. (CS) – PROGRAM HANDBOOK**  
**UNDER CBCS**  
**(With effect from 2017-2018)**

## **Overview**

B.Sc. Computer Science is a 3-year undergraduate program which deals with subjects and topics related to computer science and services. Technological implementation of computer systems is the main agenda of the program. The program ranges widely from creating quality professionals and research fellows who are working in every sector of the world today. The B.Sc. (Computer Sc.) program has been designed to cater to the ever changing demands of software technology along with necessary inputs to make them adopt to the needs of recent trends of technology besides it offers basic programming languages such as C, C++ and Java thus students acquire professional and technical skills, which enable them to produce mini projects. It also offers recent tools i.e. Weka, Data modeling tools, VB, Photoshop, Audacity, Xampp and Dreamweaver. These tools help students to design software projects, to develop dynamic webpages locally, learn basics knowledge about mobile computing and networks. Thus a computer science graduate would be able to satisfy the demands such as aptitude and technical skills, leadership skills, teamwork, communication skills of the various IT sectors and Industry and continuously work to sustain and improve their professional competencies to succeed in a competitive professional environment and appreciate business and social environments of information technology development.

## **Vision**

An abode where education and expertise in ICT culminate to achieve integrity and excellence.

## **Mission**

Stimulate the student community with integral development in all dimensions, knowledge and skill set to become employable in the competitive world.

## **Objectives**

1. To offer programmers of study that develops employable youth with integral values for life.
2. To conduct co-curricular, extra-curricular and extension activities for holistic formation of the students.
3. To motivate students to become agents of social transformation.
4. To partner with institutions and execute subject-based projects to develop rural India.
5. To develop economic programmers for the sustainability of the institute.

## **Strategies**

1. Create an ambience of trust so that students feel free to express themselves.
2. Help students to be more communicative.
3. Support students in software application development for better employability.
4. Support slow/fast learners.
5. Prepare students to present papers at national conferences or symposiums.
6. Encourage students to be tech-savvy.
7. Support students to realize their responsibility in the society.

## **REGULATIONS**

### **Programme**

“Programme” means a course of study leading to the award of a degree in a discipline.

### **Course**

“Course” refers to a paper / practical / subject offered under the degree programme. Each Course is to be designed variously under lectures / tutorials / laboratory or field work / seminar / practical training / Assignments / Term paper or Report writing etc., to meet effective teaching and learning needs.

### **Credits**

The weight age given to each course of study (subject) by the experts of the Board of Studies concerned. The total minimum credits, required for completing a UG program is 140.

### **Choice Based**

All Undergraduate Programmers’ offered by Thiruvalluvar University are under Choice Based Credit System. This is to enhance the quality and mobility of the students within and between the Universities in the country and abroad.

### **Eligibility for Admission to the Course:**

Candidate seeking admission to the first year of the UG Degree Course should have passed the Higher Secondary Course Examination (Academic or Vocational) Conducted by the Govt. of Tamil Nadu with Mathematics as a subject or any other Examination accepted as equivalent thereto by the Syndicate subject to such other conditions as may be prescribed.

### **Duration of the Course**

The course shall extend over a period of **three years comprising** of six semesters with two semesters in one academic year. There shall not be less than 90 working days for each semester. Examination shall be conducted at the end of every semester for the respective subjects. Each semester has 90 working days consisting of 5 teaching hours per working day. Thus, each semester has 450 teaching hours and the whole Programme has 2700 teaching hours.

### **Medium of Instruction and Examinations**

The medium of instruction and examinations for the courses of Part I, II & IV-(i) (a) & (i)(b) shall be the language concerned. For part III & remaining Part IV courses other than modern languages, the medium of instruction shall be either Tamil or English and the medium of examinations is English / Tamil irrespective of the medium of instructions.

### **Course of study**

The course of study for the UG degree courses of all branches shall consist of the following:

PART-I	Tamil or any one of the following modern/classical languages i.e. Telugu, Kannada, Malayalam, Hindi, Sanskrit, French, German, Arabic & Urdu.	The subject shall be offered during the <b>first four semesters</b> with one examination at the end of each semester (4 courses: 4x4=16 credits).
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PART-II	English language offered under Part II of the Programme.	The subject shall be offered during the <b>first four semesters</b> with one examination at the end of each semester (4 courses: 4x4= 16 credits)
PART-III	(i) Core subject	Core papers including practical's wherever applicable are offered as prescribed in the scheme of examination, by the Boards of studies of different subjects. There shall be 14 / 15 /16 Core papers including practicals with 57 credits for all UG Courses, except for para-professional courses like B.Com or B.B.A.,. However for B.Com or B.B.A., courses, there shall be 19 Core papers with 73 credits.
	(ii) Allied Subjects	Allied papers including practicals wherever applicable are offered as prescribed in the scheme of Examination by the Boards of Studies of different subjects. There shall be 4 papers, <b>one each</b> in I, II, III and IV semester, for all UG Courses except for Science courses with practical's.
	(iii) Electives Courses	Three elective courses with (3x3=9) credits are to be offered one in the V Semester and two in the VI Semester. Elective subjects are to be selected from the list of electives prescribed by the Board of Studies concerned, as given below. Colleges can choose any one of the papers, given below, as elective for a particular semester whether 5 <sup>th</sup> semester or 6 <sup>th</sup> semester. Elective paper for a particular semester once chosen by a particular college, should not be changed without getting prior permission and approval of the University.

PART -IV	(i) Basic Tamil / Advanced Tamil	Those who have not studied Tamil upto XII std and taken a non-Tamil language under Part-I shall take Tamil comprising of two courses with 2 credits each (2x2=4 credits). The course content of which shall be equivalent to that prescribed for the 6th standard by the Board of Secondary Education and they shall be offered in the <b>third and fourth semesters.</b>
	(OR) Non-Major Elective	<b>Non-major electives</b> comprising of two courses with (2x2=4) credits, in the <b>third and fourth semesters.</b>
	(ii) Skill Based Subjects	All the UG programmes shall offer four courses of <b>skill based subjects one each</b> in III, IV, V & VI semester with 3 credits each (4x3= 12 credits) for which examination shall be conducted at the end of the respective semesters.
	(iii) Foundation Courses:	<p>There are 3 Foundation Courses offered.</p> <p>a) Environmental Studies - offered in 1<sup>st</sup> Semester, under Part IV of the programme.</p> <p>b) Value Education - offered in 2<sup>nd</sup> Semester under Part IV of the programme.</p> <p>c) Soft Skill - offered in 2<sup>nd</sup> Semester under Part IV of the programme.</p> <p>(a) Environmental Studies:</p> <p>All the UG programmers' shall offer a course in Environmental Studies subject and it shall be offered in the <b>first semester as</b> one paper with 2 credits. Examination shall be conducted at the end of the semester 1<sup>st</sup> semester.</p> <p>(b) Value Education:</p>

		<p>All the UG programmers' shall offer a course in "Value Education subject and it shall be offered in the <b>second semester</b> as one paper with 2 credits. Examination shall be conducted at the end of the 2<sup>nd</sup> semester.</p> <p>(c) Soft Skill:</p> <p>All the UG programmers' shall offer a course in "Soft Skill" subject and it shall be offered in the <b>Second Semester by the Department of English</b>, as one paper with 1 credit. Examination shall be conducted at the end of the 2<sup>nd</sup> semester.</p>
PART- V	Extension Activities	<p>Proper relevant records shall be maintained by the respective departments and if necessary it may be verified by the university authority at any time. The extension activities shall be conducted outside the regular working hours of the college. The mark sheet shall carry the gradation relevant to the marks awarded to the candidates. This grading shall be incorporated in the mark sheet to be issued at the end of the semester for which students shall pay fee for one theory paper.</p> <p>The marks shall be sent to the Controller of Examinations before the commencement of the final semester examinations.</p> <p>Marks to be awarded as follows:</p> <ul style="list-style-type: none"> <li>o 20% of marks for Regularity of attendance.</li> <li>o 60% of marks for Active Participation in classes/camps/games/special Camps/programmes in the college/ District / State/ University activities.</li> <li>o 10% of marks for Exemplary awards/Certificates/Prizes.</li> <li>o 10% of marks for Other Social components such as Blood Donations, Fine Arts, etc.</li> </ul>

## PASSING MINIMUM

1. A candidate shall be declared to have passed the whole examination, if the candidate passes in all the theory papers and practical's wherever prescribed as per the scheme of examinations by earning 140 credits in Part I, II, III, IV and V. He / She shall also fulfill the extension activity prescribed by earning 1 credit to qualify for the degree.

2. A candidate should get **not less than 40% in the University (external) Examination**, compulsorily, in any course of Part I, II, III & IV papers. Also the candidate who secures **not less than 40%** marks in the external as well as internal (CIA) examinations put together in any course of Part I, II, III & IV shall be declared to have successfully passed the examination in the subject in theory as well as Practical's.

## DISTRIBUTION

**Table - 1(A):** The following are the distribution of marks for external and internal for University (external) examination and continuous internal assessment and passing minimum marks for **theory papers of UG Programmes.**

UNI. EXAM TOTAL (ESE)	PASSING MINIMUM FOR UNLEXAM	CIA TOTAL	PASSING MINIMUM FOR CIA	TOTAL MARKS ALLOTTED	PASSING MINIMUM (UNLEXAM+CIA)
75	30	25	0	100	40

**Table - 1(B):** The following are the Distribution of marks for Continuous Internal Assessment in the theory papers of UG Programmes.

S.No.	For Theory - UG courses	Distribution of Marks	
		Assignments	Tests
1	Assignment-1 (First 2 Units of the Syllabus)	10	-
2	Test-1 (First 2 Units of the Syllabus for 1 Hour duration)	-	50
3	Assignment-2 (3 <sup>rd</sup> & 4 <sup>th</sup> Units of the Syllabus)	10	
4	Test-2 (First 4 Units of the Syllabus for 2 Hours duration)	-	50
5	Assignment-2 ( 5 <sup>th</sup> Unit of the Syllabus)	10	-
6	Test-3 (Entire Syllabus for 3 Hours duration)	-	100
	TOTAL MARKS	30	200
	Marks to be converted to	5	20
	Total Maximum Marks for CIA	25	



**Table - 2(A):** The following are the distribution of marks for University (external) examinations and continuous internal assessments and passing minimum marks for the practical courses of UG Programmes.

UNI. EXAM TOTAL (ESE)	PASSING MINIMUM FOR UNI.EXAM	CIA TOTAL	PASSING MINIMUM FOR CIA	TOTAL MARKS ALLOTTED	PASSING MINIMUM (UNI.EXAM+CIA)
75	30	25	0	100	40

**Table - 2(B):** The following are the distribution of marks for the Continuous Internal Assessment in UG practical courses.

S.No.	For Practical - UG courses	Distribution of Marks	
		Assignments	Tests
1	Regular maintenance of the Observation note book-1 (Up to the end of I-Semester)	10	-
2	Test-1 (Up to the end of I-Semester for 2 Hours duration)	-	25
3	Regular maintenance of the Observation note book-2 (Up to the end of II-Semester)	10	
4	Test-2 (Up to the end of II-Semester for 2 Hours duration)	-	25
5	Regular maintenance & proper completion of the Record note book	10	-
6	Test-3 (Entire Syllabus following University examination pattern)	-	25
	<b>TOTAL MARKS</b>	<b>30</b>	<b>75</b>
	Marks to be converted to	10	15
	Total Maximum Marks for CIA	25	

### QUESTION PAPER PATTERN

The following question paper patterns shall be followed for CBCS pattern syllabi for the candidates admitted from the academic year 2017-2018 onwards.

External Maximum 75 Marks – wherever applicable (Ext.75 + Int.25 = Total. 100)

Section A	Very short answer questions	10X 2=20	10 questions – 2 from each unit
Section B	Short answer questions of either / or type (like 1a (or) 1b)	5X5=25	5 questions – 1 from each unit
Section C	Essay-type questions / Problem ( Answer any 3 out of 5)	3X10=30	5 questions – 1 from each unit

**NOTE:** In Section “C” one of the questions shall be application oriented or a problem, wherever applicable.

## GRADING

Once the marks of the CIA and end-semester examinations for each of the course are available, they shall be added. The mark thus obtained shall then be converted to the relevant letter grade, grade point as per the details given below:

Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/Paper)

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Distinction
75-79	7.5-7.9	D	
70-74	7.0-7.4	A+	First Class
60-69	6.0-6.9	A	
50-59	5.0-5.9	B	Second Class
40-49	4.0-4.9	C	Third Class
00-39	0.0	U	Re-appear
Absent	0.0	AAA	Absent

## PROGRAM EDUCATION OBJECTIVES (PEO)

**OB1: EDUCATION** The graduate will be able to pursue their higher studies in the field of Computer Science / Applications.

**OB2: TECHNOLOGY** The graduate will be able to understand, analyze and develop software application and attitude to adapt to emerging technological changes

**OB3: RESEARCH** The graduate will be able to work in a research team to provide computing paradigm or solution with innovation.

**OB4: ETHICAL & PROFESSIONAL GROWTH** The graduate will be able to develop skills in articulating one's own value system and live by the values in life and in one's profession.

## PROGRAM LEARNING OUTCOMES (PLO)

- 1. Problem Solving:** Ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve problems related to Technology, Life and Career.
- 2. Individual and Team work:** Ability to Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 3. Communication Skills:** Ability to Communicate effectively on complex activities with the software community and with society at large, such as, being able to

comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

4. **Professionalism:** Understand the professional ethics and apply the same for public and the public interest.
5. **Ethics and equity:** Ability to apply ethics, accountability, and equity in all dealings.
6. **Life-long learning:** Ability to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
7. **Knowledge of Computer systems.** Ability to demonstrate the knowledge of sustainable development of Software, Components, Tools, Computing Systems and Solutions with an understanding of the impact of these solutions on society and environment..
8. **Application of mathematical principles:** Apply mathematical principles to solve real world problems using appropriate data structures and suitable algorithms.
9. **Programming:** Understand, analyze, design and develop *computer programs* using C, C++, Java and upcoming popular technologies.
10. **Software Engineering:** Apply process and life cycle of software engineering to develop software.
11. **Database Design:** Model and design the *database* for any computer system.
12. **Appreciation and Application of Emerging Technologies:** Analyze and appreciate *emerging computing systems* such as mobile, cloud, decision support, data mining, operating system, IoT, Networks, Information Security and related topics.

