



श्रीचन्द्रशेखरेन्द्रसरस्वतीविश्वमहाविद्यालयः  
**SRI CHANDRASEKHARENDRA SARASWATHI  
VISWA MAHAVIDYALAYA**

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Enathur, Kanchipuram - 631 561. Tamilnadu, India  
[www.kanchiuniv.ac.in](http://www.kanchiuniv.ac.in) | Ph : 96290 32323 | 96290 01144



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## **SYLLABUS**

**DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS**  
**BACHELOR OF SCIENCE IN COMPUTER SCIENCE (B.SC. [CS])**

REGULATIONS EFFECTIVE FROM ACADEMIC YEAR 2023-2024 ONWARDS

**SRI CHANDRASEKHARENDRA SARASWATHI VISWA MAHA  
VIDYALAYA**

**DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS**

**Bachelor of Science in Computer Science**

**REGULATIONS**

(Effective from the Academic Year 2023-2024)

The Department of Computer Science and Applications was established during 1996 with the vision of Empower every student to be innovative, creative and productive in the field of Computer Science by imparting quality education, developing skills and inculcating human values. The Department of Computer Science offers the following Programmes.

- ❖ B.Sc. in Computer Science
- ❖ BCA
- ❖ MCA

As per the NEP 2020 Policy, The Department offers the following UG 4-Year Honours Programmes with an exit option at the end of the 3<sup>rd</sup> year, 2<sup>nd</sup> year and 1<sup>st</sup> year from the year 2023-2024.

- ❖ B.Sc. in Computer Science
- ❖ BCA

As per the NEP 2020 Policy, The Department offers the following UG 4-Year Honours Programmes with an exit option at the end of the 3<sup>rd</sup> year, 2<sup>nd</sup> year and 1<sup>st</sup> year from the year 2024-2025.

- ❖ B.Sc. in Data Science
- ❖ B.Sc. in Cyber Security

In addition, the Department of Computer Science and Applications offers the following PG Programme.

- ❖ M.Sc. in Computer Science

**SALIENT FEATURES OF FOUR YEARS UNDER GRADUATE PROGRAMMES**

1. It is a Choice Based Credit System under Semester Scheme.
2. The Programmes comprise of about 50% Discipline Specific Core Courses as Major subjects, 20% Discipline Specific Core Courses / Multi-Discipline Specific Courses as Minor courses, and remaining 30% Ability Enhancement Compulsory Courses, Skill Enhancement Courses along with Open Elective Courses.

3. The relative importance of Courses of the study is measured in terms of credits.
4. The declaration of result is based on Aggregate Percentage of marks obtained and Cumulative Grade Point Average (CGPA) earned.
5. The candidate has an option to exit after TWO, FOUR and SIX semesters of the Programme and shall be awarded Certificate, Diploma, and General Degree, respectively with a provision to reenter and complete the degree.

## **OBJECTIVES**

The **B.Sc. in Computer Science** course strives to inculcate job-oriented and value based quality education in Computing Principles, Information Technology and Commercial Application Development using information system and enterprise software. At the end of the course, the students will be well-versed, particularly in core subjects with quality in inter- personal and professional skills. In addition

- ❖ To help students analyze the requirements for system development.
- ❖ To expose students to business software and information system.
- ❖ To produce outstanding Computer Scientists who can apply the theoretical knowledge into practice in the real world and develop standalone live projects themselves.
- ❖ To provide opportunity for the study of modern methods of information processing and its applications.
- ❖ To prepare students who wish to go on to further studies in computer science and related subjects.
- ❖ To acquaint students to Work effectively with a range of current, standard, Office Productivity software applications

## **PROGRAM OUTCOMES**

- ❖ **Discipline knowledge:** Acquiring knowledge on basics of Computer Science and ability to apply to design principles in the development of solutions for problems of varying complexity
- ❖ **Problem Solving:** Improved reasoning with strong mathematical ability to Identify, formulate and analyze problems related to computer science and exhibiting a sound knowledge on data structures and algorithms.
- ❖ **Design and Development of Solutions:** Ability to design and development of algorithmic solutions to real world problems.

- ❖ **Programming a computer:** Exhibiting strong skills required to program a computer for various issues and problems of day-to-day scientific applications.
- ❖ **Application Systems Knowledge:** Possessing a minimum knowledge to practice existing computer application software.
- ❖ **Communication:** Must have a reasonably good communication knowledge both in oral and writing.
- ❖ **Ethics on Profession, Environment and Society:** Exhibiting professional ethics to maintain the integrality in a working environment and also have concern on societal impacts due to computer-based solutions for problems.
- ❖ **Lifelong Learning:** Should become an independent learner. So, learn to learn ability.
- ❖ **Motivation to take up Higher Studies:** Inspiration to continue educations towards advanced studies on Computer Science.

### **PROGRAM SPECIFIC OUTCOMES FOR B.Sc. IN COMPUTER SCIENCE**

The four years **Bachelor of Science in Computer Science** program enables students to attain the following additional attributes besides the afore-mentioned attributes:

- ❖ Apply standard Software Engineering practices and strategies in real -time software project development
- ❖ Design and develop computer programs/computer-based systems in the areas related to AI, algorithms, networking, web design, cloud computing, IoT and data analytics.
- ❖ Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems
- ❖ The ability to apply the knowledge and understanding noted above to the analysis of a given information handling problem.
- ❖ The ability to work independently on a substantial software project and as an effective team member.

### **ELIGIBILITY FOR ADMISSION**

Candidates for admission to the first year of the Degree of **B.Sc. in Computer Science** shall be required to have passed the Higher Secondary Examination conducted by the Government of Tamil Nadu or an Examination accepted as equivalent thereof by the University authorities, with Mathematics / Business Mathematics / Statistics /

Computer Science as one of the subjects in XII Std. The upper age limit to join the first year is 19.

For Lateral Entry to II year, Candidates for admission to the Second year of the Degree of **B.Sc. in Computer Science** shall be required to have passed the Diploma in Computer Technology Examination conducted by the Government of Tamil Nadu, or an Examination accepted as equivalent thereof by the University authorities. The upper age limit to join the second year is 21.

### **DURATION OF THE COURSE**

The duration of the UG Programme is 4 years or 8 semesters. Students who desire to undergo a 3-year UG Programme will be allowed to exit after completion of the 3<sup>rd</sup> year. If a student wants to leave after the completion of the first or second year, the student will be given a UG Certificate or UG Diploma, respectively, provided they secure the prescribed number of credits. Students who exit with a UG certificate or UG diploma are permitted to re-enter within three years and complete the degree Programme.

Students may be permitted to take a break from the study during the period of study but the total duration for completing the Programme shall not exceed 7 years.

### **REGISTRATION OF COURSE**

A newly admitted student will automatically be registered for all the courses prescribed for the first semester without option. Every student shall submit a completed registration form indicating the list of courses intended to be credited during the second to final semester. This registration will be done a week before the last working day of the current semester.

### **CHOICE BASED CREDIT SYSTEM**

The University follows the '**Choice Based Credit System (CBCS)**' for all its Programmes. Each course is normally assigned one credit per lecture per week and one credit for two periods of tutorials or part thereof for laboratory or practical per week.

## STRUCTURE OF THE COURSE AND EVALUATION PATTERN

**Internal Marks: 40** - **External Marks: 60**

The duration of University examination for both theory and practical subjects shall be 3 hours. The maximum marks for each theory and practical course is 100. Continuous Internal Assessment (CIA) will be for 40. The university theory examination will be conducted for 100 marks, which will be then converted to 60 in order to add with continuous internal assessment to make 100 marks for the course. For the conduct of University examinations in practical, the question paper for the practical examination will be set by both internal and external examiners appointed by the University.