### MAPPING OF INSTITUTION OBJECTIVES WITH PEOs

COLLEGE / PROGRAMME	EDUCATION	TECHNOLOGY	RESEARCH	ETHICAL AND PROFESSIONAL
OB1 : EDUCATION	√			
OB2 : RESEARCH			√	√
OB3 : EMPLOYABILITY		√		√
OB4 : COMM.SERVICE				√

## MAPPING PEOs WITH POs / PSOs

PEO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
1: EDUCATION	√	√	√			√	√	√	√	√	√	√
2: TECHNOLOGY	√					√	√		√		√	√
3: RESEARCH	√	√		√		√		√			√	√
4: ETHICAL AND PROFESSIONAL		√		√	√	√				√		√

## COURSESTRUCTURE

S.No	Part	Type	Credit	HrS/WK	Paper Code	Title of the Paper	Int	Ext	Total
<b>( SEMESTER - I )</b>									
01	I	LANG	4	6	BLT 10	TAMIL - I	25	75	100
02	II	LANG	4	6	BLE 10	ENGLISH - I	25	75	100
03	III	ALLIED-I	4	7	BAMA15B	FOUNDATAION MATHEMATICS-I	25	75	100
04	III	CORE THOERY	4	6	BCS 11	DIGITAL LOGIC & PROGRAMMING IN C LANGUAGE	25	75	100
05	III	CORE PRACTICAL	4	3	BPCS 13	PROGRAMMING IN C LAB	25	75	100
06	IV	Environ. Studies	2	2	BGA10	ENVIRONMENTAL STUDIES	25	75	100
			22	30			150	450	600
<b>( SEMESTER - II )</b>									
07	I	LANG	4	6	BLT 20	TAMIL - II	25	75	100
08	II	LANG	4	4	BLE 20	ENGLISH - II	25	75	100
09	III	ALLIED-I	6	7	BAMA25B	FOUNDATAION MATHEMATICS-II	25	75	100
10	III	CORE THOERY	6	6	BCS 21	C++ & DATA STUCTURE	25	75	100
11	III	CORE PRACTICAL	2	3	BPCS 23	PROGRAMMING IN C++ LAB	25	75	100
12	IV	SOFT SKILL	1	2	BSS20	SOFT SKILL	25	75	100
13	IV	VALUE EDUCATION	2	2	BGA20	VALUE EDUCATION	25	75	100
			25	30			175	525	700

						<b>( SEMESTER - III )</b>			
14	I	LANG	4	6	BLT30	TAMIL -III	25	75	100
15	II	ENGLISH	4	6	BLE30	ENGLISH-III	25	75	100
16	III	CORE THOERY	3	3	BCS31	JAVA PROGRAMMING	25	75	100
17	III	ALLIED	4	4	BACS32	STATISTICAL METHODS AND THEOR APPLICATIONS- I	25	75	100
18	III	CORE PRACTICAL	3	3	BPCS35	PRACTICAL -III JAVA PROGRAMMING LAB	25	75	100
19	III	ALLIED	0	3		STATISTICS PRACTICAL	0	0	0
20	IV	SKILL BASED	3	3	BSCS33	DESIGN & ANALYSIS DESIGN	25	75	100
21	IV	NON-MAJOR ELECTIVE	2	2	BNCS34	INTRODUCTION TO INFORMATION TECHNOLOGY(NME-I)	25	75	100
			23	30			175	525	700
						<b>( SEMESTER - IV )</b>			
22	I	LANGUAGE	4	6	BLT40	TAMIL -IV / OTHER LANGUAGES	25	75	100
23	II	ENGLISH	4	6	BLE40	ENGLISH-IV	25	75	100
24	III	CORE THEORY	3	3	BCS41	DATABASE MANAGENT SYSTEMS	25	75	100
25	III	CORE PRACTICAL	3	3	BPCS46	RDBMS LAB	25	75	100
26	III	ALLIED-II	4	4	BACS42	STATISTICAL METHODS AND THEIR APPLICATIONS-II	25	75	100
27	IV	SKILL BASED SUBJECT-II	3	3	BSCS43	COMPUTER ORGANISATION AND ARCHITECTURE	25	75	100
28	IV	NON-MAJOR ELECTIVE II	2	2	BNCS44	INTERNET AND ITS APPLICATIONS	25	75	100
29	III	ALLIED PRACTICAL	2	3	BPCS46	PRACTICAL STATISTICS PRACTICAL(ALLIED)	25	75	100
			25	30			200	600	800
						<b>( SEMESTER - V )</b>			
30	III	CORE THEORY	3	6	BCS51	MOBILE APPLICATION DEVELOPMENT	25	75	100
31	III	CORE THEORY	3	6	BCS52	OPERATING SYSTEM	25	75	100
32	III	CORE PRACTICAL	2	4	BCS53	DATA COMMUNICATION & NETWORK	25	75	100

33	III	ELECTIVE-I	3	3	BECS54A	DATA MINING	25	75	100
	III	ELECTIVE-I	3	3	BECS54B	COMPUTER GRAPHICS	25	75	100
	III	ELECTIVE-I	3	3	BECS54C	INFROMATION SECURITY	25	75	100
34	IV	SKILL BASED SUBJECT	3	3	BSCS55	SOFTWARE ENGINEERING	25	75	100
35	III	CORE THEORY	3	4	BPCS56	MOBILE APPLICATION DEVELOPMENT LAB	25	75	100
36	III	CORE PRACTICAL	3	4	BPCS57	OPERATING SYSTEM LAB	25	75	100
			20	30			175	525	700
						<b>( SEMESTER -VI )</b>			
37	III	CORE THEORY	5	7	BCS61	CLOUD COMPUTING	25	75	100
38	III	CORE THEORY	4	6	BCS62	OPEN SOURCE PROGRAMMING	25	75	100
39	III	ELECTIVE-II	3	3	BECS63A	SOFTWARE TESTING	25	75	100
	III	ELECTIVE-II	3	3	BECS63B	MOBILE COMPUTING	25	75	100
	III	ELECTIVE-II	3	3	BECS63C	MICROPROCESSOR AND ITS APPLICATIONS	25	75	100
40	III	ELECTIVE-III	3	3	BECS64A	INTERNET OF THINGS	25	75	100
	III	ELECTIVE-III	3	3	BECS64B	SYSTEM SOFTWARE	25	75	100
	III	ELECTIVE-III	3	3	BECS64C	MULTIMEDIA SYSTEMS	25	75	100
41	III	CORE PRACTICAL	3	4	BPCS66	PRACTICAL-VII ASP.NET LAB	25	75	100
42	III	CORE PRACTICAL	3	4	BPCS67	PRACTICAL-VIII OPEN SOURCE PROGRAMMING LAB	25	75	100
43	IV	SKILL BASED	3	3	BSCS65	ASP.NET	25	75	100
44	V	EXTENSION ACTIVITIES	1	0	BEA60	EXTENSION ACTIVITIES	100	-	100
			25	30			275	525	800

Part	Subject	Papers	Credit	Total credits	Marks	Total Marks
I	Languages	4	4	16	100	400
II	English	4	4	16	100	400
III	Allied (Odd Semester)	2	4	8	100+100 (I + III SEM)	200
	Allied (Even Semester)	2	6+4	10	100+100 (II + IV SEM)	200
	Allied Practical	1	2	2	100	100
	Electives	3	3	9	100	300
	Core	9	(3-6)	35	100	900
	Core Practical	8	(2-3)	22	100	800
IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others/NME	2	2	4	100	200
	Skill Based	4	3	12	100	400
V	Extension	1	1	1	100	100
	Total	43		140		4300

#### NON-MAJOR ELECTIVES (Semesters 3 & 4)

SEM	PART	CODE	TITLE	TYPE	HR S	CREDI T
3	IV	BNBA37	Management Concepts	T	2	2
		BNCP37	Elements of Accountancy	T		
		BNMA34	Basic Mathematics	T		
		BNEN35	Language Skills and Communication I	T		
4	IV	BNCP46	Advertising and Salesmanship	T		
		BNMA44	Foundation Mathematics for Competitive Examination	T		
		BNEN45	Language Skills and Communication II	T		
		BNBA47	Training and Development	T		

## LIST OF ELECTIVE PAPERS

Semester 5 - Paper 1		
A	BECS 54A	Data Mining
B	BECS 54B	Computer Graphics
C	BECS 54C	Information Security
Semester 6 - Paper 2		
A	BECS 63A	Software Testing
B	BECS 63B	Mobile Computing
C	BECS 63C	Microprocessors and its applications
Semester 6 - Paper 3		
A	BECS 64A	Internet of Things
B	BECS 64B	System Software
C	BECS 64C	Multimedia Systems

## MAPPING COURSE OUTCOMES WITH POs / PSOs

SEM	COURSE CODE	COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	BLT 10	TAMIL I	√	√	√	√	√	√						
	BLE 10	ENGLISH I	√	√	√	√	√	√						
	BCS 11	DIGITAL LOGIC AND C PROGRAMMING	√	√	√	√	√	√	√	√	√		√	√
	BES 10	ENVIRONMENTAL STUDIES	√	√	√	√	√	√						
	BAMA 15B	MATHEMATICS FOUNDATION I	√	√	√	√	√	√		√	√			√
	BPCS 13	C PROGRAMMING LAB	√	√	√	√	√	√	√	√	√		√	√
2	BLT 20	TAMIL II	√	√	√	√	√	√						
	BLE 20	ENGLISH II	√	√	√	√	√	√						



	BCS 21	C++ AND DATA STRUCTURES	√	√	√	√	√	√	√	√	√	√	√	√
	BAMA 25B	MATHEMATICS FOUNDATION II	√	√	√	√	√	√		√	√			√
	BSS 20	SOFT SKILLS	√	√	√	√	√	√						
	BGA 20	VALUE EDUCATION	√	√	√	√	√	√						
	BPCS 23	C++ AND DATA STRUCTURES LAB	√	√	√	√	√	√	√	√	√	√	√	√
3	BLT 30	TAMIL III	√	√	√	√	√	√						
	BLE 30	ENGLISH III	√	√	√	√	√	√						
	BCS 31	JAVA PROGRAMMING	√	√	√	√	√	√	√	√	√	√	√	√
	BACS 32	STATICS AND ITS APPLICATION-I	√	√	√	√	√	√					√	√
	BSCS 33	DESIGN AND ANALYSIS OF ALGORITHMS	√	√	√	√	√	√		√	√		√	√
	BNBA 37	Management Concepts	√	√	√	√	√	√						
	BPCS 36	JAVA LAB	√	√	√	√	√	√	√	√	√	√	√	√
4	BLT 40	TAMIL IV	√	√	√	√	√	√						
	BLE 40	ENGLISH IV	√	√	√	√	√	√						
	BCS 41	DATABASE MANAGEMENT SYSTEM	√	√	√	√	√	√			√	√	√	√
	BSCS 42	STATICS AND ITS APPLICATION-II	√	√	√	√	√	√					√	√
	BSCS 43	COMPUTER ORGANIZATION AND ARCHITECTURE	√	√	√	√	√	√	√	√	√	√	√	√
	BNBA 47	TRAINING AND DEVELOPMENT	√	√	√	√	√	√						
	BPCS 46	RDBMS LAB	√	√	√	√	√	√	√	√	√	√	√	√
5	BCS 51	MOBILE APPLICATION AND DEVELOPMENT	√	√	√	√	√	√				√	√	√
	BCS 52	OPERATING SYSTEM	√	√	√	√	√	√	√	√	√	√	√	√
	BCS 53	DATA COMMUNICATION AND NETWORKING	√	√	√	√	√	√	√	√				√
	BECS 54A	DATA MINING	√	√	√	√	√	√	√	√	√	√	√	√

	BECS 54B	COMPUTER GRAPHICS	√	√	√	√	√	√	√	√	√	√	√	√
	BECS 54C	INFORMATION SECURITY	√	√	√	√	√	√	√	√	√	√	√	√
	BSCS 55	SOFTWARE ENGINEERING	√	√	√	√	√	√	√	√	√	√	√	√
	BPCS 56	MOBILE APPLICATION DEVELOPMENT LAB	√	√	√	√	√	√	√	√	√	√	√	√
	BPCS 57	OPERATING SYSTEM LAB	√	√	√	√	√	√	√	√	√	√	√	√
6	BCS 61	CLOUD COMPUTING	√	√	√	√	√	√	√	√	√	√	√	√
	BCS 62	OPEN SOURCE PROGRAMMING	√	√	√	√	√	√				√	√	√
	BECS 63A	SOFTWARE TESTING	√	√	√	√	√	√		√		√	√	√
	BECS 63B	MOBILE COMPUTING	√	√	√	√	√	√	√	√	√	√	√	√
	BECS 63C	MICROPROCESSOR	√	√	√	√	√	√	√					√
	BECS 64A	INTERNET OF THINGS	√	√	√	√	√	√	√			√	√	√
	BECS 64B	SYSTEM SOFTWARE	√	√	√	√	√	√	√			√	√	√
	BECS 64C	MULTIMEDIA SYSTEMS	√	√	√	√	√	√	√			√	√	√
	BSCS 65	ASP.NET	√	√	√	√	√	√		√	√	√	√	√
	BPCS 66	OPEN SOURCE PROGRAMMING LAB	√	√	√	√	√	√	√	√	√	√	√	√
	BPCS 67	ASP.NET LAB	√	√	√	√	√	√		√	√	√	√	√
BEA 60	EXTENSION ACTIVITIES	√	√	√	√	√	√							

THIRUVALLUVAR UNIVERSITY  
B.Sc., Computer Science Syllabus

(With effect from 2017 - 2018)

SEM I	LANGUAGE	Lecture	Practical	Credit
BLT10	TAMIL - I	6	0	4

**நோக்கம்** தமிழின் புதுக்கவிதைகள் உள்ளடக்கிய படைப்பிலக்கியங்களை இப்பாடம் அறிமுகம் செய்கிறது. தமிழ் இலக்கியத்தில் தோதெடுக்கப்பட்ட மிக முக்கியமான செய்யுட்கள், கவிதைகள், கதைகள். உரைநடைஆகியவற்றைக்கொண்டு இப்பாடம் கட்டமைக்கப்பட்டுள்ளது. மாணாக்கரின் இலக்கியத் தேடலை உருவாக்குவதும், தற்சார்புடைய அறிவைமேம்படுத்துவதும் இப்பாடத்தின் நோக்கமாகும்.

#### சிறப்புநோக்கம்

ஊழ01: மரபு வழியான கவிதை போக்கும் புதுவகையிலான நோக்கும் கலந்த இச்சூழல் கவிதை இலக்கியத்திற்கு ஒரு திருப்பு முனையாக அமைந்தது, அதைக் கொண்டுதங்களின் கற்பனைத் திறத்துடன் படைபாற்றலை வளர்த்துக்கொள்கிறார்கள்.

ஊழ02: மாணவர்கள் எளிதில் நேரே பொருளை உணர்ந்துக் கொள்ளுதல் இதன் மூலம் மாணவர்கள் எளிமையாக படிக்கும் ஆற்றலை வளர்த்துக் கொள்கிறார்கள்.

ஊழ03: மாணவர்கள் நாடகம் படிப்பதின் வாயிலாக தங்களின் தனித் திறமை வெளிப்படுத்துவதற்கு ஏதுவாக நாடகத்தினை எழுதிநடிக்கவும் செய்கிறார்கள்.

ஊழ04: மாணவர்கள் சிறுகதையை படிப்பதின் வாயிலாக தங்களின் தனித் திறனையை வெளிப்படுத்துவதற்கு ஏதுவாக சிறுகதை எழுதும் ஆற்றலை பெறுகிறார்கள்.

அலகு 1. பாரதி, பாரதிதாசன், கவிமணி, கண்ணதாசன், அறிவுமதி, வைரமுத்து, மு.மேத்தா செ. அன்னகாமு அப்துல் ரகுமான் கவிதைகள் மாணவர்களிடையே கவிதை படிக்கும் ஆர்வமும், கவிதை எழுதும் திறனையும் வளர்த்ததின் மூலம் அவர்கள் கவிதை படைக்கும் ஆற்றலை வெளிப்படுத்துகிறார்கள்.