### PROCEDURES FOR AWARDING MARKS FOR INTERNAL ASSESSMENT

The break-up of assessment and examination marks for theory subjects is as follows.

First Assessment (Test)	:	15	Marks
Second Assessment (Test)	:	15	Marks
Assignment & Attendance	:	10	Marks
		-----	
Internal Assessment	:	40	Marks
		-----	
University Examination	:	60	Marks
		-----	
Total	:	100	Marks
		-----	

The break-up of the assessment and examination marks for practical is as follows.

Observation	:	10	Marks
Model Examinations	:	20	Marks
Record Book	:	10	Marks
		-----	
Internal Assessment	:	40	Marks
University Examination	:	60	Marks
		-----	
Total	:	100	Marks
		-----	

The break-up of assessment (**Internal Assessment Only**) for the subjects Indian Culture, Yoga/Sports, Principles of Environmental Science, Fundamentals of Cyber Security and Soft Skills is as follows:

Assignment	:	10	Marks
First Internal Test	:	30	Marks
Second Internal Test	:	30	Marks
Seminar	:	10	Marks
Quiz/Objective type test	:	10	Marks
Attendance	:	10	Marks
		-----	
Total	:	100	Marks
		-----	

#### **REQUIREMENTS FOR THE COMPLETION OF THE SEMESTER**

The candidate who has fulfilled the following conditions shall be deemed to have satisfied the requirements for the completion of the semester.

1. He/ She secures not less than 80% of overall attendance in that semester taking into account the total number of periods in all courses put together attended by the candidate as against the total number of periods in all courses offered during that semester.
2. Condonation of attendance up to 10% is permitted on medical grounds. Relaxation in attendance is permitted up to 10% for the student who represents the university in sports and games. The above two relaxation cannot be taken concurrently.
3. Candidates with 69% - 40% attendance will not be permitted to write the examination (including practical) in the current semester (**Sem-Carry**) and he / she can write the same on the subsequent semester.
4. Candidates with less than 40% attendance will not be permitted to write the end semester examination (including practical) and are not permitted to go for the next semester (**Detained**). Such candidate required to repeat the incomplete semester in the next academic year, after paying the fee for the break of study as prescribed by the University from time to time.

## **REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER**

1. Candidates shall register their name for the First Semester Examination after the admission in the U.G. course.
2. Candidates shall be permitted to proceed from the First Semester up to Final Semester irrespective of their failure in any of the Semester examinations subject to the condition that the candidates should register for all the arrear subjects of earlier semesters along with current (subsequent) semester subjects.
3. Candidates shall be eligible to go to subsequent semester, only if they earn sufficient attendance as prescribed thereof by the University from time to time.

## **STUDENT MENTOR**

To help the students in planning their course of study and for general advice on the academic programme, the Head of the Department will attach a certain number of students to a member of the faculty who shall function as student Mentor for those students throughout their period of study. Such student Mentor shall advise the students, give preliminary approval for the courses to be taken by the students during each semester and obtain the final approval of the Head of the Department.

## **CLASS COMMITTEE**

The composition of the class committees will be as follows.

- ❖ Course coordinators of the courses, if any, who shall be appointed by the Head of the Department and the staff members teaching the course.
- ❖ Teaching staff of other individual courses.
- ❖ One professor, preferably not teaching the concerned class, appointed by the Head of the Department.
- ❖ The Head of the Department may opt to be a member or the Chairman.
- ❖ All student of the class, and the Head of the Department (if not already a member) or any staff member nominated by the Head of the Department may opt to be special invitees.
- ❖ The class committee shall meet three times during the semester.
- ❖ The first meeting will be held within a week after the completion of the first assessment to review the performance and for follow-up action.
- ❖ The second meeting will be held within a week after the completion of the second assessment to review the performance and for follow-up action.



- ❖ The third meeting will be held after all the assessments are completed for all the courses, and at least one week before the commencement of the examinations. During this meeting the assessment on a maximum of 40 marks will be finalized for every student and tabulated and submitted to the head of the department.

### **WITHDRAWAL FROM A COURSE**

A student can withdraw from a course at any time with the approval of the Dean and the recommendation of the Head of the Department.

### **DISCIPLINE**

Every student is required to observe disciplined and decorous behavior both inside and outside the college. They do not indulge in any activity which will tend to bring down the prestige of the University. Boys should wear decent dresses. No casual wear like T – shirts or Jeans pant is permitted. Girls shall wear decent dresses like Chudidhar with Dupatta or Saree.

### **REVISION OF REGULATION AND CURRICULUM**

The university may revise, amend or change the Regulations, Scheme of Examination and Syllabus as found necessary.

### **AUTHORITY OF BOARD OF STUDIES**

The Board of Studies has the full authority to change the syllabus any time according to IT trend and industry needs.

### **SUBSTITUTE ASSESSMENT:**

A student who has missed one or more of assessment tests of a course other than the examinations for genuine reasons as accepted by the Head of the Department may take a substitute assessment for any one of the missed assessment. A student who wishes to have a substitute assessment for missed assessment must apply to the Head of the Department within two week from the date of the missed assessment.

## EXAMINATIONS

1. The end semester examinations will ordinarily be conducted during November to December in the odd semesters and during April to May in the even semesters. For all the theory courses, question papers will be set by external examiners and valued by external and/or internal examiners.
2. All practical examinations including software development lab will be conducted by Internal & External examiners appointed by the University

## PASSING AND DECLARATION OF EXAMINATION RESULTS:

### PASSING MINIMUM

1. A candidate shall be declared to have passed in each paper / practical if he / she secures not less than 40% of marks (the continuous internal assessment (CIA) and the University examinations (External) put together), provided a minimum of 35% of marks secured in the University examination.
2. If a candidate fails to secure a pass in a particular course, it is mandatory that he/she shall register and reappear for the examination in that course during the next semester. He / She should continue to register and reappear for the examination till he/she secures a pass. However, the internal assessment marks obtained by the candidate in the first attempt shall be retained and considered valid for all subsequent attempts.
3. Assessments of all the courses on absolute marks will be considered and passed by the Results – Passing- Board in accordance with the rules of the University. Thereafter, the Controller of Examinations shall convert the marks of each course to the corresponding letter grade as stated below. In addition the grade point average and the cumulative grade point average calculated. Based on these, the grade cards will be prepared.

Marks	Letter Grade	Grade Point
100	O (Outstanding)	10
90-99	A+ (Excellent)	9
80-89	A (Very good)	8
70-79	B+ (Good)	7
60-69	B (Above average)	6
50-59	C (Average)	5
40-49	P (Pass)	4
	F (Fail)	0
	Ab (Absent)	0

4. A Student who obtains less than 40 marks out of 100 in the examination will be awarded the “**F**” grade and absent for the examination will be awarded the “**Ab**” grade. A Student who earns a grade of “**O**”, “**A+**”, “**A**”, “**B+**”, “**B**”, “**C**” or “**P**” in a course is declared to have successfully completed that course and earned the respective credits for that course. Such a course cannot be repeated by the student.
5. A Student who obtains a letter grade “**F**” or “**Ab**” in a course is to reappear for the examinations in that course.
6. The following grade points are associated with each letter grade for calculating the grade point average and cumulative grade point average.