சிறப்பு நோக்கம் மரபு வழியான கவிதை போக்கும் புது வகையிலான நோக்கும் கலந்த இச்சூழல் கவிதை இலக்கியத்திற்கு ஒரு திருப்பு முனையாக அமைந்தது, அதைக் கொண்டு தங்களின் கற்பனைத் திறத்துடன் படைபாற்றலை வளர்த்துக் கொள்கிறார்கள்.

அலகு 2. உள்ளூர் கனவாக வெளிப்படுகிறது— எம்.எஸ். ஊதயமூர்த்தி, வீழ்ந்த ஆலமரம், -கல்கி, ஏழாவது அறிவு— வெ. இறையன்பு மாணவர்களுக்கு கருத்துக்களை எளிதில் சொல்லுவதற்கேற்ற எழுத்துவடிவமே உரைநடையாகும்.

#### சிறப்புநோக்கம்

மாணவர்கள் எளிதில் நேரே பொருளை உணர்ந்துக் கொள்ளுதல் இதன் மூலம் மாணவர்கள் எளிமையாக படிக்கும் ஆற்றலை வளர்த்துக்கொள்கிறார்கள்.

அலகு 3. நாடகம் மாங்கல்யப்பிச்சைடி.என். சுகி, சுப்பிரமணியம், சாபம் விமோசனம், -மு. இராமசாமி மனதின் வெளிப்பாடு இயல் ஆகவும் மொழியின் இனிமை இசையாகவும் மெய்யின் அழகிய செயற்பாடு நாடகமாகவும் மலரும் காண்போரை பெரிதும் கவர்வது நாடக கலை என்பதை மாணவர்கள் உணர்த்துகிறார்கள் சிறப்புநோக்கம் மாணவர்கள் நாடகம் படிப்பதின் வாயிலாக தங்களின் தனித்திறமை வெளிப்படுத்துவதற்கு ஏதுவாக நாடகத்தினை எழுதிநடிக்கவும் செய்கிறார்கள்.

அலகு 4. சிறுகதைவளையாத பனைகள் - இரா. நந்தகோபால், ஒரு சிறு இசை— வண்ணதாசன் மனிதனுடைய வாழ்வின் சிறுபகுதியை கருவாகக் கொண்டு தங்களின் கற்பனைத் திறனுடன் சிறுகதை எழுத பழகிக்கொள்கிறார்கள்.

#### சிறப்புநோக்கம்

மாணவர்கள் சிறுகதையை படிப்பதின் வாயிலாக தங்களின் தனித்திறனையை வெளிப்படுத்துவதற்கு ஏதுவாக சிறுகதை எழுதும் ஆற்றலை பெறுகிறார்கள்.

அலகு 5. மொழித்திறன் அகரவரிசைப்படுத்தல், ண-ன-ந, ல-ள-ழ, ர-ற வேறுபாடு அறிதல், தன் விவரக் குறிப்புதயாரித்தல், கலைச் சொல்லாக்கம், ஒற்றுப்பிழை, தொடர்பிழை, நீக்கி எழுதுதல்.

மொழித்திறனின் மூலம் மாணவர்கள் அகரவரிசையில் எழுதவும் பிழையில்லாமல் எழுதவும் சொற்களுக்கு பொருள்களை உணரவும் மொழித்திறன் பயிற்சி உதவுகிறது.

SEM I	GENERAL ENGLISH	Lecture	Practical	Credit
BLE 10	ENGLISH I	6	0	4

### **LEARNING OBJECTIVES**

1. To write, read, and understand any text.
2. To understand English better and to attain competency in both written and spoken skills.

### **LEARNING OUTCOMES**

1. Learn new words and their meanings within the context of literary texts.
2. Understand the basic elements of poetry.
3. Learn about the storytelling skills.
4. Identify the elements of a One-Act Play.
5. Learn to form new words, antonyms and synonyms using prefixes and suffixes, to make new dialogues, letters (formal & informal) and to write short paragraphs.

### **UNIT -1: PROSE**

1. My greatest Olympic Prize - Jesse Owens
2. The Tree Speaks – Rajagopalachari
3. Snake in the Garden – R.K.Narayan
4. Futurology - Aldous Huxley

### **UNIT - 2: POETRY**

1. The River – Parthasarathy
2. Ode to Nightingale – John Keats
3. “O Captain, My Captain” Walt Whitman
4. Paper Boat – Rabindranath Tagore

### **UNIT- 3: SHORT STORY AND ONE ACT PLAY**

1. A Day’s Wait – Ernest Miller Hemingway
2. Little Girls Wiser Than Men – Tolstoy
3. One act play
3. The Bishop’s Candlesticks – Norman MacKinnel

### **UNIT - 4: GRAMMAR AND COMPOSITION**

1. Correct usage of Words
2. Vocabulary – Synonyms & Antonyms
3. Abbreviations
4. English for Excellence – Parts of Speech -Modern Avenue
5. Functional English: Creative Writing – College Grammar Letter of Application

### **UNIT - 5: COMMUNICATION SKILLS**

1. Listening Conversation – (i) Agreeing and Disagreeing. (ii) Seeking and giving permission (iii) Greetings (iv) Introducing Oneself to other

REFERENCES-- NIL

SEM I	CORE THEORY	Lecture	Practical	Credit
BCS 11	DIGITAL LOGIC AND C PROGRAMMING	6	0	4

### LEARNING OBJECTIVES

Provide basic knowledge on Digital Electronics to understand the working principles of Digital computer and to develop programming skill using C language.

#### The students will be able to

CO01: Represent and convert numbers from one format to another and perform subtraction using complements

CO02: Simplify circuits using Boolean laws and Karnaugh Map

CO03: Design logical circuits such as adders, subtractor, counter, register etc. and explain their working

CO04: Design an algorithmic solution for a given problem using C language

CO05: Develop a solution for any digital problem using functions.

CO06: Write C programs using the concepts of solve problems arrays, structures, unions, files and pointers.

### SYLLABUS

UNIT - I: Number systems and Boolean algebra

**Number Systems** - Decimal, Binary, Octal, Hexadecimal and their inter conversions, - Binary Arithmetic -1's complement, 2's complement and 9's complement .Binary codes - BCD, Excess-3, Graycode. **Boolean Algebra:** Boolean Laws - Simplification of Boolean Functions - Logic gates and Truth Table – Universal Gates (NAND and NOR ) - The K-map method up to five variables, don't care conditions, POS & SOP forms.

UNIT-II: Combinational and Sequential Circuits

**Combinational Logic:** Half/Full adder/subtractor, code conversion, Multiplexers, de multiplexers, encoders, decoders, Combinational design using MUX & DEMUX. BCD adder, magnitude comparator. **Sequential logic:** Flip flops (RS, Clocked RS, D, JK, JK Master Slave)-Counters & types Synchronous and Asynchronous counters- Registers, Shift registers and their types.

UNIT –III: C Basics and Control constructs

C fundamentals- Operators- Constants- Expression – Library functions- Decision making and branching- Switch- FOR,WHILE, DO WHILE loops-continue-break

Unit IV: Arrays, Functions and Structures

Arrays-Multi dimensional arrays- User defines functions- Call by Value and reference- Recursion- Storage classes- Structures and Union –Self referential structures

Unit – V: Pointers and Files

Pointers- Pointer operations and Arithmetic- File management in C : File opening and closing - I/O operations on files - Error handling during I/O operations - Random access to files - Command line arguments.

Text Book:

Morris Mono M. “**Digital Logic and Computer Design**”, PHI Latest Pub. Ed. (Unit I and 2 )  
 ReemaThareja,” **Programming in C** “ Oxford University Press 2014

SEM I	ALLIED I	Lecture	Practical	Credit
BAMA15B	MATHEMATICS FOUNDATION I	6	0	4

### LEARNING OBJECTIVES

To acquire knowledge on the basic concepts of Logical operators, set theory and Set operation, Relations and Functions, Binary operation, Binary algebra, Permutations and Combinations, Differentiation, Straight lines, Pair of Straight lines in the field of Computer application.

#### The students will be able to

C001: Explain the fundamental concepts from the Logical operators.

C002: Appreciate the validity of arguments (Proposition).

C003: Demonstrate accurate and efficient use of set theoretical techniques.

C004: Determine the Relations and Functions.

C005: Interpret the concepts of the Binary Operations and Boolean algebra.

C006: Solve problem in permutations combinations.

C007: Analyze problems in Differentiation.

C008: Distinguish Straight-line equation from angle, point and slope.

### SYLLABUS

#### UNIT-I: SYMBOLIC LOGIC

Proposition, Logical operators, conjunction, disjunction, negation, conditional and bi-conditional operators, converse, Inverse, ContraPositive, logically equivalent, tautology and contradiction. Arguments and validity of arguments.

#### UNIT-II: SET THEORY

Sets, set operations, venn diagram, Properties of sets, number of elements in a set, Cartesian product, relations & functions, Relations: Equivalence relation. Equivalence class, Partially and Totally Ordered sets, Functions: Types of Functions, Composition of Functions.

#### UNIT-III: BINARY OPERATIONS

Types of Binary Operations: Commutative, Associative, Distributive and identity, Boolean algebra: simple properties. Permutations and Combinations.

#### UNIT-IV: DIFFERENTIATION

Simple problems using standard limits,

					$(1+1/n)^n$ , Lt $(1+n)$
Lt	$x^n - a^n$ , lt	$\sin x$ , lt	$\tan x$ lt	$e^x - 1$ , lt	$1/n$
X	$x - a$ x	x x	x x 0 x n		

Differentiation, successive differentiation, Leibnitz theorem, partial differentiation,

Applications of differentiation, Tangent and normal, angle between two curves.

#### UNIT-V: TWO-DIMENSIONAL ANALYTICAL GEOMETRY

Straight Lines - Pair Straight Lines

#### REFERENCES

P.R. Vittal, Mathematical Foundations – Maragham Publication, Chennai.

U. Rizwan, Mathematical Foundation - SciTech, Chennai

V.Sundaram& Others, Discrete Mathematical Foundation - A.P.Publication, sirkali.

P.Duraipandian& Others, Analytical Geometry 2 Dimension - Emerald publication 1992.

SEM I	CORE PRACTICAL	Lecture	Practical	Credit
BPCS 13	C PROGRAMMING LAB	0	3	3

#### LEARNING OBJECTIVES

##### **The students will be able to**

CO01: Demonstrate the features of Linux Environment and create, compile, run C programs using the same

CO02: Analyze the given problem, write algorithm and convert into flow chart

CO03: Write simple programs using basic concepts in C

CO04: Develop C programs using functions, arrays, structures, file etc.,

#### CORE PRACTICAL – I PROGRAMMING IN C - LAB

1. Summation of Series: Sin(x) (Compare with built in functions)
2. Summation of Series Cos(x) (Compare with built in functions)
3. Counting the no. of vowels, consonants, words, white spaces in a line of text
4. Reverse a string & check for palindrome without built in string function
5.  ${}^n P_r$ ,  ${}^n C_r$  in a single program using function
6. Matrix Addison, subtraction and multiplication
7. Linear Search of a number in an array
8. Sorting an array in ascending and descending order
9. Finding maximum and minimum of list of numbers
10. Call by value and call by reference of functions
11. Employee pay bill using structure
12. Preparing an EB bill using file



SEM I	ENVIRONMENTAL STUDIES	Lecture	Practical	Credit
BES10	ENVIRONMENTAL STUDIES	2	0	2

#### LEARNING OBJECTIVES

##### **The students will be able to**

CO01: Explain the various natural resources and the impact of man-made fertilizers on the environment.

CO02: Describe the Ecosystem, Biodiversity and its Conservation.

CO03: Explain the Environmental Pollution and Management

CO04: Analyze the Social Issues concerning Human Population such as Environmental ethics, health and the role of IT on the environment and human health

CO05: Visit and study a simple local ecosystem and prepare a FIELD WORK Report.

#### SYLLABUS

##### UNIT-I: INTRODUCTION TO ENVIRONMENTAL SCIENCES: NATURAL RESOURCES

Environmental Sciences - Relevance - Significance - Public awareness – Forest resources - Water resources - Mineral resources - Food resources – conflicts over resource sharing - Exploitation - Land use pattern - Environmental impact - fertilizer - Pesticide Problems - case studies.

##### UNIT-II: ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION

Ecosystem - concept - structure and function - producers, consumers and decomposers - Food chain - Food web - Ecological pyramids - Energy flow - Forest, Grassland, desert and aquatic ecosystem. **Biodiversity** - Definition - genetic, species and ecosystem diversity - Values and uses of biodiversity - biodiversity at global, national (India) and local levels - Hotspots, threats to biodiversity - conservation of biodiversity - Insitu&Exsitu.

##### UNIT-III: ENVIRONMENTAL POLLUTION AND MANAGEMENT

Environmental Pollution - Causes - Effects and control measures of Air, Water, Marine, soil, solid waste, Thermal, Nuclear pollution and Disaster Management - Floods, Earthquake, Cyclone and Landslides. Role of individuals in prevention of pollution - pollution case studies.

##### UNIT-IV: SOCIAL ISSUES - HUMAN POPULATION

Urban issues - Energy - water conservation - Environmental Ethics – Global warming - Resettlement and Rehabilitation issues - Environmental legislations - Environmental

Production Act. 1986 - Air, Water, Wildlife and forest conservation Act - Population growth and Explosion - Human rights and Value Education - Environmental Health - HIV/AIDS - Role of IT in Environment and Human Health - Women and child welfare - Public awareness – Case studies.

#### UNIT-V: FIELD WORK

Visit to a local area / local polluted site / local simple ecosystem – Report submission

#### REFERENCES

Kumarasamy, K., A.Alagappa Moses AndM.Vasanthy, 2004. Environmental Studies, Bharathidsan University Pub, 1, Trichy

Rajamannar, 2004, Environemntal Studies, Evr College Pub, Trichy

Kalavathy,S. (Ed.) 2004, Environmental Studies, Bishop Heber College Pub., Trichy.

SEM II	LANGUAGE	Lecture	Practical	Credit
BLT20	TAMIL II	6	0	4

Nehf;fk;

khzth;fs; tho;f;ifapy; mwnewpAld; tho;tjw;Fk; kdijxUKfgLj;Jtjw;Fk; gf;jp ,yf;fpaq;fSk; rpw;wpyf;fpaq;fSk; khzth;fSf;Fgad;gLfpwJ. gf;jp ,yf;fpaj;jpd; thapyhfGuhzq;fspd; Kf;fpaj;Jtj;ijAk; nja;tq;fspd; ngUikfisAk; khzth;fs; mwpe;Jf;nfhs;fpwhh;fs;. flTsh;fisAk; murh;fisAk; Nguhpyf;fpaq;fs; Ngrpafhyq;fspy; rpw;wpyf;fpaq;fs; vspakf;fspd; tho;f;ifKiwiagw;wpNgRfpwJvd;gijkhzth;fs; mwpe;Jf;nfhs;fpwhh;fs;.

#### **The students will be able to**

CO01: khzth;fs; ehad;kh;fs;>rpj;jh;fspd; tho;f;iftuyhw;iwAk; mth;fs; ghbaghly;fisAk; mwpe;Jf;nfhs;fpwhh;fs;.

CO02: khzth;fs; Mo;th;fspd; tho;f;ifKiwiaAk; jpUkhypd; ngUikfisAk; mwpe;Jf;nfhs;fpwhh;fs;.

CO03: khzth;fs; J}J>cyh>NfhitMfparpw;wpyf;fpatiffismwpe;Jf;nfhs;fpwhh;fs;.

CO04: khzth;fs; rkak; Fwpj;jk; fpwpj;Jtk;> ,J;yhkpak; Mfparka E}yfs; \$Wk; tuyhw;Wr; nra;jpfismwpe;Jf;nfhs;fpwhh;fs;.

CO05: khzth;fs; nghJf;fl;LiuvOjJTk;>gy; Jiwapy; Njh;r;rng;ngw;wMSikfisNeh;fhzy; nra;jy; vg;gbvd;gjidnjhpe;Jf;nfhs;fpwhh;fs;.

myF. 1 - m. jpUQhdrk;ge;jh; - Njthuk;>jpUtPopkpoi-y-khzpf;fthrfh; - jpUthrfk;>jpU%yh; - jpUke;jpuk;khzth;fs; jkpo; ,yf;fpaj;jpy; mbahh;fspd; jkpo;g;gw;iwAk; irtj;jpUKiwfs; gd;dpnuz;LFwpj;Jk; mwpe;Jf;nfhs;fpwhh;fs;rpwg;GNehf;fk;khzth;fs; ehad;kh;fs;>rpj;jh;fspd; tho;f;iftuyhw;iwAk; mth;fs; ghbaghly;fisAk; mwpe;Jf;nfhs;fpwhh;fs;.

myF. 2Mz;lhs; - jpUg;ghit-njh;lubg; nghbaho;thh; - jpUg;gs;spnaOr;rp>FyNrfuho;thh; - ngUkhs; jpUnkhopehyhapujpt;agpuge;jj;jpy; Mo;thh;fspd; tho;f;iftuyhw;iwnjhpe;Jf;nfhs;tJld; tho;f;ifapy; gpd;gw;wTk; nra;thh;fs;rpwg;GNehf;fk;khzth;fs; Mo;th;fspd; tho;f;ifKiwiaAk; jpUkhypd; ngUikfisAk; mwpe;Jf;nfhs;fpwhh;fs;.

myF.3 jkpo;tpL]] - 69>90 fz;zpfs;>jpUf;fapyhaQhdscy- 1>10 fz;zpfs; tiu>jQ;irthzd; Nfhit-  
1>5 ghly;fs; tiurq;f ,yf;fpaq;fspd; jdpq;ghly;fshftUfpd;wrpw;wpyf;fpaq;fiskhzth;fs;  
gpioapd;wpvOjTk; gbf;fTk; nra;thh;fs;.rpwg;GNehf;fk;khzth;fs;  
]]>cyh>NfhitMfparpw;wpyf;fpatiffismwpe;Jf;nfhs;fpwhh;fs;

myF.4,uhkypq;fmbfs; - jpUtUl;gh>vr;.V. fpU\;zg;gps;is - ,ul;rz;aahj;jphpfk;>Fzq;Fb  
k];jhd;rhfpG- k];jhd; rhfpGghly;fs;>Kj;njhs;shapuk; - 9>ghly;fs; kl;Lk;.khzth;fs; rka  
,yf;fpaq;fs; Fwpj;Jmwpe;Jf;nfhs;tJld; mjd; fijahly;fisnrhy;yTk; vOjTk; gofpf;nfhs;fpwhh;fs;.   
rpwg;GNehf;fk;  
khzth;fs; rkak; Fwpj;jk; fpwpj;Jtk;> ,];yhkpak; Mfarka E}yfspy; \$Wk; tuyhw;Wr;  
nra;jpfismwpe;Jf;nfhs;fpwhh;fs;.

myF..5 Neh;fhzy;>ngHf;fl;Liufs;>khzth;fs; fbjk; vOjTk; Neh;fhziyg; gw;wpAk;  
njhpe;Jf;nfhs;Sjy;.

SEM II	GENERAL ENGLISH	Lecture	Practical	Credit
BLE 20	ENGLISH II	4	0	2

### LEARNING OBJECTIVES

The students will be able to

CO01: Identify the characteristics of prose through intensive reading of various texts

CO02: Analyze and interpret the poetical devices and critique the themes intended in the poems.

CO03: Identify the elements of short story and One-Act play

CO04: Apply the basic sentence structures and other grammatical elements in writing

CO05: Demonstrate basic communication skills required for professional scenario.

### SYLLABUS

#### UNIT - 1 PROSE

1. Ant and Grasshopper - Somerset Maugham 2. Early Influences - A.P.J. Abdul Kalam 3. Forgetting – Robert Lynd 4. The Unity of Indian Culture – HumayunKabir

#### UNIT - 2 POETRY

1. The Soul's Prayer.-Sarojini Naidu 2. The Lotus - Toru Dutt 3. Nutting – William Wordsworth 4. Ozymandias - P.B.Shelley

#### UNIT - 3 SHORT STORY AND ONE ACT PLAY

4. The Doll's House - Katherine Mansfield 5. Karma - Kushwant Singh One Act Play 6. Hijack -Charles Wills

#### UNIT - 4 Vocabulary 6. Functional Grammar 7. Functional English

#### UNIT - 5 COMMUNICATION SKILLS

8. Making Request 9. Offering Help 10. Inviting Someone 11. Asking Permission

REFERENCES-- NIL

SEM II	CORE THEORY	Lecture	Practical	Credit
BCS 21	C++ AND DATA STRUCTURES	6	0	6

### LEARNING OBJECTIVES

To develop Object oriented programming skills using C++ and to introduce data structure concepts

#### **The students will be able to**

CO01: Develop simple programs using C++.

CO02: Analyze a given problem, identify its members and methods and convert the same to a class diagram.

CO03: Apply OOP concepts for real world problems and develop solutions using C++ language.

CO04: Apply appropriate data structures for solving specific problems.

CO05: Design and develop C++ programs for any data structures to perform basic operations.

### SYLLABUS

#### UNIT-I: Object Oriented Concepts and C++

C++ Fundamentals - Operators, Expressions and Control Structures: If, If..Else, Switch - Repetitive Statements- for, while, do..while - Input and Output in C++ - manipulators-manipulators with parameters. - Pointers and arrays

#### UNIT-II: Functions and Classes

Functions in C++ - Main Function - Function Prototyping - Parameters Passing in Functions - Values Return by Functions - inline Functions - Function Overloading.  
Classes and Objects; Constructors and Destructors; and Operator Overloading - Type of Constructors

#### UNIT – III: Inheritance, Polymorphism & Files

Inheritance : Single Inheritance - Multilevel inheritance - Multiple inheritance - Hierarchical Inheritance - Hybrid Inheritance - Polymorphism - Working with Files : Classes for File Stream Operations - Opening and Closing a File - End-of-File Detection - Updating a File - Error Handling during File Operations .

#### UNIT-IV: Fundamental Data Structures

Definition of a Data structure - primitive and composite Data Types, Stacks (Array) - Operations – Linked Stack-Operations- Applications of Stack (Infix to Postfix Conversion).  
Queue (Array)- operations-Linked Queue- Operations- - Singly Linked List - Operations, Application of List ( Polynomial Addition)-. Doubly Linked List - Operations.

#### UNIT-V : Trees and Graphs

Trees: Binary Trees –Binary Search Tree- Operations - Recursive Tree Traversals- Recursion.  
Graph - Definition, Types of Graphs, Graph Traversal –Dijkstras shortest path- DFS and BFS.

### Text Books

Mastering in C++, K.R.Venugopal, Raj Kumar, T.Ravisankar – McGraw Hill, 2011.  
C++ Plus Data Structure by Nell Dale, Narosa Publications, 2000.

SEM II	ALLIED I	Lecture	Practical	Credit
BAMA 25B	MATHEMATICAL FOUNDATION II	7	0	6

### LEARNING OUTCOMES

CO01: Describe matrix and perform different operations on it.

CO02: Solve Simultaneous Linear equations.

CO03: Test and explain the concepts of Consistency and Inconsistency of linear equations

CO04: Solve problems relating to matrix of linear transformations:

CO05: Solve problems using Integration techniques.

CO06: Compare and contrast Straight line equation from angle, point and slope in three dimensions.

### SYLLABUS

**UNIT-I: MATRICES** Multiplication of matrices, Singular and Non-Singular matrices, Adjoint of a Matrix, Inverse of a matrix Symmetric and Skew-Symmetric, Hermitian and Skew-Hermitian, Orthogonal and unitary matrices, Rank of a matrix, Solution of Simultaneous Linear equations by (i) Cramer's rule. (ii) Matrix Inversion Method.

**UNIT-II: MATRICES** Test for Consistency and Inconsistency of linear equations, (Rank Method), characteristic roots and characteristic vectors, Cayley - Hamilton theorem, matrix of linear transformations: reflection about the x, y axes and the line y=x, rotation about the origin through an angle, expansion or compression, shears, translation.

**UNIT-III** Integration Simple problems, integration of rational function involving algebraic expressions of the form  $\frac{1}{ax^2+bx+c}$ ,  $\frac{1}{px+q}$ ,  $\frac{1}{px^2+qx+r}$ ,  $\frac{1}{ax^2+bx+c}$  integrations using simple substitutions integrations

involving trigonometric functions of the form

$\frac{1}{a+b\cos x}$	,	$\frac{1}{a^2\sin^2x+b^2\cos^2x}$	,
		Integration by parts.	

### UNIT-IV

Properties of definite integrals. Reduction formulae for

$\int x^n e^{ax} dx$ ,  $\int \sin^n x dx$ ,  $\int \cos^n x dx$ ,  $\int x^m (1-x)^n dx$ , applications of integration for (i) Area under plane curves, (ii) Volume of solid of revolution.

### UNIT-V: ANALYTICAL GEOMETRY OF THREE DIMENSION

Planes, straight lines.

**Text Book.** Vittal, Mathematical Foundations - Margham Publication, Chennai.

### Reference Books

U. Rizwan, Mathematical Foundation - SciTech, Chennai

V.Sundaram & Others, Discrete Mathematical Foundation - A.P.Publication, sirkali.

P.Duraipandian & Others, Analytical Geometry 3 Dimension – Emerald publication 1992 Reprint. Manicavachagompillay & Natarajan. Analytical Geometry part II - three Dimension - S. Viswanathan (printers & publication) Put Ltd., 1991.

SEM II	CORE PRACTICAL	Lecture	Practical	Credit
BPCS 23	C++ AND DATA STRUCTURES LAB	0	3	2

#### LEARNING OUTCOMES

##### **The students will be able to**

CO01: Analyze, write algorithm and draw the class diagram for any given problem

CO02: Write programs using C++ basic concept

CO03: Develop C++ programs for data structures like Stack, Queue, Tree, Linked List etc, using OOPS concepts

#### C++ & DATA STRUCTURE - LAB

1. Implementing classes, object, constructors and member functions for calculating area and perimeter of a circle.
2. Implementing function overloading (Find area/volume of rectangle, circle, sphere, cylinder, cone etc).
3. Implementing operator over loading (Addition, subtraction, multiplication of matrices)
4. Implementing single, multiple, hierarchical inheritance.
5. Implementing sequential file operations using error handling functions.
6. Implementing PUSH, POP operations of stack using Arrays.
7. Implementing add, delete operations of a queue using Arrays.
8. Implementing Infix to postfix conversion of an expression using stack
9. Implementing Binary search tree recursive traversals (in-order, pre-order, post-order).
10. Implementing Polynomial addition using linked list.

SEM II	VALUE EDUCATION	Lecture	Practical	Credit
BGA20	VALUE EDUCATION	2	0	2

### LEARNING OUTCOMES

To know the values of human, social, local and global life in the context of one's own setting.

The students will be able to

CO01: Appreciate human values and gain self-esteem

CO02: Realize the importance of family and its members particularly women in the society

CO03: Interpret the ethical values in the context of profession, media, family and personal life.

CO04: Recognize the values of the society and its impact

CO05: Formulate the ethical system at the international level and modern trends.

### UNIT-I

Value Education - Definition - relevance to present day - Concept of Human Values - self-introspection - Self-esteem.

### UNIT-II

**Family values** - Components, structure and responsibilities of family - Neutralization of anger - Adjustability - Threats of family life - Status of women in family and society - Caring for needy and elderly - Time allotment for sharing ideas and concerns.

### UNIT-III

Ethical values - Professional ethics - Mass media ethics - Advertising ethics - Influence of ethics on family life - psychology of children and youth - Leadership qualities - Personality development.

### UNIT-IV

Social values - Faith, service and secularism - Social sense and commitment - Students and Politics - Social awareness, Consumer awareness, Consumer rights and responsibilities - Redressal mechanisms.

### UNIT-V

Effect of international affairs on values of life/ Issue of Globalization - Modern warfare - Terrorism. Environmental issues - mutual respect of different cultures, religions and their beliefs.

### Reference Books

T. Anchukandam and J. Kuttainimathathil (Ed) Grow Free Live Free, KrisituJyoti Publications, Bangalore (1995)

Mani Jacob (Ed) Resource Book for Value Education, Institute for Value Education, New Delhi 2002.

DBNI, NCERT, SCERT, Dharma Bharti National Institute of Peace and Value Education, Secunderabad, 2002.

Daniel and Selvamony - Value Education Today, (Madras Christian College, Tambaram and ALACHE, New Delhi, 1990)

S. Ignacimuthu - Values for Life - Better Yourself Books, Mumbai, 1991.



M.M.M.Mascaronhas Centre for Research Education Science and Training for Family Life  
Promotion - Family Life Education, Bangalore, 1993.

SEM II	SOFT SKILLS	Lecture	Practical	Credit
BSS20	SOFT SKILLS	2	0	2

### LEARNING OBJECTIVES

#### **The students will be able to**

CO01: Demonstrate the skills for listening, writing, reading and writing

CO02: Read and respond to instruction

CO03: Seek and respond to information in day to day life

CO04: Correct grammatical and spelling errors

CO05: Actively engage in formal, in-formal and non-verbal communication

### SYLLABUS

#### UNIT I

Skills in Listening and Writing --Skills in Reading and Understanding

#### UNIT - II

2.1. Skills to Read and Respond to Instructions

2.2. Skills of Interpretation and Transcoding Information

#### UNIT III

3.1. Skills in Seeking and Responding to Information

3.2. Skills of Day-to-Day communication

#### UNIT IV

4.1. Grammatical skills and Spelling rules

4.2. Career skills

#### UNIT V

5.1. Skills of formal and in-formal expressions

5.2. Skills of non-verbal communication

**Note:** The contents of the previous book for 'Soft Skills' by Trinity Publication for I year UG students have not been changed. However, the titles of the contents have been modified.