“ <b>O</b> ” – 10;	“ <b>B+</b> ” – 07;	“ <b>P</b> ” – 04;
“ <b>A+</b> ” – 09;	“ <b>B</b> ” – 06;	“ <b>F</b> ” - 0;
“ <b>A</b> ” – 08;	“ <b>C</b> ” – 05;	“ <b>Ab</b> ” - 0;

7. A Student can apply for revaluation of one or more of her/his examination answer papers within a week from the date of display of the result on payment of the prescribed fee. The application must be made to the Controller of Examinations with the recommendation of the Head of the Department.
8. After the results are declared, grade cards will be issued to the student. The grade cards will contain the list of courses registered during the year/ semester, the grades scored and the grade point average (GPA) for the year/ semester.
9. GPA is the sum of the products of the number of credits of a course with the grade point scored in that course, taken over all the course for the year/semester, divided by the sum of the number of credits for all courses taken in that year/semester. CGPA is similarly calculated by considering all the courses taken from the time of admission.
10. After successful completion of the programme, the degree will be awarded with the following classification based on CGPA.
  - a) **First class with Distinction** will be awarded, if the student passed all the courses in the first attempt and obtained a minimum CGPA Of 8.25.
  - b) **First class** will be awarded, if the student earned a minimum CGPA of 6.5 within five years for **B.Sc. (HONOURS)**, four years for **B.Sc.**, three years for **Diploma** and two years for **Certificate course** from the time of admission.

c) **Second Class** will be awarded, if the student completed the course beyond the above said period of the respective course.

- ❖ The total credits for **Bachelor of Science (HONOURS) in Computer Science** course are 178.
- ❖ The total credits for **Bachelor of Science in Computer Science** course are 136.
- ❖ The total credits for **Diploma in Computer Science** course are 88.
- ❖ The total credits for **Certificate course on Basics of Computer Science** are 46.

#### **ELIGIBILITY FOR THE AWARD OF THE DEGREE**

1. The candidate shall be declared to be eligible for the award of Degree of **Bachelor of Science (HONOURS) in Computer Science**, if He / She has successfully completed the course requirements and has passed all the prescribed examinations in all the eight semesters with a minimum of 178 credits within a maximum period of seven years reckoned from the commencement of the first semester to which the candidate was admitted.
2. The candidate shall be declared to be eligible for the award of Degree of **Bachelor of Science in Computer Science**, if He / She exits at the end of third year and has successfully completed the course requirements and has passed all the prescribed examinations in all the six semesters with a minimum of 136 credits within a maximum period of five years reckoned from the commencement of the first semester to which the candidate was admitted.
3. The candidate shall be declared to be eligible for the award of **Diploma in Computer Science**, if He / She exits at the end of second year and has successfully completed the course requirements and has passed all the prescribed examinations in all the four semesters with a minimum of 88 credits within a maximum period of four years reckoned from the commencement of the first semester to which the candidate was admitted.
4. The candidate shall be declared to be eligible for the award of **Certificate Course on Basics of Computer Science**, if He / She exits at the end of first year and has successfully completed the course requirements and has passed all the prescribed examinations in all the two semesters with a minimum of 46 credits within a maximum period of two years reckoned from the commencement of the first semester to which the candidate was admitted.

## **PATTERN OF QUESTION PAPER (THEORY)**

**Time** : 3 hours

**Max Marks** : 100

### **Part – A (10 \* 2 = 20 Marks)**

(2 Question from each unit) Theory

### **Part – B (5 \* 16 = 80 Marks)**

(1 Set from each Unit (Either or Pattern))

Marks secured by the candidate will be converted to 60 to make the aggregate 100, while adding with Continuous Internal Assessment 40.

## **PATTERN OF QUESTION PAPER (PRACTICAL)**

**Time** : 3 Hours

**Max** : 60 Marks.

One compulsory lab exercise (may contain sub divisions) should be solved within 3 hours. The External Examiner will set a question paper on the spot with the help of the question bank or list of exercise. The evaluation pattern as follows

Program and output - 40 Marks

Record - 10 Marks

Viva- Voce - 10 Marks.

No more than threecandidates should get the same question in a batch.

## **STRUCTURE OF THE COURSE**

The course of the **B.Sc. in Computer Science** Degree shall consist of the following subjects.

1. Foundation Courses: The course shall comprise the study of,
  - a) Part-I Tamil / Sanskrit /Hindi
  - b) Part-II English
2. Core Courses:
  - a) Main Subject
  - b) Allied Subjects
  - c) Application Oriented subjects related to the main subject of study and practical etc.

## Curriculum and Credits

Sem	Course Code	Category	Paper	Hrs	L	T	P	Total Credits
<b>I</b>	BSC231LT01 / BSC231LH01 / BSC231LS01	Multidisciplinary	Tamil - I / Hindi - I / Sanskrit - I	4	3	1	0	3
	BSC231E02	AEC-1	English - I	4	3	1	0	3
	BSC231T03	Major-1	Programming in C	5	3	2	0	4
	BSC231T04	Major-2	Digital Principles and Its Applications	5	3	2	0	4
	BSC231A05	Minor-1	Mathematical foundation to Computer Science - I	4	3	1	0	4
	BSC231P06	SEC-1	Programming in C Lab	5	0	0	5	2
	BSC231V07	VAC-1	Indian Culture	1	0	1	0	1
	BSC231V08	VAC-2	Principles of Environmental Science	2	0	2	0	2
<b>Total</b>				<b>30</b>	<b>15</b>	<b>10</b>	<b>5</b>	<b>23</b>
<b>II</b>	BSC232LT01 / BSC232LH01 / BSC232LS01	Multidisciplinary	Tamil - II / Hindi - II / Sanskrit - II	4	3	1	0	3
	BSC232E02	AEC-2	English - II	4	3	1	0	3
	BSC232T03	Major-3	Object Oriented Programming with C++	5	3	2	0	4
	BSC232T04	Major-4	Data Structures and Algorithms	5	3	2	0	4
	BSC232A05	Minor-2	Mathematical foundation to Computer Science - II	4	3	1	0	4
	BSC232P06	SEC-2	OOPS with Data Structures -Lab	5	0	0	5	2
	BSC232V07	VAC-3	Yoga	1	0	1	0	1
	BSC232V08	VAC-4	Fundamentals of Cyber Security	2	0	2	0	2
<b>Total</b>				<b>30</b>	<b>15</b>	<b>10</b>	<b>5</b>	<b>23</b>
<b>III</b>	BSC233LT01 / BSC233LH01 / BSC233LS01	Multidisciplinary	Tamil - III / Hindi - III / Sanskrit - III	4	3	1	0	3
	BSC233E02	AEC-3	English - III	4	3	1	0	3
	BSC233T03	Major-5	Relational Data Base Management Systems	5	3	2	0	4
	BSC233T04	Major-6	Computer System Architecture	5	3	2	0	4
	BSC233A05	Minor-3	Applied Physics-I	5	3	2	0	4
	BSC233P06	SEC-3	RDBMS Lab	6	0	0	6	2
	BSC233V07	VAC-5	Soft Skills - I	1	0	1	0	1
<b>Total</b>				<b>30</b>	<b>15</b>	<b>9</b>	<b>6</b>	<b>21</b>

Sem	Course Code	Category	Paper	Hrs	L	T	P	Total Credits
IV	BSC234LT01 / BSC234LH01 / BSC234LS01	Multidisciplinary	Tamil - IV / Hindi - IV / Sanskrit - IV	4	3	1	0	3
	BSC234E02	AEC-4	English - IV	4	3	1	0	3
	BSC234T03	Major-7	Java Programming	5	3	2	0	4
	BSC234T04	Major-8	Operating System & System Administration	5	3	2	0	4
	BSC234A05	Minor-4	Applied Physics-II	5	3	2	0	4
	BSC234P06	SEC-4	Java Programming Lab	6	0	0	6	2
	BSC234V07	VAC-6	Soft Skills - II	1	0	1	0	1
<b>Total</b>				<b>30</b>	<b>15</b>	<b>9</b>	<b>6</b>	<b>21</b>
V	BSC235T01	Major-9	C# and .NET Programming	5	3	2	0	4
	BSC235T02	Major-10	Cloud Computing	4	3	1	0	4
	BSC235T03	Major-11	Web Technology	5	3	2	0	4
		Major-12	<b>Major Elective-1</b>	4	3	1	0	4
	BSC235TE04A		A. Computer Graphics & Multimedia Systems					
	BSC235TE04B		B. Digital Marketing					
		Minor-5	<b>Minor Elective - 1</b>	4	3	1	0	4
	BSC235TE05A		A. Management Information System					
	BSC235TE05B		B. Management Principles & Practice					
	BSC235P06	SEC-5	C# Lab	4	0	0	4	2
BSC235P07	SEC-6	Web Technology Lab	4	0	0	4	2	
<b>Total</b>				<b>30</b>	<b>15</b>	<b>7</b>	<b>8</b>	<b>24</b>
VI	BSC236T01	Major-13	Programming with Python	5	3	2	0	4
	BSC236T02	Major-14	Software Engineering	4	3	1	0	4
	BSC236T03	Major-15	Mobile Communications	5	3	2	0	4
		Major-16	<b>Major Elective-2</b>	4	3	1	0	4
	BSC236TE04A		A. Computer Networks					
	BSC236TE04B		B. Data Warehousing and Data Mining					
		Minor-6	<b>Minor Elective-2</b>	4	3	1	0	4
	BSC236AE05A		A. Organizational Behaviour					
	BSC236AE05B		B. Human Resource Management					
	BSC236P06	SEC-7	Python Lab	4	0	0	4	2
BSC236P07	SEC-8	Software Development Lab	4	0	0	4	2	
<b>Total</b>				<b>30</b>	<b>15</b>	<b>7</b>	<b>8</b>	<b>24</b>

Sem	Course Code	Category	Paper	Hrs	L	T	P	Total Credits	
VII	BSC237T01	Major-17	Research trends in Computer Science	5	3	2	0	4	
	BSC237TE02A	Major-18	<b>Major Elective-3</b> A. Internet of Things (IoT)	5	3	2	0	4	
	BSC237TE02B		B. Agile Software Engineering						
	BSC237TE03A	Major-19	<b>Major Elective-4</b> A. Machine Learning	5	3	2	0	4	
	BSC237TE03B		B. Network Security						
	BSC237TE04A	Major-20	<b>Major Elective-5</b> A. Big Data Analytics	5	3	0	2	4	
	BSC237TE04B		B. Mobile Application Development						
	BSC237AE05A	Minor-7	<b>Minor Elective-3</b> A. Statistical Methods	4	3	1	0	4	
	BSC237AE05B		B. Operations Research						
	BSC237P06	IAPC - 1	Mini Project	6	0	0	6	2	
	<b>Total</b>				<b>30</b>	<b>15</b>	<b>7</b>	<b>8</b>	<b>22</b>
	VIII	BSC238T01	Major-21	Artificial Intelligence	5	3	2	0	4
BSC238AE02A		Minor-8	<b>Minor Elective-4</b> A. Human Values and Professional Ethics	4	3	1	0	4	
BSC238AE02B			B. Ethical Hacking						
BSC238P03		IAPC - 2	Project	21	0	0	21	12	
<b>Total</b>				<b>30</b>	<b>6</b>	<b>3</b>	<b>21</b>	<b>20</b>	
<b>Overall Total</b>								<b>178</b>	

S.No	Course Category	Total Credits	
		III Year	IV Year
1	Multidisciplinary	12	12
2	Ability Enhancement Course (AEC)	12	12
3	Minor	24	32
4	Major	64	84
5	Skills Enhancement Course (SEC)	16	16
6	Research Project / Dissertation (IAPC)	-	14
7	Value Added Course	8	8
<b>Overall Credits</b>		<b>136</b>	<b>178</b>



BSC231LT01	<b>LANGUAGE – I</b>			
	<b>( TAMIL – I )</b>			
	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

(For Students admitted from 2023 onwards)  
(Common to B.C.A. / B.Sc.(Computer Science / Data Science / Cyber Security)

**நோக்கம்:**

- தற்கால இலக்கியப் போக்குகளையும், இலக்கணங்களையும் மாணவர்கள் அறியுமாறு செய்து அவர்களின் படைப்பாற்றலைத் தூண்டுதல்.
- பாரதியார் காலம் தொட்டு தற்கால புதுக்கவிதைகள் வரை கவிதை இலக்கியம் அறிமுகப்படுத்தப்படுவதால் படைப்பாற்றல் திறன் பெறுதல்.
- மொழி அறிவோடு சிந்தனை திறன் அதிகரித்தல்.
- தமிழ் மொழியை பிழையின்றி எழுதவும் புதிய கலைச் சொற்களை உருவாக்கவும் அறிந்து கொள்ளுதல்.
- புதுக்கவிதையின்மூலம் வாழ்வியல் விழுமியங்களை உணர்த்துதல்
- இலக்கணமும் மொழித் திறனும் மொழியை பிழையின்றி பேச எழுத கற்க தேவையான தமிழ் இலக்கணத்தின் இன்றியமையாமையை உணர்த்துதல்
- பக்தி இலக்கியங்கள் வழி சமயச் சான்றோர்களின் கருத்துக்களை உணர்த்துதல்
- மாணவர்களின் வாசிப்பு திறனையும் படைப்புத் திறனையும் மேம்படுத்த சமூகப் பிரச்சனைகளை அறிய வைத்தல்
- மொழியினைப் பிழையின்றி கற்பதற்கும் பிறத்துரைச் சார்ந்த கலைச் சொற்களையும் அறிய வைத்தல்

**பயன் :-**

- புதுக்கவிதையின் மூலம் வாழ்வியல் விழுமியங்களை உணர்ந்து கொள்ளுதல்
- இலக்கணமும் மொழித்திறனும் மொழியை பிழையின்றிப் பேச எழுத கற்கத் தேவையான தமிழ் இலக்கணத்தின் இன்றியமையாமையை உணர்ந்து கொள்ளுதல்
- பக்தி இலக்கியங்கள் வழி பக்தி நெறிகளை உணர்ந்து கொள்ளுதல்
- மாணவர்களின் வாசிப்பு திறனையும் படைப்புத்திறனையும் மேம்படுத்த சமூகப் பிரச்சனைகளை அறிந்து கொள்ளுதல்
- மொழியினை பிழையின்றி கற்பதற்கும் பிற துறைச் சார்ந்த கலைச் சொற்களையும் அறிந்து கொள்ளுதல்

**பாடத்திட்டங்கள்**

அலகு - I இக்கால இலக்கியம்

தமிழ்த் தாய் வாழ்த்து- மனோன்மணியம் சுந்தரனார் போகின்ற பாரதமும் வருகின்ற பாரதம், பாரதியார் வருகின்ற பாரதத்தை வாழ்த்துதல் தமிழின் இனிமை- பாரதிதாசன், ஒரு கிராமத்து நதி- சிற்பி பாலசுப்ரமணியம், அனுபவம்-கண்ணதாசன், வண்ணத்துப்பூச்சி-நாமுத்துக்குமார்- சென்னிமலை கிளியோ பாத்ரா ஈரோடு தமிழன்பன்- தொழில் பாடல்கள் - கொண்டாட்டப் பாடல்கள் - வழிபாட்டு பாடல்கள்

12

அலகு - II இலக்கணம்

எழுத்தின் விளக்கம் - எழுத்தின் வகைகள் - வினா எழுத்துக்கள் - சுட்டெழுத்துக்கள் - வல்லினம் மிகும் இடங்கள் - வல்லினம் மிகா இடங்கள் - ஒலிப்பு மாறுபாடுகளும் பொருள் வேறுபாடுகளும்.