SEM III	LANGUAGE	Lecture	Practical	Credit
BLT 30	TAMIL-III	5	0	2

mbj;jsg; gbg;G : gFjp - 1 jkpo;

,uz;lkhkz;L - %d;whk; gUtk;

jpUf;Fws;

1. kf;fl;NgW

2. tpUe;Njhk;gy;

3. ,iwkhl;rp

4. fhykwpjy;

5. neQ;NrhLGyj;jy;

rpyg;gjpfhuk;

kjiuf;fhz;lk; - VohtJfhij

Ma;r;rpah; Fuit

kzpNkfiy- gj;njhd;gjhtJfhij

rpiwf;Nfhl;lk; mwf;Nfhl;lk; Mf;fpafhij.

rPtfprpe;jhkzp

fhe;jUtjj;ijahh; ,yk;gfk;

fk;guhkhazk;

fpl;fpe;jhfhz;lk; - thypitijg; glyk;

nghpaGuhzk; - Kjw;fhz;lk;

jLj;jhl;nfhz;lGuhzk;

rPwhg;Guhzk; - ,uz;lhk; fhz;lk; -

EGt;tj;Jf; fhz;lk; - rijf;fl;biag;

ngz;ZUtikj;jglyk;

Njk;ghtzp- Kjw;fhz;lk; - tsd; rdpj;jglyk;

SEM III	LANGUAGE	Lecture	Practical	Credit
BLE 30	ENGLISH-III	5	0	2

#### UNIT -1 PROSE

- 1.The Right to Public Amnesia–Santhoshesai
- 2.On aying “Please”–.A.G. Gradiner.
- 3.With the Photographer –Stephen Leacock4.Indian Women –Dr.S.Radhakrishnan

#### UNIT -2 POETRY

- 1.Time and Love –William Shakespeare
- 2.Satan’s Speech –John Milton
- 3.Obituary –A.K.Ramunujam
- 4.The Professor –Nissim Ezekiel

#### UNIT -3 DRAMA

- 1.LadyMacbethsoliloquy-Act I scene V
- 2.Women's Monologue-Antony & Cleopatra ActIV scene ii and Act V scene xiii
- BIOGRAPHY1.Mother Teresa –F.G.Herod

#### UNIT -4 VOCABULARY

- 1.Lexical Skills2.Functional Grammar3.Functional English

#### UNIT -5 COMMUNICATION SKILLS

1. Asking for Advice
- 2.Expressing Gratitude
- 3.Complementing and Congratulating4.Complaining

SEM III	CORE THEORY	Lecture	Practical	Credit
BCS 31	JAVA PROGRAMMING	5	0	3

## LEARNING OBJECTIVES

To improve Object Oriented Programming gathered already through an independent platform.

### **The students will be able to**

CO01: Describe Object oriented programming concepts.

CO02: Write Java Programs using Arrays, Inheritance, Interface and Packages based on requirements.

CO03: Use String handling, exception handling and Multithreading concepts in Java programs

CO04: Create a simple application with the use of AWT controls and GUI Tools.

CO05: Develop a JDBC enabled Java Application.

### Unit – I: BASICS, ESSENTIALS, CONTROL STATEMENT AND CLASSES & OBJECTS

Computer and its Languages – Stage, Origin and Features for Java - JDK–OOP; Java Essentials: Program – API - Variables& Literals - Data Types - String Class – Operators - Type conversion - Constants - Scope – Comments - Keyboard Input; Control Statements: Conditional Statements – Looping Statements - Break and Continue Statements; Classes and Objects: Modifiers - Arguments – Constructors - Packages and import - Static Class - Overloaded Methods and Constructors - Returning Objects – to String() - this reference –Enumeration - Garbage Collection.

### Unit – II: ARRAYS, INHERITANCE, INTERFACES AND PACKAGES

Arrays - Three or More Dimensions; Inheritance: Basics - Calling the Super class Constructor - Overriding Super class Methods - Inheritance from Subclasses – Polymorphism -Abstract Classes and Methods - Interfaces: Fields - Multiple inheritance - Interface inheritance; Packages: Creating packages – Accessing package from other packages- Access Specifier.

### Unit – III: STRING HANDLING, EXCEPTION HANDLING AND MULTI THREADING

String Handling: Basics - Operations –String Methods - String Buffer class - String Builder – to String method -String Tokenizer class. Exception Basics: try and catch block - Multiple catch block - Nested try - throws keyword - Throw vs Throws - Final Vs Finally Vs Finalize - Method Overriding - Custom Exception - Multithreading: Life Cycle - Methods in Thread - thread application – Thread priority – Synchronization - Inter-thread communication - Suspending, Resuming, and Stopping Threads;

### Unit – IV: APplet AND GUI APPLICATION

Applets: Basis - Lifecycle - Applet classes - Application – Graphics; AWT-I: GUI Programming - AWT classes - Windows fundamentals- Creating Windows - Dialog Boxes - Layout Managers - Radio Buttons and Check Boxes – Borders- Swing

### Unit – V: JAVA DATABASE CONNECTIVITY

JDBC - Types of Drivers- Architecture- Classes and Interfaces - Developing JDBC Application - New Database and Table with JDBC - Working with Database Metadata.

#### Text Book

Patrick Naughton and Herbert Schildt. “The Complete Reference JAVA 2”. 3<sup>rd</sup> Edition. Tata McGraw-Hill Edition, 1999.

Muthu C. "Programming with JAVA". 2<sup>nd</sup> Edition. Vijay Nicole Imprints, 2011.

S.Sagayaraj, R.Denis, P.Karthik&D.Gajalakshmi, "Java Programming", Universities Press, 2017

SEM III	CORE PRACTICAL	Lecture	Practical	Credit
BPCS 35	JAVA PROGRAMMING LAB	4	0	3

#### LEARNING OBJECTIVES

The students will be able to

CO01: Write Java programs using Package, Inheritance and Interfaces

CO02: Create Simple GUI application using Applet and Swing classes

CO03: Develop client server applications using TCP and UDP

CO04: Develop simple JDBC enable java application for doing basic operation with database

#### List of Practical's

1. Implementing Package, inheritances and interfaces
2. Implementing Flow, Border and Grid Layouts
3. Implementing Dialogs , Menu and Frame
4. Implementing User defined Exception Handling
5. Implementing Multithreading
6. Implementing I/O Stream File handling
7. Implementing a Calculator using Swing
8. CRUD operation Using JDBC
9. Client Server using TCP and UDP Socket
10. GUI application with JDBC

SEM III	SKILL BASED SUBJECT	Lecture	Practical	Credit
BSCS 33	DESIGN AND ANALYSIS OF ALGORITHM	3	0	3

## LEARNING OBJECTIVES

To build a solid foundation of the most important fundamental subject in computer science. Creative thinking is essential to algorithm design and mathematical acumen and programming skills.

The students will be able to

CO01: Write pseudo code for given problem and to analyze algorithm based on Time and Space.

CO02: Identify, analyze and apply the appropriate divide-and-conquer algorithms

CO03: Explain greedy algorithms and its types focusing on the efficiency of the algorithm.

CO04: Identify and apply the most appropriate dynamic-programming algorithms for the solution of a problem.

CO05: Identify and explain the different types of backtracking algorithm

UNIT -I: ALGORITHM AND ANALYSIS What is an Algorithm? - Algorithm Specification- Performance Analysis- Randomized Algorithms.

UNIT - II: DIVIDE AND CONQUER General Method - Binary Search - Finding the Maximum and Minimum-Merge Sort - Quick Sort - Selection Sort- Stassen's Matrix Multiplications.

UNIT - III: THE GREEDY METHOD The General Method - Knapsack Problem – Tree Vertex Splitting - Job Sequencing with Deadlines - Minimum Cost Spanning Trees - Optimal Storage on Tapes - Optimal Merge Pattern - Single Source Shortest Paths.

UNIT - IV: DYNAMIC PROGRAMMING The General Method – Multistage Graphs - All pair shortest path - String Editing - 0/1 Knapsack – Reliability Design - The Traveling Salesperson Problem

UNIT - V: TRAVERSAL, SEARCHING & BACKTRACKING Techniques for Binary Trees- Techniques for Graphs - The General Method - The 8- Queens Problem – Sum of Subsets- Graph Colouring- Hamiltonian Cycles

## TEXT BOOK

Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Galgotia Publications, 2015.

## REFERENCE BOOKS:

Introduction to Algorithms ,Coremen T.H.,Leiserson C.E. and Rivest R.L., PHI 1998.

Introduction to the Design and Analysis of Algorithms, Anany Levitin, Pearson Education, 2nd Edition.

SEM III	NON-MAJOR ELECTIVE - PAPER 1	Lecture	Practical	Credit
BNCS 34	INTRODUCTION TO INFORMATION TECHNOLOGY	2	0	2

## LEARNING OBJECTIVE

It also provides students with an introduction to the range of applications of Information Technology, partly through an introduction to the second disciplines available to them. It introduces students to some of the techniques that they will need for later courses, in particular object-oriented design and databases and SQL.

## SYLLABUS

### UNIT – I Introduction to Computers:

Definition - Characteristics of a Computer - Classification of Computers - Basic Anatomy of the Computer - Applications / Uses of Computers in different fields

### UNIT – II Input and Output Devices:

Input Devices - Output Devices - Data Representation - Programming Languages / Computer Languages - Software: System Software - Application Software

### UNIT – III Data Communication and Computer Networks:

Data Communication - Computer Network - The Uses of a Network - Types of Networks - Network Topologies- Transmission Media: Guided Transmission Media - Wireless Transmission

### UNIT – IV Internet and its Applications:

History of Internet - Uses of Internet - Advantages of Internet - ISP - Internet Services - IP Address - Web Browser - URL - DNS - Internet Explorer - Types of internet connections - E-mail - Search Engine.

### UNIT – V Operating System:

Evolution of operating systems - Function of Operating System - Classification of Operating – System - Example of Operating System – DOS –Windows – UNIX - Linux

## TEXT BOOKS:

Alexis Leon and Mathews Leon, “Fundamentals of Information Technology”, Vikas Publishing House Pvt. Ltd.

Introduction to Information Technology, P.Rizwan Ahmed, Second Edition, Margham Publications, 2016

Introduction to Information Technology, PelinAksoy, Laura DeNardis, Cengage Learning India Private Limited.





SEM IV	LANGUAGE	Lecture	Practical	Credit
BLT 40	TAMIL-IV	5	0	2

### myFi

1. **FWenjhif**(ghlyfs-7>8>58>94>103)
2. eww**iz** (ghlyfs-1>226>238>249>380)
3. **IqFWE}W(FuFFggjJ1-5>rWntzfhfi fggjJ1-5)**

### myFII

4. GwehD}W (ghlyfs-10>18>206>212>278)
5. **gj}wWggjJ**(ghlyfs-20>59)

### myFIII

6. **fy}jn}hif**(ghlyfs-8>59>84>108>120)
- gh}ghly **j}Ukhy** -1:36-73  
nrt**Nts** -5:55-81  
**itia** -6:1-24

### myFIV

**gjJgghlL-KyiygghlL(KOtJk)**

### myFv

r**qf,yff}atuyhW**  
**vll}jn}hife}yfs**  
**gjJgghlLE}yfs**

### nkho}ngahgG

**nfhlffggllssMqfyggfj}iajjk}o}ynk}o}ngah}j}jy.**  
**mYtyfffbj}k}j}k}o}ynk}o}ngah}j}jy**

SEM IV	LANGUAGE	Lecture	Practical	Credit
BLE 40	ENGLISH-IV	5	0	2

#### UNIT -1 PROSE

1. What is Courage - J.B.Priestly
2. Travel By Train - J.B.Priestly
3. Nobel Lecture - C.MalalaYousafjai
4. I won't Let him Go -MathavanKutty

#### UNIT -2 POETRY

1. Stopping by Woods on Snowy Evening – Robert Frost
2. Refugee Mother and Child -Chinua Achebe
3. An Octobere Morning - JayantaMahapatra
4. Lyric No.1-XX11 (From Gitanjali) – Rabindranath Tagore

#### UNIT -3 DRAMA

Selected Scenes from Shakespeare

1. Hamlet (Soliloquy) Act III Scene I
2. Funeral Oration – Julius Caesar Act III Scene II

#### BIOGRAPHY

1. Rabindranath Tagore – E.M. Carter

#### UNIT -4 VOCABULARY

1. Lexical Skills
2. Functional Grammar and English Grammar

#### UNIT -5

1. E-mail
2. Presentation Skills
3. Curriculum Vitae and Covering Letter
4. Facing an Interview

SEM IV	CORE THEORY	Lecture	Practical	Credit
BCS 41	DATABASE MANAGEMENT SYSTEM	5	0	2

### LEARNING OBJECTIVES

To incorporate a strong knowledge on databases to students

The students will be able to

CO01: Discuss the basic concepts of database and models

CO02: Compare and Contrast various data models

CO03: Convert E-R Model to database

CO04: Design conceptual model of a database using relational algebra

CO05: Retrieve data using relational calculus

CO06: Create a simple database using the rules of Normalization

CO07: Create and Retrieve any type of information from database using SQL Commands

CO08: Write PL/SQL Blocks to insert and retrieve data from database

CO09: Create stored procedures, functions, triggers and views to initiate/perform appropriate action on the database

### SYLLABUS

UNIT - I Database Basics Introduction: Flat File – Database System – Database – Actionable for DBA. The Entity– Relationship Model: Introduction – The Entity Relationship Model. Data Models: Introduction – Relational Approach – The Hierarchical Approach – The Network Approach.

UNIT – II Relational Algebra Structure of Relational Databases – Fundamental Relational Algebra Operations – Additional Relational Algebra Operations - Extended Relational Algebra Operations - Null Values - Modification of the Database - The Tuple Relational Calculus – The Domain Relational Calculus

UNIT – III Normalization Normalization: Introduction - Normalization – Definition of Functional Dependence (FD)– Normal Forms: 1NF, 2NF, 3NF and BCNF.

UNIT – IV Structured Query Language Structured Query Language: Features of SQL – Select SQL Operations – Grouping the Output of the Query – Querying from Multiple Tables – Retrieval Using Set operators – Nested Queries. T-SQL – Triggers and Dynamic Execution: Transact-SQL..

UNIT – V Procedural Language

Procedural Language- SQL: PL/SQL Block Structure – PL/SQL Tables. Cursor Management and Advanced PL/SQL: Opening and Closing a Cursor – Processing Explicit Cursor – Implicit Cursor – Exception Handlers – Sub Programs in PL/SQL – Functions – Precaution While Using PL/SQL Functions – Stored Procedure – Object Oriented Technology.

Text Book 1. Rajesh Narang, “Database Management Systems”, PHI Learning Private Limited, New Delhi, sixth printing, 2010.

Reference 1.S.K. Singh, “Database Systems – Concepts, Design and Applications”, Dorling Kindersley (India) Pvt. Ltd., Second Impression, 2008

2. Database System Concepts , Abraham Silberchatz, Henry F Korth , S.Sudarshan, McGraw-Hill - 5<sup>th</sup> Edition - 2006.

SEM IV	CORE PRACTICAL	Lecture	Practical	Credit
BPCS 45	RDBMS LAB	0	4	3

#### LEARNING OBJECTIVES

##### **The students will be able to**

C001: Create / Modify DB using Basic SQL commands

C002: Combine tables using different types of Joins

C003: Insert / Retrieve data using Subqueries

C004: Write PL/SQL block to create / retrieve data from a DB.

C005: Write a function to retrieve data from the DB.

C006: Write a trigger to initiate appropriate action on a table

C007: Write Procedure & Views to manipulate / retrieve data

#### DBMS LAB

1. Table creation and simple Queries
2. Queries using Aggregate Function and Set Operations
3. Table creation with various Joins
4. Nested Sub queries and correlated Sub queries
5. View creation and manipulation
6. PL/SQL program for cursor
7. PL/SQL program for packages
8. PL/SQL program for triggers and its type
9. PL/SQL program for procedures and functions

SEM IV	SKILL BASED SUBJECT	Lecture	Practical	Credit
BSCS 44	COMPUTER ORGANIZATION AND ARCHITECTURE	3	0	3

### LEARNING OBJECTIVES

To enable the student to have a better understanding of architecture of computer and prepare the student for higher level of programming

#### **The students will be able to**

CO01: Explain instruction cycle.

CO02: Discuss the different computer register

CO03: Identify and explain the appropriate I/O and O/P interrupts

CO04: Explain timing, control and memory reference instructions

CO05: Discuss the working of the control unit

CO06: Write micro programs for the control unit.

CO07: Compare and contrast the different instruction formats

CO08: Use appropriate addressing modes in micro instructions

CO09: Explain the different peripheral devices and interfaces

CO010: Discuss the three modes of data transfer (DMA, Program IO, Interrupt Driven)

CO011: Differentiate the I/O Processors

CO012: Elaborate the Organization of the memory Unit.

### SYLLABUS

UNIT –I Instruction Codes – Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle – Memory Reference Instructions – Input-Output and Interrupts.

UNIT – II Control Memory – Address Sequencing – Micro program Examples – Design of Control Unit.

UNIT –III Introduction – General Register Organization – Instruction Formats – Addressing Modes.

UNIT – IV Peripheral Devices – I/O interface – Asynchronous Data Transfer – Modes of Transfer – Direct Memory Access – Input Output Processor (Excluding IBM and Intel IOPs).

UNIT – V Auxiliary Memory – Main Memory – Auxiliary Memory - Associative Memory – Cache Memory -Virtual Memory.

### TEXT BOOK

Morris Mano M. Computer System Architecture. New Delhi :Prentice Hall of India Private Limited, 2011

### REFERENCES

William Stallings . Computer Organization and Architecture. 8<sup>th</sup> edition. Pearson publication, 2010

Morris Mano. Digital Logic and Computer Design. New Delhi :Prentice Hall of India Private Limited, 2001

SEM IV	NON MAJOR ELECTIVE (NME-II)	Lecture	Practical	Credit
BNCS 44	INTERNET AND ITS APPLICATIONS	2	0	2

## LEARNING OUTCOME

Understand the meaning of the term internet and its functioning.

Know the various applications of internet.

Understand various IT terms and their role in internet functioning.

List the different components of internet and their functions.

Understand internet protocols and its types.

Know the functioning and types of search engines.

Know the basic HTML to design and develop a webpage.

### UNIT - I Internet Basics

Introduction to Computers Programming Language types History of Internet Personal computers  
History of World Wide Web- Micro software .NET Java-Web resources.

### UNIT - II Web Browsers

Web Browsers - Internet Explorer - connecting to Internet Features of Internet explorer6  
Searching the Internet- online help and tutorials - File Transmission Protocol (FTP) Browser  
settings.

### UNIT - III E-Mail

Attaching a file, Electronic mail creating an E-mail id sending and Receiving mails - attaching a  
file - Instance messaging - other web browsers.

### UNIT - IV HTML

Introduction to HTML headers – Linking - Images-special characters and line breaks unordered  
lists- simple HTML programs.

### UNIT - V Digital Cash

E-marketing consumer tracking Electronic advertising search engine – CRM - credit card  
payments Digital cash and e-wallets micro payments- smart card

### Text book

Internet and World Wide Web Third edition H.M.Deitel, P.J. Deitel and A.B.Goldberg - PHI

### Reference

The Internet- Complete Reference Harley hahn, Tata McGraw Hill

SEM V	CORE THEORY	Lecture	Practical	Credit
BCS 51	MOBILE APPLICATION DEVELOPMENT	6	0	3

## LEARNING OBJECTIVES

This course aims to provide the students with a detailed knowledge on Mobile Application and Development and covers Android programming from fundamentals to building mobile applications for smart gadgets

### The students will be able to

CO01: Describe Android platform, Architecture and features.

CO02: Design User Interface and develop activity for Android App.

CO03: Use Intent, Broadcast receivers and Internet services in Android App.

CO04: Design and implement a Database Application and Content providers.

CO05: Use multimedia, camera and Location based services in Android App and address issues in security.

## SYLLABUS

UNIT I Introduction to Mobile Applications: Native and web applications - Mobile operating systems and applications - Mobile Databases. Android: History of Android - Android Features - OSS - OHA - Android Versions and compatibility - Android devices - Prerequisites to learn Android -- Setting up software - IDE - XML. Android Architecture: Android Stack - Linux Kernel - Android Runtime - Dalvik VM - Application Framework - Android emulator - Android applications.

UNIT II Android development: Java - Android Studio - Eclipse - Virtualization - APIs and Android tools - Debugging with DDMS - Android File system - Working with emulator and smart devices - A Basic Android Application - Deployment. Android Activities: The Activity Lifecycle - Lifecycle methods - Creating Activity. Intents - Intent Filters - Activity stack.

UNIT III Android Services: Simple services - Binding and Querying the service - Executing services.- Broadcast Receivers: Creating and managing receivers - Receiver intents - ordered broadcasts. Content Providers: Creating and using content providers - Content resolver. Working with databases: SQLite - coding for SQLite using Android - Sample database applications - Data analysis.

UNIT IV Android User Interface: Android Layouts - Attributes - Layout styles - Linear - Relative - Table - Grid - Frame. Menus: Option menu - context menu - pop-up menu - Lists and Notifications: creation and display. Input Controls: Buttons-Text Fields-Checkboxes-alert dialogs-Spinners-rating bar-progress bar.

UNIT V Publishing and Internationalizing mobile applications :Live mobile application development: Game, Clock, Calendar, Convertor, Phone book. App Deployment and Testing: Doodlz app - Tip calculator app - Weather viewer app.

**Text Books** BarryBurd, "Android Application Development - All-in-one for Dummies", 2nd Edition, Wiley India, 2016.**Reference:** Paul Deitel, Harvey Deitel, Alexander Wald, " Android 6 for Programmers - An App-driven Approach", 3rd edition, Pearson education, 2016. Jerome (J. F) DiMarzio, "Android - A Programmer"s Guide", McGraw Hill Education, 8th reprint, 2015.

SEM V	CORE THEORY	Lecture	Practical	Credit
BCS 52	OPERATING SYSTEM	6	0	3

## LEARNING OBJECTIVES

To enable the student to get sufficient knowledge on various system resources.

### The students will be able to

CO01: Explain architecture, services, types of an operating system.

CO02: Describe process and its scheduling methods

CO03: Analyze different approaches to handle and know memory management.

CO04: Examine the mapping techniques and the know how skills of paging memory.

CO05: Explain the File management concepts.

## SYLLABUS

### Unit – I Operating System Basics

Basic Concepts of Operating System - Services of Operating System-Classification of Operating System- Architecture and Design of an Operating System-Process Management -Introduction to Process-Process State -PCB - Process Scheduling – Inter process Communication

### Unit –II Operating System Scheduling

CPU Scheduling: Introduction - Types of CPU Scheduler - Scheduling Criteria - Scheduling Algorithms - FCFS Scheduling – SJF Scheduling;-Priority Scheduling - Round-Robin Scheduling- Multilevel Queue Scheduling - Deadlock - Basic Concept of Deadlock- Deadlock Prevention - Deadlock Avoidance- Deadlock - Detection and Recovery

### Unit- III Memory management

Memory Management - Basic Concept of Memory - Address Binding; Logical and Physical Address Space- Memory Partitioning - Memory Allocation-Protection- Fragmentation and Compaction

### Unit – IV Swapping

Swapping- Using Bitmaps - Using Linked Lists- Paging-Mapping of Pages to Frames - Hierarchical Page Tables- Segmentation - Virtual Memory - Basic Concept of Virtual Memory- Demand Paging - Transaction Look aside Buffer (TLB) - Inverted Page Table- Page Replacement Algorithms

### Unit –V File Management

File Management - Basic Concept of File-Directory Structure-File Protection-Allocation Methods – Various Disk Scheduling algorithms

### Text Books:

Abraham Silberschatz Peter B. Galvin, G. Gagne, “Operating System Concepts”, Sixth Edition, Addison Wesley Publishing Co., 2003 .**Reference:** Operating systems - Internals and Design



Principles, W. Stallings, 6th Edition, Pearson Willam-Stalling “Operating System” Fourth Edition, Pearson Education,

SEM V	CORE THEORY	Lecture	Practical	Credit
BCS 53	DATA COMMUNICATION AND NETWORKS	3	0	2

### LEARNING OBJECTIVES

To equip students to basics of Data Communication and prepare them for better computer networking.

#### **The students will be able to**

CO01: Distinguish the functionality of every layer in both OSI and TCP/IP

CO02: Compare and contrast the guided from the unguided media

CO03: Illustrate the division of data into smaller frames

CO04: List and Use the appropriate method for correcting errors in data transmitted

CO05: Differentiate the various MAC protocols

CO06: Differentiate Static Routing from Dynamic Routing

CO07: Compare and Contrast Multicast & Broadcast routing

CO08: Compute the shortest path to a given destination using the metrics given.

CO09: Explain the TL Elements

CO010: Assess the functions performed by the TCP & UDP in data transmission

CO011: Discuss the function of DNS

CO012: Illustrate the working of E-mail

CO013: Elucidate how the data is transferred using WWW

CO014: Encrypt & Decrypt data using simple cipher techniques

CO015: Explain how the multimedia files get transferred over the network.

### SYLLABUS

UNIT I Introductory Concepts - Network hardware - Network software – Network Architecture - Physical layer - Guided transmission media - Cable television.

UNIT II Data Link Layer - Design issues - Channel allocation problem - Multiple access protocols - Ethernet - Wireless LAN - 802.11 architecture.

UNIT III Network Layer : Design issues, Routing Algorithms, Shortest path routing, Flooding, Broadcast & Multicast routing congestion, Control & internetworking.

UNIT IV Transport Layer - Transport service - Elements of transport protocols - User Datagram

UNIT V Application Layer - DNS - Electronic mail - World Wide Web - Multimedia - Network security.

### TEXT BOOK

1. Tannenbaum, A.S., 2003 : Computer Networks, Prentice Hall.

### REFERENCES

Stallings, William, 2008: Local and Metropolitan Area Networks: An Introduction, Macmillian Publishing Co.Black: Data Network, Prentice Hall of India. W. Stallings, "Data and Computer Communication", Pearson Education, Fifth Edition, 2001

SEM V	CORE PRACTICAL	Lecture	Practical	Credit
BPCS 56	MOBILE APPLICATION DEVELOPMENT LAB	4	0	3

## LEARNING OBJECTIVES

### **The students will be able to**

C001: Install and configure Android application development tools.

C002: Design and develop Mobile application in selected Application framework.

C003: Deploy the application in mobile phones.

## SYLLABUS

1. Intent and Activity
2. Using Controls
3. Alert Dialogs
4. List View
5. Options Menu
6. Seek Bars
7. Shared Preferences
8. Status Bar Notifications
9. Tab Widgets Talking Clock.
- 10.Tween Animation
- 11.Grid View
- 12.Internal Storage - Files
- 13.SQLite - Database
- 14.Google Map
- 15.Permissions

SEM V	CORE PRACTICAL	Lecture	Practical	Credit
BPCS 57	OPERATING SYSTEM LAB	4	0	2

## LEARNING OBJECTIVES

To enable the student to get sufficient practical knowledge on various system process and scheduling concept.

### **The students will be able to**

- Setup Environment to write and execute shell programs.
- Write basic shell script programs
- Implement CPU scheduling algorithms, System calls using c language.

## SYLLABUS

1. Implementing the Process system calls.
2. Implementing I/O system calls.
3. Implementing IPC using message queues.
4. Implementing CPU& scheduling algorithm for first come first serve scheduling.
5. Implementing CPU scheduling algorithm for shortest job first scheduling.
6. Implementing perform priority scheduling.
7. Implementing CPU scheduling for Round Robin Scheduling.
8. Implementing pipe processing.
9. Implementing first fit, best fit algorithm for memory management.
- 10.A program to simulate producer-consumer problem using semaphores.
- 11.A Shell Program to find factorial of a given number.
- 12.A shell program to generate Fibonacci number.

SEM V	ELECTIVE I	Lecture	Practical	Credit
BECS 54A	DATA MINING	3	0	3

## LEARNING OBJECTIVES

To enable the student to get sufficient knowledge on mining the data

### **The students will be able to**

CO01: Define data mining and its process.

CO02: List the different types of techniques in data mining

CO03: Compare data mining Vs Query Tools

CO04: Describe Data Models, Cubes and OLAP

CO05: Illustrate the types of Metadata

CO06: Apply data pre-processing techniques in the real-world problem.

CO07: Describe & Demonstrate basic data mining algorithms

CO08: Analyze the different classification method

CO09: Evaluate clustering method with an example

CO010: Describe the various web mining methods.

## SYLLABUS

### UNIT - I: Data Mining Basics

Introduction: Definition of data mining - data mining vs. query tools - machine learning - steps in data mining process - overview of data mining techniques.

### UNIT - II: Data Models

Multidimensional Data Model - Data Cube - Dimension Modeling - OLAP Operations - Meta Data - Types of Meta Data.

### UNIT - III: Data Editing

Data Pre-Processing and Characterization: Data Cleaning - Data Integration and Transformation - Data Reduction - Data Mining Query Language - Generalization - Summarization - Association Rule Mining

### UNIT - IV: Classification

Classification: Classification - Decision Tree Induction - Bayesian Classification - Prediction - Back Propagation - Cluster Analysis - Hierarchical Method - Density Based Method - Grid Based Method - Outlier Analysis.

### UNIT - V: Analysis

Cluster analysis: Types of data - Clustering Methods - Partitioning methods - Model based clustering methods - outlier analysis. Advanced topics: Web Mining - Web Content Mining - Structure and Usage Mining - Spatial Mining - Time Series and Sequence Mining.

## TEXT BOOKS:

PaulrajPonnaiah, "Data Warehousing Fundamentals", Wiley Publishers, 2001.

Jiawei Han, MichelineKamber, "Data Mining: Concepts and Techniques",Morgan Kaufman Publishers, 2006.

SEM V	ELECTIVE I	Lecture	Practical	Credit
BECS 54B	COMPUTER GRAPHICS	3	0	3

### LEARNING OBJECTIVES

To equip students to basics of computer drawing and prepare them for computer modeling of objects

The students will be able to

CO01: List the basic concepts used in computer graphics.

CO02: Implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.

CO03: Describe the importance of viewing and projections.

CO04: Explain the three-dimensional transformation, viewing and clipping concepts

CO05: Explain the different types of visible surface detection methods

### SYLLABUS

#### UNIT – I : OVERVIEW OF GRAPHICS SYSTEMS AND OUTPUT PRIMITIVES

Video Display Devices- Raster Scan System- Random Scan Systems- Hard Copy Deices- Graphic Software- Line Drawing Algorithms: DDA- Bresenham's Line -Circle Generating Algorithms

#### UNIT – II : ATTRIBUTES AND TWO DIMESIONAL TRANSFORMATIONS

Line Attributes- Curve Attributes-Color And Gray Scale Level- Area Fill Attributes- Character Attributes- Inquiry Functions- Basic Transformations - Composite Transformation – Other transformation

#### UNIT – III : TWO DIMENSIONAL VIEWING AND CLIPPING

The Viewing Pipeline- Window To Viewport Transformation –Clipping Operations- Point Clipping- Line Clipping: Cohen Sutherland- Liang Barsky-Sutherland Hodgeman Polygon Clipping- Text Clipping- Exterior Clipping- Logical Classification Of Input Devices- Interactive Picture Construction

#### UNIT – IV : THREE DIMENSION TRANSFORMATION, VIEWING AND CLIPPING

Translation-Rotation-Scaling-Viewing Pipeline- Viewing Coordinates- Projections -View Volumes and General Projection Transformation- Clipping -

#### UNIT – V : VISIBLE SURFACE DETECTION METHODS

Classification of Visible Surface Detection Algorithms - Back Face Detection - Depth Buffer Method - A Buffer Method - Scan Line Method - Depth Sorting Method- BSP Tree Method -Area Sub Division Method - Octree Methods - Ray Casting Method

### TEXT BOOK:

Computer Graphics( C version) , Donald Hearn and M.Pauline Baker, Pearson- 2<sup>nd</sup> Edit. 2012.