12

அலகு - III பக்தி இலக்கியம்

விநாயகர் - தத்துவமயமான விநாயகர் - பக்தி - பக்தி செய்வது எதற்காக - ஸ்ரீராமன்- அம்மா - குரு பரம்பரை - சரணாகதியே முக்கியம்- மகான்கள் காட்டும் குரு பக்தி - விநாயகர் துணை- ஸ்ரீ மகா பெரியவர்

12

அலகு - IV சிறுகதைமற்றும் நாவல்

செவ்வாழை- அறிஞர் அண்ணா, குலத்தங்கரை அரசமரம்- வவே.சு ஐயர், வாடாமல்லி - புதுமைப்பித்தன், தனிமை - ராஜம் கிருஷ்ணன் ,நரிப்பில்- இறையன்பு - பார்வதி பிஏ பேரறிஞர் அண்ணா

12

அலகு - V மொழிப் பயிற்சி

பொருந்திய சொல்லைத் தேர்வு செய்தல் மரபுத்தொடர் நேர்காணல் கலைச்சொல் பிறமொழிச் சொற்களை நீக்கி எழுதுதல்

12

TOTAL : 60

பாடநூல் :-

1. பாரதியார் கவிதைகள் 2007 எட்டாம் பதிப்பு தென்றல் நிலையம்
2. சு சக்திவேல் நாட்டுப்புறவியல் ஆய்வு மணிவாசகர் பதிப்பகம் சிதம்பரம்
3. ரா வள்ளிக்கண்ணன் 1999 புதுக்கவிதையில் தோற்றமும் வளர்ச்சியும் நான்காம் பதிப்பு அகரம் வெளியீடு கும்பகோணம்
4. தெய்வத்தின் குரல் தொகுப்பாசிரியர் ரா கணபதி வானதி பதிப்பகம் சென்னை -17
5. தமிழர் நாட்டுப் பாடல்கள் நியூ செஞ்சுரி புத்தக நிறுவனம்.

பார்வை நூல் :-

1. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு நியூ செஞ்சுரி புக் ஹவுஸ் சென்னை
2. நாட்டுப்புறவியல் ஆய்வுவானமாமலை
3. சு சக்திவேல் மணிவாசகர் பதிப்பகம் பாரிமுனை சென்னை 108
4. சிற்பி பாலசுப்ரமணியம் இருபதாம் நூற்றாண்டு தமிழ் கவிதைகள்
5. பாரதிதாசன் பாடல்கள் பாவை பப்ளிகேஷன்ஸ் சென்னை
6. அற இலக்கியத்தில் வாழ்வியல் விழுமியங்கள் செம்முதாய்பதிப்பகம் சென்னை.

<b>BSC231LH01</b>	<b>LANGUAGE – I ( HINDI – I )</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

(For Students admitted from 2023 onwards)

**Common for B.Sc. (CS) / BCA**

**UNIT – I REFLECTION ON HINDI LANGUAGE:**

- Importance of Hindi learning & the place of Hindi as National language.
- Cultural contexts of Hindi : an introduction & Various functional forms of Hindi
- Hindi Phonetics – Vowels and Consonants
- Barakhadi & Dwitvakshar and Samyuktakshar
- Often wrong spelt words and correction

**UNIT – II HINDI VOCABULORY: made easy**

- Greetings and Introductory words
- Basic words for daily usage – spoken purpose in particular.
- Introduction to parts of speech in Hindi
- Adjective noun agreements, Oblique and expressions of possession (APNA)

**UNIT – III HINDI GRAMMAR: for Syntax Understanding**

- Gender and Number
- Infinitive Verbs : commands and requests
- Partsof speech - sentence making
- Verb usage variations
- Karakchihn – Introduction

**UNIT – IV WRITING AND READING SKILLS OF HINDI**

- Application of case-endings in sentences
- Sentence formation (Gender specified)
- Sentence formation (Number specified)
- Changing the sentence according to the instructions (using 'Be form' )
- Hindi – reading and writing exercises (Short stories, paragraphs etc.)

**UNIT – V THE FOUNDATION FOR HINDI SPEAKING**

- Introduction of Tenses
- Present Tense and it's variations
- Future Tense and it's variations
- Transcription of Paragraph
- Overall Review of What We Learned so Far

**TEXT BOOKS:**

1. **HINDI SOURABH**, Prepared by Department of Hindi, SCSVMV

**REFERENCES:**

1. “Come Let us Learn Hindi” : Dr. Alok Pandey, Published by Milind Prakashan, Hyderabad 2013
2. Pankhudiyan 1&2: Dr. Madhu Dhawan, Lekhan Prakashan, New Delhi 2011
3. SABARI HINDI BODHINI, Published by Shabari Prakasan, Selam, 2012

BSC231LS01	LANGUAGE – I ( SANSKRIT – I )			
	L	T	P	C
	3	1	0	3

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA

**UNIT - I भाग: - क**

- |                            |                          |
|----------------------------|--------------------------|
| 1. Vowels & Consonants     | 3. Words begin with कtoण |
| 2. Words begin with vowels | 4. Words begin with तtoह |

**UNIT - II भाग: - ख**

1. Words begin with क to झ with the combination of Vowels.
2. Words begin with टto न with the combination of Vowels.
3. Words begin with प to हwith the combination of Vowels.
4. Combined Letters.
5. Simple Sentences.

**UNIT - III भाग: - ग**

1. Lessons from text book 1-6.

**UNIT - IV भाग: -घ**

1. Lessons from text book 7-12.

**UNIT - V भाग: - ङ**

**1. शब्दरूपाणि**

- |          |           |             |          |
|----------|-----------|-------------|----------|
| 1. देवः  | 6. छात्रा | 11. वनम्    | 16. इदम् |
| 2. मुनिः | 7. मतिः   | 12. अस्मद्  | 17. किम् |
| 3. गुरुः | 8. गौरी   | 13. युष्मद् |          |
| 4. पितृ  | 9. धेनुः  | 14. तद्     |          |
| 5. गो    | 10. मातृ  | 15. एतद्    |          |

**2. धातुरूपाणि(Present tense, Past tense and Future tense) परस्मैपद-आत्मनेपदधातवः**

1. भूधातुः
2. पठ्धातुः
3. गम्धातुः

**TEXT BOOKS:**

1. Samskrita Siksha - Part I & II, Published by Department of Sanskrit and Indian culture, SCSVMV University (Deemed University), Enathur, Kanchipuram.