### REFERENCE BOOKS:

Interactive Computer Graphics–A top down approach using Open GL, Edward Angel , Pearson, 5<sup>th</sup> Edition.

Computer Graphics, Peter Shirley, Steve Marschner, Cengage Learning, Indian Edition,2009

SEM V	ELECTIVE I	Lecture	Practical	Credit
BECS 54C	INFORMATION SECURITY	3	0	3

## LEARNING OBJECTIVES

To enable the student to understand various methodology available for securing information

### **The students will be able to**

CO01: Define key terms and critical concepts of information security and understand the phases of SDLC.

CO02: List the different threats and attacks and understand the Legal, Ethical and Professional Issues.

CO03: Identify, Assess and control the risk

CO04: Explain different standards, Policy and Practices and Security Model.

CO05: Describe how to handle the physical security issues

## SYLLABUS

### UNIT I Information Security Basics

INTRODUCTION -History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC

### UNIT II Security Investigation

SECURITY INVESTIGATION - Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

### UNIT III Security Analysis

SECURITY ANALYSIS-Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

### UNIT IV Security Models

LOGICAL DESIGN-Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity

### UNIT V Security Physical Design

PHYSICAL DESIGN-Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel.

## Text Book

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2003.



SEM V	SKILL BASED SUBJECT III	Lecture	Practical	Credit
BSCS 55	SOFTWARE ENGINEERING	3	0	3

### LEARNING OBJECTIVES

To introduce the concepts and methods required for the construction of large software intensive systems.

The students will be able to

C001: Apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment

C002: Identify the various methods involved in software process for requirements and apply the same to a simple project

C003: Appreciate various design concepts and methods to build an analysis cum design model including as many diagrams as possible.

C004: Summarize various testing methods in software engineering

C005: Develop a project plan applying the methods of estimation, scheduling and quality reviews.

### SYLLABUS

#### UNIT-I:

Introduction - Evolving Role of Software - Changing Nature of Software – Software Myths; A Generic View of Process: Layered Technology - Process Models: Waterfall Model - Evolutionary Process Models.

#### UNIT-II:

Requirements Engineering: Tasks - Initiating the Requirements Engineering Process - Eliciting Requirements - Building the Analysis Model - Requirements Analysis - Data Modelling Concepts.

#### UNIT-III:

Data Engineering: Design Process and Design Quality - Design Concepts - The Design Model Creating an Architectural Design: Software Architecture - Data Design - Architectural Design - Mapping Data Flow into Software Architecture; Performing User Interface Design: Golden Rules.

#### UNIT-IV:

Testing Strategies: Strategic Approach to Software Testing- Test Strategies for Conventional and Object Oriented Software - Validation Testing - System Testing -Art of Debugging. Testing Tactics: Fundamentals - White Box- Basis Path - Control Structure - Black Box Testing Methods

#### UNIT-V:

Project Management: Management Spectrum - People - Product - Process - Project.

Estimation: Project Planning Process - Resources - Software Project Estimation -

Project Scheduling - Quality Concepts - Software Quality Assurance - Formal Technical Reviews.

#### TEXT BOOK:

Roger S Pressman, "Software Engineering - A Practitioner's Approach", Sixth Edition, McGraw Hill International Edition, New York: 2005.

REFERENCES:1. Ian Somerville, "Software Engineering", 7th Edition, Pearson Education, 2006.

2.MallRajib," Software Engineering", 2/E, PHI, 2006.



SEM VI	CORE THEORY	Lecture	Practical	Credit
BCS 61	CLOUD COMPUTING	7	0	5

## LEARNING OBJECTIVES

To enable the students to learn the basic functions, principles and concepts of cloud Systems.

The Students will be able to

CO01: Articulate the main concepts, key technologies, History, Architecture, strengths, and limitations of cloud computing.

CO02: Explain the different type of Cloud Services.

CO03: Use and propose different cloud computing services.

CO04: Choose the appropriate cloud player, Programming Models and approach.

CO05: Address the core issues of cloud computing such as security, privacy and interoperability.

## SYLLABUS

UNIT 1 - UNDERSTANDING CLOUD COMPUTING Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Cloud Services.

UNIT 2 - DEVELOPING CLOUD SERVICES Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds.

UNIT 3 - CLOUD COMPUTING FOR EVERYONE Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-do Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events.

UNIT 4 - PROGRAMMING MODEL Parallel and Distributed Programming Paradigms – Map Reduce, Twister and Iterative Map Reduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, Open Stack, Aneka, CloudSim.

UNIT 5 - SECURITY IN THE CLOUD Security Overview - Cloud Security Challenges and Risks - Software-as-a-Service Security Security Governance - Risk Management - Security Monitoring - Security Architecture Design - Data Security - Application Security - Virtual Machine Security - Identity Management and Access Control - Autonomic Security.

## REFERENCES

Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que Publishing, August 2008.

Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.

John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.

Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach”, TMH, 2009. 4. Kumar Saurabh, “Cloud Computing – insights into New-Era Infrastructure”, Wiley India, 2011.

SEM VI	CORE THEORY	Lecture	Practical	Credit
BCS 62	OPEN SOURCE PROGRAMMING	6	0	4

### LEARNING OBJECTIVES

To discuss techniques that can be effectively applied in practice about HTML5, JavaScript, PHP, CSS and Linux

#### **The Students will be able to**

CO01: Design a web page using HTML, JavaScript and CSS

CO02: Explain the Linux Operating system architecture and its commands

CO03: Write Queries for storing and retrieving data using MYSQL commands.

CO04: Develop simple web application using PHP

CO05: Develop web application with database transaction through PHP

### SYLLABUS

UNIT 1 - INTRODUCTION TO HTML5, JAVA SCRIPT, PHP AND CSS Introduction to Dynamic Web content- HTTP and HTML- Request and Response Procedure- The Benefits of PHP, JAVA Script, CSS, and HTML5- Introduction to HTML5- The Canvas The HTML5 Canvas- HTML5 Audio and Video- Introduction to CSS- CSS Rules-Style Types- CSS Selectors- CSS Colors.

UNIT 2 – LINUX Introduction: Linux Essential Commands – File system Concept – Standard Files – The Linux Security Model – Vi Editor – Partitions Creation – Shell Introduction – String Processing – Investigation and Managing Processes – Network Clients – Installing Application.

UNIT 3 – MYSQL Introduction to MY SQL – The show Databases and Table – The USE command – Create Database and Tables – Describe Table – Select, Insert, Update, and Delete statement – Some Administrative details – Table Joins – Loading and Dumping a Database.

UNIT 4 - PHP Introduction – General Syntactic Characteristics – PHP Scripting – Commenting your code – Primitives, Operations and Expressions – PHP Variables – Operations and Expressions Control -statement – Array – Functions.

UNIT 5 – PHP Basic Form Processing – File and Folder Access – Cookies – Sessions – Database Access with PHP – MySQL - MySQL Functions – Inserting Records – Selecting Records – Deleting Records – Update Records.

### REFERENCES

“Learning PHP, MySQL, Java Script, CSS and HTML5”, Robin Nixon, O’Reilly Publications, 3rd Edition, 2014.

Steven Holzner, “HTML Black Book”, Dreamtech Press &Paraglyph Press Publishers, 2007. Open Source Software, P.Rizwan Ahmed, Margham Publication, Chennai, 2015

SEM VI	CORE PRACTICAL	Lecture	Practical	Credit
BPCS 66	OPEN SOURCE PROGRAMMING LAB	0	4	3

## LEARNING OBJECTIVES

The Students will be able to

CO01: Set up environment to run PHP application

CO02: Develop a web-based application in PHP using HTML, CSS, JavaScript etc.

CO03: Connect application to Database (MYSQL)

CO04: Deploy the application in Web server.

## SYLLABUS

1. Create a web page with Frames and Tables.
2. Create a web page incorporating CSS (Cascading Style Sheets)
3. Write a shell program to find the factorial of an integer positive number
4. Write a shell program for checking whether a given string is a palindrome or not
5. Create a simple calculator in JavaScript.
6. Write a JavaScript program to scroll your name in the scroll bar
7. Develop a program and check the message passing mechanism between pages.
8. Develop a program and check file system functions, date & time functions.
9. Create a student database table in MYSQL and manipulate records (insert, delete, update) records in a web browser.
10. Develop a program using cookies and sessions.

REFERENCES --NIL

SEM VI	ELECTIVE II	Lecture	Practical	Credit
BECS 63A	SOFTWARE TESTING	3	0	3

## LEARNING OBJECTIVES

To make the student more proficient with error free software development.

The students will be able to

CO01: Explain the problem domain to choose process models, to develop SRS, to test the software by applying various testing techniques.

CO02: Differentiate White Box and Black Box Testing and apply it in a software.

CO03: Describe and distinguish Integration, System and Acceptance Testing and apply it in a software.

CO04: Describe and distinguish performance and regression testing to test the performance of the software.

CO05: Apply adhoc testing to find the errors in software.

## SYLLABUS

UNIT 1 - PRINCIPLES OF TESTING A test in time - The cat and the saint - Test the tests first - The Policemen on the bridge - Phase of software project - Quality, Quality Assurance and Quality Control - Testing, Verification and Validation -Process model to represent different phases - Life cycle models.

UNIT 2 - BLACK BOX k WHITE BOX TESTING White box testing - Challenges - Static testing - Structural testing - Black box testing.

UNIT 3 - INTEGRATION, SYSTEM AND ACCEPTANCE TESTING Integration testing - Types - Phase of testing - Scenario testing - Defect bash - System and Acceptance testing: Overview - Functional vs. Non-Functional testing - Functional system testing - Non-functional Testing-Acceptance testing.

UNIT 4 - PERFORMANCE AND REGRESSION TESTING Introduction - Factors Governing - Methodology for Performance testing - Tools and Process for Performance Testing - Regression Testing - Types of Regression testing - How to do Regression Testing?

UNIT 5 - INTERNATIONALIZATION AND ADHOC TESTING Introduction to Internationalization - Primer on Internationalization - Test phases for Internationalization testing - Enabling testing - Locale testing - Internationalization Validation- Fake language testing - Language testing - Localization testing - Tools used for Internationalization - Challenges and Issues - Overview of Ad Hoc testing - Buddy, Pair, Exploratory, Iterative, Agile and Extreme Testing - Defect Seeding.

## REFERENCES

Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing: Principles and Practices", Pearson Publications, 2006.

RenuRajani, Pradeep Oak, "Software Testing- Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.

Boris Beizer, "Software Testing Techniques", Dream Tech Press, Second Edition, 2003.

SEM VI	ELECTIVE II	Lecture	Practical	Credit
BECS 63B	MOBILE COMPUTING	3	0	3

## LEARNING OBJECTIVES

To impart good knowledge of wireless communication to students

The students will be able to

CO01: Explain the fundamental concept of mobile computing.

CO02: Discuss the different MAC protocols

CO03: Distinguish the standards used for Wireless LAN (802.11,802.11a,802.11b)

CO04: Explain Mobile IP and DHCP Protocols.

CO05: Compare and Contrast Metrics of Routing

CO06: Differentiate between Mobile IP, Traditional Internet Protocol

CO07: Explain the working of WAP User Agent

CO08: Write WML Script

CO09: Discuss various database issues encountered in wireless communication

## SYLLABUS

**UNIT 1 - WIRELESS COMMUNICATION FUNDAMENTALS** Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation -MAC – SDMA – FDMA –TDMA – CDMA – Cellular Wireless Networks.

**UNIT 2 - TELECOMMUNICATION NETWORKS & WIRELESS LAN** Telecommunication systems – GSM – GPRS - Satellite Networks, Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a -802.11b standards – HIPERLAN – Blue Tooth.

**UNIT 3 - MOBILE NETWORK LAYER & TRANSPORT LAYER** Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV – DSR – Alternative Metrics. Traditional TCP, Mobile TCP

**UNIT 4 - APPLICATION LAYER WAP Model-** Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile- caching model-wireless bearers for WAP - WML – WML Scripts

**UNIT 5 - DATABASE ISSUES** Database Issues: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

## REFERENCES

Jochen Schiller, “Mobile Communications”, Second Edition, Pearson Education, 2003.

William Stallings, “Wireless Communications and Networks”, Pearson Education, 2002.

Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, PHI/Pearson Education, 2003.

Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003

SEM VI	ELECTIVE II	Lecture	Practical	Credit
BECS 63C	MICROPROCESSOR AND ITS APPLICATIONS	3	0	3

## LEARNING OBJECTIVES

To learn the architecture, programming, interfacing and rudiments of system design of microprocessors.

The students will be able to

CO01: Explain computer architecture, memory organizations and working of I/O devices.

CO02: Evaluate assembly level instructions with respect to syntax and semantics.

CO03: Design and Implement assembly level programs for a specified problem.

CO04: Design and Implement I/O and memory devices interfacing for a specification.

CO05: Compare accepted standards and guidelines to select appropriate Microprocessor (8085 & 8086) and Microcontroller to meet specified performance requirements.

## SYLLABUS

**UNIT 1 - 8085 MICROPROCESSOR AND ARCHITECTURE** Microprocessors - Memory - I/O Devices - Memory Mapped I/O - Pin diagram and internal architecture of 8085 - Registers, ALU, Control & Status Registers - Instruction and Machine Cycles. Interrupts

**UNIT 2 - PROGRAMMING THE 8085** Introduction to 8085 Assembly language programming - 8085 instructions - Programming techniques with Additional instructions - Counters and Time Delays - Stack and Subroutines - Code Conversions

**UNIT 3 - 8086 MICROPROCESSOR AND ARCHITECTURE** Pin Details and Internal Architecture of 8086 - Register organization, Bus interface unit, Execution unit, Memory addressing, Memory segmentation. Operating modes - Hardware and Software interrupts - Addressing Modes.

**UNIT 4 - PROGRAMMING THE 8086** 8086 Assembly Language Programming - Implementing Standard Program Structures - String - Procedure and Macros. Instruction Description and Assembler Directives

**UNIT 5 - INTERFACING PERIPHERALS** 8255 PPI , 8253/8254 PIT, 8237 DMAC,8259 PIC, 8251 USART.

## REFERENCES

Microprocessor Architecture, Programming and Applications with 8085, Ramesh S.Gaonkar, Penram International Publishing ( India) Pvt. Ltd. 4th Ed. ( for Units I,II and V)

Microprocessors and Interfacing,Douglas V. Hall, Tata McGraw Hill , 2nd Ed. ( for Units III and IV)

Assembly Language Programming the IBM PC ,Alan R. Miller, SubexInc, 1987.