<b>BSC231E02</b>	<b>ENGLISH – I</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

(For Students admitted from 2023 onwards)

(Common to B.C.A. / B.Sc.(Computer Science / Data Science / Cyber Security)

### OBJECTIVES

To get inspiration from the life history of great scientists

- To get exposed to the genre of poetry
- To provide students with basic grammar of English
- To understand grammatically correct sentences and make use of it
- To groom the students to become a successful personality

### OUTCOME

Students will be able to:

- Read and interpret the text in English language
- Appreciate the poetic language.
- Comprehend the Basic English grammar and its usage.
- Write sentences without errors.
- Develop an integrated sense of personal identity, a positive sense of self, and a personal code of ethics.

### SYLLABUS

#### UNIT – I BIOGRAPHY

1. Sir C.V. Raman
2. Srinivasa Ramanujan
3. APJ. Abdul Kalam

12

#### UNIT – II POETRY

1. Edgar Allan Poe : Sonnet –To Science
2. Walt Whitman : When I heard the Learn'd Astronomer
3. Rudyard Kipling : The Secret of machine

12

#### UNIT – III BASIC GRAMMAR – I

1. Articles
2. Pronouns –Personal & Impersonal
3. Adjectives Synonyms & Antonyms
4. Sentence Structure

12

#### UNIT – IV BASIC GRAMMAR – II

1. Tense forms
2. Idioms & Phrases
3. Suitability & Verbs
4. E-Mail
5. Patterns of Greeting

12

**UNIT – V PERSONALITY DEVELOPMENT**

1. Know your personality
2. Leadership qualities
3. Enhance your effectiveness
4. Career planning
5. Time management

**12**

**TOTAL: 60**

**TEXT BOOKS:**

1. Rajiv K. Mishra. *Personality Development*. Delhi: Rupa Publications, 2004

<b>BSC231T03</b>	<b>PROGRAMMING IN C</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / B.Sc. (Data Science) / B.Sc. (Cyber Security)

### **COURSE OBJECTIVES**

- To help the students to learn programming concepts using C Language
- To learn the fundamentals of PST and methodologies which are essential for building good C programs
- To demonstrate a thorough understanding of modular programming by designing programs which require the use of programmer-defined functions
- To impart the knowledge about pointers which is the backbone of effective memory handling
- To demonstrate adeptness of file access in developing solutions to problems

### **COURSE OUTCOMES**

- Learn the fundamental programming concepts and methodologies, which are essential for building good C programs.
- Understand the modular programming by designing programs, which require the use of programmer defined functions.
- Acquire the knowledge about pointers
- Learn about the Storage Classes and building good C programs.
- Obtain the knowledge of writing programs for file access.

### **SYLLABUS**

#### **UNIT – I**

C fundamentals: Character set - Identifier and keywords - data types - constants- Variables - Declarations - Statements - Operators – Expressions.

**12**

#### **UNIT – II**

Data input and output functions: - Simple C programs - Flow of control - if, if else, While, do-while, for loop, Nested control structures - Switch, break and continue, go to statements.

**12**

#### **UNIT – III**

Functions:-Definition - prototypes - Passing arguments – Recursion- Storage Classes - Automatic, External, Static, Register Variables

**12**

#### **UNIT – IV**

Arrays: - Defining and Processing - Passing arrays to functions - Arrays and Strings. Structures and unions - Passing structures to functions - Unions - Bit wise operations.

**12**



**UNIT – V**

Pointers: - Declarations - Passing pointers to Functions - Pointer and Arrays -Arrays of Pointers - Structures and Pointers - Files: Creating, Processing, Opening and Closing a data file.

**12****TOTAL: 60****TEXT BOOKS:**

1. Henry Mullish, Herbert Cooper, The Spirit of C An Introduction to Modern Programming, Jaico Publishing House, 28th Impression, 2006.
2. Yashavant P. Kanetkar, Understanding Pointers In C , BPB Publications, New Delhi, 14thEdition, 2016

**REFERENCE BOOK:**

1. Byron C Gotfried, Programming with C, Schuams' outline series, 3rd Edition, TataMcGraw Hill Education, 2017.

<b>BSC231T04</b>	<b>DIGITAL PRINCIPLES AND ITS APPLICATIONS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA

### OBJECTIVES

- To learn about the basic concepts of Digital Computer Fundamentals
- To get through knowledge about the concepts of logic gates, Boolean Algebra
- To Learn the combinational circuits and sequential logic
- To study about the various counters and memory
- To know the concepts of registers.

### OUTCOMES

- Know the basics of Digital Computer Fundamentals
- Understand the theory of logic gates, Boolean Algebra
- Acquire knowledge of the combinational circuits and sequential logic
- Know about various counters and memory
- Obtain and Understand the concepts of registers

### SYLLABUS

#### UNIT – I INTRODUCTION TO NUMBER SYSTEM

Number Systems and Codes: Number System, Base Conversion, Binary Codes. Code Conversion - Digital Logic: Logic Gates, Truth Tables, Universal Gates.

12

#### UNIT – II BOOLEAN ALGEBRA:

Truth Table - theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, K-map (upto 4 Variables), Don't care conditions.

12

#### UNIT – III COMBINATIONAL CIRCUITS:

Digital logic gates - Design procedure - Universal Gates – Adder – Subtractor - Encoder – Decoder – Multiplexer – Demultiplexer.

12

#### UNIT – IV SEQUENTIAL CIRCUITS:

Flip flop – SR Flip flop – D Flip flop T Flip Flop- JK Flip flop - Master Slave Flip Flop.

12

#### UNIT – V REGISTERS AND COUNTERS

Introduction to Registers, Shift Left Register, Shift Right Register, Introduction to Counters, Up Counter, Down Counter

12

**TOTAL : 60**

**TEXTBOOKS:**

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India, Eastern Economy edition 2008

**REFERENCE BOOKS:**

1. Charles H.Roth, 'Fundamentals Logic Design', Jaico Publishing, VII edition, 2014.
2. Floyd, 'Digital Fundamentals', 11th edition, Pearson Education, 2015.
3. Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 7th edition, Tata McGraw Hill Publishing Company Limited, 2011.

<b>BSC231A05</b>	<b>MATHEMATICAL FOUNDATION TO COMPUTER SCIENCE – I</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

(For Students admitted from 2023 onwards)  
Common to B.C.A. / B.Sc. (Computer Science)

### OBJECTIVES

- To understand the basics of matrices, its operation and the rank of a matrix
- To gain knowledge in set operations and their properties
- To understand propositions, its types and logical equivalences
- To get a clear idea about relations, poset and binary operations
- To acquire knowledge about the basics of graph theory

### OUTCOMES

After completion of the course, students will be able to

- Perform set operations and apply its properties
- Compute rank of a matrix and inverse of a matrix using elementary transformations
- Broaden the knowledge of graph theory to search minimal spanning tree
- Check logical equivalences of propositions

### SYLLABUS

#### UNIT – I MATRICES

Introduction - Types of matrices- Operations on matrices - Symmetric matrix - Skew-Symmetric matrix - Conjugate of a matrix- Hermitian and Skew- Hermitian - matrix - Orthogonal and Unitary matrices (only definition) - Determinant of a matrix - Inverse of a matrix - Rank of a matrix - Characteristic equation - Eigen values and eigenvectors

12

#### UNIT – II SET THEORY

Introduction - Set and its elements - Set description - Types of sets - Venn diagram - Operations and laws of set theory - Cartesian product - Algebra of sets and duality -Inclusion and exclusion principle.

12

#### UNIT – III MATHEMATICAL LOGIC

Introduction - Logical operations - Converse, inverse and contrapositive – Tautologies - Contradiction - Algebra of propositions - Argument - Method of proof

12

#### UNIT – IV RELATIONS

Binary relations - Set operation on relations - Types of relations - Partial order relation - Equivalence relation - Composition of relations - Functions - Types of functions - Invertible functions - Composition of functions.

12

## **UNIT – V      GRAPH THEORY**

Basic terminology - Paths - Cycle - Connectivity - Sub graphs - Types of graphs - Representation of graphs in computer memory - Trees - Properties of trees - Binary trees - Traversing binary trees - Computer representation of general trees.

**12**

**TOTAL: 60**

### **TEXT BOOKS:**

1. P.R.Vittal, Mathematical Foundations, Margham Publications, Chennai.  
Unit – I: Chapter 8    Unit – II : Chapter 2  
Unit – III: Chapter 1    Unit – IV : Chapters 3 and 4
2. Kenneth H. Rosen, Discrete Mathematics and its Applications, 6<sup>th</sup> Edition, Tata McGraw Hill, New Delhi. (2007).  
Unit – V – Chapter 8 : 8.1-8.3, Chapter 9: 9.1, 9.2

### **REFERENCE BOOKS:**

1. J.P.Tremblay R. Manohar, Discrete Mathematics Structures with Applications to Computer Science, McGraw Hill International Edition.
2. Dr M.K. Venkataraman, Dr.N.Sridharan, N. Chandarasekaran, Discrete Mathematics, The National Publishing Company , Chennai.
3. Srimanta Pal, Subodh C. Bhunia, Engineering Mathematics, Oxford University Press- Free online resources available.

<b>BSC231P06</b>	<b>PROGRAMMING IN C LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>5</b>	<b>2</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / B.Sc.(Data Science) / B.Sc. (Cyber Security)**

### **COURSE OBJECTIVES**

- To be able to get trained in programming skills using C
- To help the students to write the programs using conditional Statements and Lopping Statements.
- To learn and write the programs for Array and structure.
- To learn about the usage of functions.
- To impart the knowledge about pointers, files and effective memory handling

### **COURSE OUTCOMES**

- Ability to implement application programs using C Language
- Able to implement structure and functions concepts
- Understand various string functions
- Knowledge on implementing the concepts of Pointers
- Create and use of the file operations.

### **LIST OF EXERCISES**

1. Write a Program to generate a Fibonacci Series
2. Write a Program to Check Whether a Number is Prime or not
3. Write a Program to count the number of positive, negative and 0 values switch case statement.
4. Write a Program to check whether the given string is palindrome or not.
5. Write a Program to print the given number in the reverse order using WHILE loop.
6. Write a Program to sort an array.
7. Write a Program to add two matrices.
8. Write a Program to multiply of two matrices.
9. Write a Program to sort the array of names.
10. Write a Program to find the factorial of an integer using recursion.
11. Write a Program to swap two values using function.
12. Write a Program to perform read and write operation on a file.

<b>BSC231V07</b>	<b>INDIAN CULTURE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>

(For Students admitted from 2023 onwards)

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)**

#### **UNIT – I**

Introduction to Vedic Cultures; significance & how it is different from the other cultures. Why we have to follow? Important features.

#### **UNIT – II**

Literary Heritage of India–significance of Indian Literature; Chronology of Indian literature; Literature in Sanskrit and other Indian languages;

#### **UNIT – III**

Early Indian Education – significance & advantages. Gurukulas and Guru- shishya parampara. Learning methods. Evolution of script and languages; important early scripts and writing materials; important early educational centers (ghattikas, universities) & their unique features. Important personalities and their Contribution – Devarishies, Maharishies, Rishies, Seers and contribution of their institutions to protect the cultural heritage.

#### **UNIT – IV**

Scientific thoughts of Early Indian Sages;

#### **UNIT – V**

Importance and significance of Upavedas – Ayurveda, Dhanurveda, Gandhrava veda, stapatya & Arthasastra.

#### **TEXT BOOKS:**

1. Joshi,K. The Veda and Indian Culture. RastriyaVedaVidya Pratishthana, New Delhi, 1992(rp).
2. Kangle, R.P..The Kautilya Arthasastra. Delhi. 1992(rp).
3. Kulkarni,R.P. Geometry according to Sulba Sutra. Samsodhana Mandal. Pune. 1983.
4. Majumdar,R.C. Ancient India. Motilal Banarsidas Publishers. Delhi. 1994(rp).
5. Patel,I.S.(ed) Science and the Vedas. Bombay. 1984.

#### **REFERENCE:**

1. Majumdar, R.C. The History and Culture of the Indian People. Vol I-IV. Bharatriya Vidya Bhavan. Mumbai, 1996 (ed) (rp).
2. Radhakrishna,S. Indian Philosophy. Vol I & II. Oxford University Press. Delhi, 1993(rp).
3. Sri Chandrasekarendra Sarasvati Swamihi. The Guru Tradition. Bharatiya Vidya Bhavan. Bombay, 1991.
4. Sri Jayendra Saraswatiji Maharaj. The Vedas and Vedangas. Prakashan Kendra. Lucknow, 1951.
5. Winternize, M. 1996(rp). History of Indian Literature. Delhi.

BSC231V08	PRINCIPLES OF ENVIRONMENTAL SCIENCE	L	T	P	C
		2	0	0	2

(For Students admitted from 2024 onwards)

(Common to B.C.A. / B.Sc. (Computer Science / Data Science / Cyber Security))

### COURSE OBJECTIVES

- Foundational Understanding: Introduce the fundamental components of the environment and its role in sustaining life, emphasizing the interconnections of natural systems.
- Environmental Awareness: Foster awareness of environmental issues, the reasons behind them, and different perspectives on the environment, including anthropocentric and ecocentric views.
- Multidisciplinary Approach: Highlight the multidisciplinary nature of environmental studies, emphasizing its scope and aims in addressing complex environmental challenges.
- Sustainability Principles: Introduce principles of sustainable development, focusing on the need to balance economic, social, and environmental factors for long-term well-being.
- Resource Conservation and Pollution Control: Define and classify natural resources and explore strategies for their conservation. Address various types of pollution, their causes, effects, and remedies to emphasize pollution control and mitigation

### COURSE OUTCOMES

Upon completing the Environmental Science course, students should be able to:

- **Demonstrate Comprehensive Environmental Knowledge:** Understand and explain the fundamental components of the environment, various types of natural resources, and the multidisciplinary nature of environmental studies.
- **Recognize Environmental Issues:** Identify and analyze the causes and consequences of environmental problems, demonstrating an awareness of the need for environmental conservation and sustainability.
- **Evaluate Perspectives:** Compare and contrast anthropocentric and ecocentric views on the environment, and understand how ethical considerations play a crucial role in environmental decision-making.
- **Apply Sustainable Principles:** Apply principles of sustainable development to evaluate and propose solutions for environmental issues, considering economic, social, and environmental factors.
- **Resource Conservation:** Distinguish between different types of natural resources, assess the consequences of their depletion, and propose strategies for resource conservation.
- **Pollution Management:** Recognize, evaluate, and propose solutions for various forms of pollution, including air, water, soil, noise, nuclear, and thermal pollution.
- **Engage with Global Agreements:** Understand the significance of international environmental agreements and their role in addressing global environmental challenges.
- **Environmental Ethics and Social Awareness:** Apply principles of environmental ethics to make ethically informed decisions related to environmental issues and understand the social and ethical dimensions of environmental challenges.