Advanced Microprocessors and Peripherals, Ray A K ,Bhurchandi K M , TMH

SEM VI	ELECTIVE III	Lecture	Practical	Credit
BECS 64A	INTERNET OF THINGS	3	0	3

## LEARNING OBJECTIVES

To prepare the student for better application of internet technology.

### **The Students will be able to**

CO01: Understand the techniques of enterprises plan which includes IoT deployment in networks

CO02: Explain basic IoT applications on embedded platform featuring Response systems.

CO03: Design IoT applications for environment friendly which has as social impact.

CO04: Implementation of Data, Knowledge Management and the use of Devices in IoT Technology for Monitoring purposes.

CO05: Identify the application of IoT in Industrial Automation and identify Real World Design

## SYLLABUS

**UNIT 1 - IoT Introduction - Introduction to Internet of Things: Definition – Characteristics of IOT – Physical Design of IoT – Things in IoT – IoT Protocols – Logical Design of IoT – Iot Functional Blocks – IoT Communication Models – IoT Communication APIs – IoT Enabling Technologies**

**UNIT 2 - Domain-Specific IoT – I: Smart Lighting – Smart Appliances – Intrusion Detection – Smoke / Gas Detection – Smart Parking – Smart Roads – Structural Health Monitoring – Surveillance – Emergency Response – Weather Monitoring –**

**UNIT 3 - Domain Specific IoT – II: Air Pollution Monitoring – Noise Pollution Monitoring – Forest Fire Detection – River Flood Detection – Smart Grids- Smart Vending Machines – Route Generation & Scheduling – Fleet Tracking – Shipment Monitoring**

**UNIT 4 - Domain Specific IoT – III: Remote Vehicle Diagnostics – Smart Irrigation – Green House Control – Machine Diagnosis & Prognosis – Indoor Air Quality Monitoring – Health & Fitness Monitoring – Wearable Electronics**

**UNIT 5 - IoT and M2M: M2M – Difference Between IoT and M2M – SDN and NFV for IoT – IoT System Management with NETCONF – YANG: Need for IoT Systems Management – SNMP- Network Operator Requirements – NETCONF – YANG-IoT Systems Management with NETCONF - YANG**

## REFERENCES

Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam

Dunkels, Morgan Kuffmann.

Internet of Things, P.Rizwan Ahmed, Margham Publications, Chennai.

Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally

SEM VI	ELECTIVE III	Lecture	Practical	Credit
BECS 64B	SYSTEM SOFTWARE	3	0	3

## LEARNING OBJECTIVES

To make the student to become more proficient with system programming

The students will be able to

CO01: Understand SIC architecture, features of utility software such as assemblers, loaders, linkers, editors and macro processor.

CO02: Design simple assembler for Simple instruction computer.

CO03: Design linker and loaders for simple instruction computer.

CO04: Design elementary macro processor for simple assembly level language.

CO05: Design and implement simple lexer and parser using lex and yacc tools.

## SYLLABUS

**UNIT 1 - LANGUAGE PROCESSORS** Language Processing Activities – Fundamentals of Language Processing – Fundamentals of Language Specification – Language Processor Development Tools.

**UNIT 2 - ASSEMBLERS AND MACRO** Elements of Assembly Language Programming – Overview of Assembly Process - Design of a Two – Pass Assembler - Macro Definition and Call – Macro Expansion – Nested Macro Calls.

**UNIT 3 - COMPILER I** Scanning: Finite State Automate – Regular Expressions – Building DFA – Performing Semantic Action – Writing a Scanner – Parsing: Parse Tree and Abstract Syntax Trees – Top Down Parsing – Bottom-Up Parsing.

**UNIT 4 - COMPILER II AND INTERPRETERS** Aspects of Compilation –Memory Allocation - Compilation of Expressions-Compilation of Control Structure-Code Optimization - Interpreters.

**UNIT 5 - LINKERS** Relocation and Linking Concepts – Design of a Linker – Self-Relocating Programs – Linking for Overlays - Loader.

## REFERENCES

D.M. Dhamdhare, “System Programming and Operating Systems”, New Delhi: Tata McGraw-Hill Publishing Company Limited, 1993.



SEM VI	ELECTIVE III	Lecture	Practical	Credit
BECS 64C	MULTIMEDIA SYSTEMS	3	0	3

## LEARNING OBJECTIVES

To present the Introduction to Multimedia, Images & Animation and enable the students to learn the concepts of Multimedia.

The Student will be able to,

CO01: Explain the importance of Multimedia Systems.

CO02: Describe various file formats for audio, video and text media.

CO03: Develop Multimedia Systems.

CO04: Design interactive multimedia software and apply various networking protocols for multimedia applications.

CO05: Evaluate multimedia application for its optimum performance.

## SYLLABUS

**UNIT 1 - Introduction to Multimedia:** Introduction to Multimedia PCs – Components of Multimedia – Multimedia Tools Sound and Graphics: Digital Sound – Editing and Mixing sound files – MIDI creation – Tracking Procedure – Interactive and Non-Interactive Graphics – High Resolution Graphics – Difference between TV and Computer Display.

**UNIT 2 - Video and Animation:** Digital Image concepts – Video Capturing – Scanning Images – Digital Filters Morphing and Warping – Two Dimensional and Three-dimensional animation – Animation Tools – Layering technique – Blue Screen technique – Latest movie technologies – Motion Tracking System – Motion Capturing System.

**UNIT 3 - Creating Presentation:** Script Writing and creating interactive and non-interactive presentation – Linear and Non-Linear Editing – Authoring Tools – File Formats SOUND, VIDEO, ANIMATION, Presentation Images. Multimedia Programming: Text Links – Hyper Text system – Form Creation – File storing - Error Trapping.

**UNIT 4 - Sound Links:** Multimedia interfaces – MCI- API- High Level Multimedia Functions – WAVE, MIDI file processing. Animation: Color Palette – Events – ROPs.

**UNIT 5 - Imaging Special Visual Effects:** Bitmap – Brushes – Dissolve – Hotspot Editor – Scrolling. Media Control Interface: Simple Commands – API functions – CD Player – Video Capturing – Form – AVI Play Form.

## REFERENCES

Kaliyaperumal Karthikeyan, "Introduction to Multimedia System", LAP Lambert Academic Publishing, 2011

Tay Vaughan, "Multimedia Making It Work Eighth Edition", Tata McGraw-Hill Publishing Company, 2011

Parag Havaldar and Gerald Medioni, "Multimedia Systems", Cengage Learning, 2011

S. K. Bansal, "Multimedia Systems", Aph Publishing Corporation, 2011

SEM VI	SKILL BASED SUBJECT IV	Lecture	Practical	Credit
BSCS 65	ASP.NET	3	0	3

## LEARNING OBJECTIVES

To become well aware of .NET technology

The students will be able to

CO01: Configure and work with the ASP.NET Environment

CO02: Develop simple web application with basic controls of ASP.NET

CO03: Explain the different classes of ADO.NET

CO04: Develop web application with data sources using ADO.NET

CO05: Explain and Develop simple web-based application using XML and Web services.

## SYLLABUS

**UNIT1 - ASP.NET Basics** Introduction to ASP.NET: .NET Framework (CLR, CLI, BCL), ASP.NET Basics, ASP.NET Page Structure, Page Life Cycle. Controls: HTML Server Controls, Web Server Controls, Web User Controls, Validation Controls, Custom Web Controls.

**UNIT 2 - Form validation:** Client-side validation, Server-side validation, Validation Controls: Required Field Comparison Range, Calendar Control, Ad rotator Control, Internet Explorer Control. State Management: View State, Control State, Hidden Fields, Cookies, Query Strings, Application State, Session State.

**UNIT 3 - ADO.NET** Architecture of ADO. NET, Connected and Disconnected Database, Create Database, create connection Using the ADO.NET Object model, Connection Class, Command Class, Data Adapter Class, Dataset Class, display data on data bound controls and Data Grid.

**UNIT 4 - Database accessing on Web Applications:** Data Binding Concept with web, Creating Data Grid, binding standard web server controls, display data on web form using Data Bound Controls.

**UNIT 5 - XML** Writing Datasets to XML, Reading datasets with XML. WEB services: Remote method call using XML, SOAP, Web service description language, Building and Consuming a web service, Web Application deployment.

## REFERENCES

Professional ASP.NET 1.1 Bill Evjen, Devin Rader, Farhan Muhammad, Scott HanselmanSrivakumarWrox.

Introducing Microsoft ASP .NET 2.0 Esposito PHI

Professional ADO.NET BipinJoshi, Donny Mack, Doug Seven, Fabio Claudio Ferracchiati, Jan D NarkiewiczWrox

Special Edition Using ASP.NET Richard Leineker Person Education

The Complete Reference ASP.NET Matthew MacDonald TMH

ASP.NET Black Book DreamTech

SEM VI	CORE PRACTICAL	Lecture	Practical	Credit
BPCS 67	ASP.NET LAB	0	4	3

### LEARNING OBJECTIVES

The students will be able to

CO 1: Demonstrate the features of ASP.NET Environment and design and develop a web application using ASP.NET IDE

CO 2: Analyze and design and develop simple application using ASP.NET controls

CO 3: Design and develop Database manipulation in ASP.NET & ADO.NET

CO 4: Configure and Deploy application in IIS Server

### SYLLABUS

1. Implement Validation Controls
2. Write a Program to implement ad rotator control
3. Write a Program to implement state management techniques
4. Write a Program to implement view State and Session State.
5. Write a Program to displaying data with the grid view
6. Write a Program to implement ASP.Net Server-Side Controls.
7. Write a Program to implement ASP.Net Master Pages, Themes and Skins.
8. Write a Program working with forms using ASP.Net
9. Write a Program working with pages using ASP.Net.
10. Write a Program to access data sources through ADO.NET

REFERENCES --NIL

## **CURRICULUM ENRICHMENT COURSES**

### **PROFESSIONAL EDUCATION COURSES**

These courses are career-oriented which provide exposure to recent technologies are offered by Bosco Institute of Information Technology (BIIT). All these courses are conducted from third semester to sixth semester, with three contact hours per week (12 weeks). A student can opt for any course. Combination of courses lead to a diploma program of study for the students.

1. OPEN SOURCE PHP TOOLS
2. ROBOTICS
3. WEB DEVELOPMENT USING HTML (Basic Level)
4. .NET PROGRAMMING (C# and Win Apps)
5. PROGRAMMING WITH PYTHON
6. WEB TECHNOLOGY
7. LAMP TECHNOLOGY
8. MULTIMEDIA AND WEB DESIGN
9. WEB DEVELOPMENT USING PYTHON
10. MS OFFICE APPLICATIONS
11. PYTHON PROGRAMMING
12. MASTERING MS-EXCEL
13. TALLY 9.0
14. TECHNICAL WRITING

Students who qualify in at least four courses are given additional post-graduate diploma in Computer Applications. The offered diplomas are:

Diploma in Software Technology (.Net, Python, LAMP)  
Diploma in Multimedia and Web Design  
Diploma in Technical Writing

## ADDITIONAL ONLINE COURSES

Course Teachers exhort the students to do additional online course or supplementary courses through various online platforms offered by Ministry of Human Resource Department,

### 1 SWAYAM On-line Courses

**SWAYAM (Study Webs of Active Learning for Young Aspiring Minds)** is the online education platform <https://swayam.gov.in/>, developed by MHRD, Govt. Of India. It offers numerous courses with transferable credits. All courses are offered free of cost under this program; however, fees are levied in case the learner requires a certificate. The students register themselves in a course which they like and produce the certificate after their completion of the course. **Every BSc.,CSstudent is asked to undertake at least a single SWAYAM course per year.**

### 2 UG MOOCs

Students and learners can access UG courses through this link. These are learning material of the SWAYAM UG archived courses.

[http://ugcmoocs.inflibnet.ac.in/ugcmoocs/moocs\\_courses.php](http://ugcmoocs.inflibnet.ac.in/ugcmoocs/moocs_courses.php)

### 3 e-PG Pathshala

It provides great quality, curriculum-based, interactive e-content containing 23,000 modules (e-text and video) in various disciplines of social sciences, arts, fine arts and humanities, natural & mathematical sciences. <https://epgp.inflibnet.ac.in/>

### 4 e-Content courseware in UG subjects

It provides e-content in 87 UG courses with about 24,110 e-content modules.

<http://cec.nic.in/>

### 5 SWAYAMPBHA

It is a group of 32 DTH channels delivering high quality educational curriculum based courses covering diverse disciplines such as arts, science, commerce, performing arts, social sciences & humanities subjects, engineering, technology, law, medicine, agriculture etc to all teachers, students and citizens across the country interested in lifelong learning. These channels are free to air and can also be accessed through your cable operator. The telecasted videos/lectures are also archived videos on the Swayamprabha

portal. <https://swayamprabha.gov.in/>

## 6 CEC-UGC YouTube channel

It provides free access to unlimited educational curriculum based lectures.

<https://www.youtube.com/user/cecedusat>

## 7 National Digital Library

It is a digital repository of a vast amount of academic content in different formats and provides interface support for leading Indian languages for all academic levels including researchers and life-long learners, all disciplines, all popular form of access devices and differently-abled learners.

<https://ndl.iitkgp.ac.in/>

## **BRIDGE COURSES**

Bridge Courses for first year students are conducted intensely at the beginning of every year and throughout the year. It is based on the performance of the students in CIE and Semester examinations. The main objective is to enable the students to understand the basic concepts and frameworks related to English, Computing fundamentals and mathematics.

The following bridge courses are conducted in the department

English for Life (for all first-year students, two semesters)

PC Software (for first-year students, first semester as association activity)

Computer Fundamentals (for slow learners)

Mathematical Foundation (for slow learners)

## **VOCATIONAL COURSES**

Vocational courses aim at equipping the students with practical skills for a specific profession or field which helps them to upgrade their skills for that particular career.

The following vocational courses are offered

Music

Craftwork

Bridal Making

Cell Phone Repairing

Tailoring

Mushroom Cultivation

## VALUE ADDED COURSES

The university curriculum may not cover all areas of importance or relevance of industry. It is important for higher education institutions to supplement the curriculum to make students better prepared to meet industry demands as well as develop their own interests and aptitudes. These courses are conducted after the class hours to add value to their resume.

The following value-added courses are offered

Life Skills

Information Literacy (from second semester to sixth semester)

General Knowledge

Professional Aptitude

SEM - ALL	VALUE ADDED COURSES	Seminar	Workshop	Test
IL01-IL04	INFORMATION LITERACY	1	1	1

## OVERVIEW

Information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. An information literate individual is able to:

Determine the extent of information needed.

Access the needed information effectively and efficiently

Evaluate information and its sources critically

Incorporate selected information into one's knowledge base

Use information effectively to accomplish a specific purpose

Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally

## REALIZATION

This course is realized through Students@ITAssociation (Technology For Life – TFL) Meets which is organized by the students with a faculty member as its President.

## STUDY DOMAINS

Technology, Systems, Applications, Environment

Evaluation scheme	
Technical Report	30 Mks
Technical Notes	30 Mks
Participation	10 Mks
Online Test	30 Mks

## REFERENCES

Information Literacy Competency Standards for Higher Education, American Library Association, 2000

<http://www.ala.org/acrl/ilcomstan.html>

BIIT Quality Manual-2009, BICS InfoTech, Yelagiri Hills