**Unit - 1: Introduction to environmental studies & Natural resources****6 Hrs**

Introduction to environment – components – nature of environment - need of awareness – reasons for environmental problems – anthropocentric and eco centric views. Environmental studies – multidisciplinary nature – scope and aim – sustainable development- principles – RRR concept-Indian environmental movements – environmental calendar.

**Unit-2: Natural Resources****6 Hrs**

Natural resources – definition – types – forest resources – uses –deforestation- reasons – effects. Water resources – dams – effects of dams - food resources – modern agriculture– ill effects of agrochemical – integrated pest management- energy resources- types – hydel –nuclear – solar –wind and biomass energy.

**Unit-3: Environmental Pollution****6 Hrs**

Pollution – definition – types – air pollution – causes and effects – effects of CO<sub>2</sub>– CO – NO<sub>x</sub> –SO<sub>x</sub> – particulates – control of air pollution – water pollution – causes – effects – remedies.

**Unit-4 : Advanced Pollution Solution & Disaster Management****6 Hrs**

Soil pollution – solid waste management – Noise pollution – reasons – effects – control – nuclear pollution – cases – effects and control –thermal pollution causes – effects and remedies. e waste – ill effects of e-waste – proper recycling, Disaster management.

**Unit – 5: Social issues and environmental ethics****6 Hrs**

Present environmental scenario – greenhouse effect – climate change – The Kyoto Protocol- ozone layer depletion-The Montreal Protocol - acid rain – causes – effects - disparity among the nations – The Copenhagen UNFCCC summit – carbon currency- virtual water- genetically modified organisms, Environmental ethics – introduction – people getting affected - resettlement and rehabilitation.

**Text Book**

1. Anubha Kaushik and C.P. Kaushik,” Prospects of Environmental Science”, New Age International publishers, 2013.

**Reference books**

1. Environmental Studies, N. Nandini, N. Sunitha and Sucharita Tandon, Sapna Book House, 2007.
2. Text book of Environmental Science, Ragavan Nambiar, Scitech Publications, 2009.
3. Text book of Environmental Chemistry and Pollution Control, S.S.Dara, S.Chand and Co., 2002.
4. Environmental Chemistry, Colin Baird, W.H.Freeman and company, New York,1999.
5. Environmental Chemistry, Gary W. VanLoon and Stephen J.Duffy, Oxford University Press, 2000.
6. New Trends in Green Chemistry, V.K. Ahluwalia and M. Kidwai, Anamaya Publishers, 2006.

BSC232LT01	<b>LANGUAGE – II</b>			
	<b>( TAMIL – II )</b>			
	L	T	P	C
	3	1	0	3

(For Students admitted from 2023 onwards)

**Common to B.C.A. / B.Sc.(Computer Science / Data Science / Cyber Security)**

நோக்கம்:-

- அற இலக்கியங்களையும் இலக்கணங்களையும் அறிவியல் தமிழ் மற்றும் கணித் தமிழ் குறித்து மாணவர்கள் அறியுமாறு செய்து அவர்களின் படைப்பாற்றலை தூண்டுதல்
- வாழ்வை மேம்படுத்தும் அற சிந்தனைகளை நீதி இலக்கியம் வழி உணர்த்துதல்

பயன்கள்:-

- அற இலக்கியங்களான திருக்குறள் நாலடியார் கொன்றைவேந்தன் ஆசாரக்கோவை போன்ற நீதி நூல்கள் வாயிலாக மாணவர்கள் அறவழியிலும் ஒழுக்க நெறியிலும் வாழ்க்கையை வாழ கற்றுக்கொடுத்தல்
- மொழி அறிவோடு சிந்தனைத் திறன் அதிகரித்தல்
- மாணவர்களை அறிவியல் தமிழ் மற்றும் கணித்தமிழ் குறித்த அறிவை வளர்த்துக் கொள்ள செய்தல்
- வாழ்வை மேம்படுத்தும் அற சிந்தனைகளை நீதி இலக்கியம் வழி உணர்த்துதல்
- இலக்கணமும் மொழித்திறனும் மொழியை பிழையின்றி பேச எழுத கற்க தேவையான தமிழ் இலக்கணத்தின் இன்றியமையாமையை உணர்த்துதல்
- பக்தி இலக்கியங்கள் வழி சமயச் சான்றோர்களையும் அறிந்து கொள்ளும் நோக்கில் இலக்கியங்களை அணுகுதல்
- மாணவர்கள் அறிவியல் தமிழ் மற்றும் கணித்தமிழ் குறித்த அறிவையும் இணை கல்வி குறித்து அறிவினை பெறுதல்
- மொழியினை பிழையின்றி கற்பதற்கும் எழுதுவதற்கும் உறுதுணை செய்தல்

பயன்

- அற இலக்கியங்கள் வழி ஒழுக்கங்களை கற்றுக் கொள்ளுதல்
- மொழிகளை பிழையின்றி எழுத இலக்கணங்களை கற்றுக் கொள்ளுதல்
- பக்தி இலக்கியங்கள் வழி பக்தி நெறிகளை உணர்த்துதல்
- மாணவர்கள் அறிவியல் தமிழ் மற்றும் தனித்தமிழ் குறித்த அறிவையும் இணைய கல்வி குறித்து அறிவினையும் பெறுதல்
- மொழியினைப் பிழையின்றி கற்பதற்கும் எழுதுவதற்கும் கற்றுக் கொள்ளுதல்

### பாடத்திட்டங்கள்

அலகு - I            அற இலக்கியம்

திருக்குறள் - நட்பு, கூடா நட்பு, உழவு, மருந்து,

நாலடியார் - 1, 29, 100, 125, 139

கொன்றைவேந்தன்- முதல் 20 பாடல்களுக்கு கதை எழுதுதல்

ஆசாரக்கோவை-10, 25

அலகு - II            இலக்கணம்

சொல் - இலக்கணம் வகைகள்- பெயர்ச்சொல் - வினைச்சொல் - இடைச்சொல் - உரிச்சொல்

அலகு - III பக்தி இலக்கியம்

சுவாமிநாதன் ஜனனம் - குருவிடம் சரணம் - 13 வயதில் பிடாதிபதி- எளியவரிடம் இரக்கம் - பைரவனின் பக்தி- பெருமாளே சாட்சி - அமுதமாகும் மோர் - அன்னதான சிவன்- அகிம்சை முறையில் தயாரிக்கப்பட்டு - அம்பாளின் வஸ்திரம் - கனகாபிஷேகம்.

12

அலகு - IV அறிவியல் தமிழ் மற்றும் கனித்தமிழ்

அறிவியல் தமிழின் வளர்ச்சி - தனித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின் பதிப்பு செய்தல்- தமிழ் மென்பொருட்களை உருவாக்கும்- தமிழ் இணைய கல்விக் கழகம் - தமிழ் மின் நூலகம்- இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்

12

அலகு - V மொழிப் பயிற்சி

இலக்கண குறிப்புகள் ஒரு பொருள் குறித்த பல சொற்கள் பல பொருள் குறித்த ஒரு சொல் அகர வரிசைப்படுத்துதல் ஒருமை பன்மை மயக்கம்

12

TOTAL : 60

பாடநூல் :-

1. பதினெண் கீழ்க்கணக்கு முல்லை நிலையம் 2009 பதிப்புசென்னை
2. ஸ்ரீ பெரியவாளின் ஆன்மீக அனுபவங்கள் கங்கா ராமமூர்த்தி அல்லயன்ஸ் கம்பெனி மைலாப்பூர் சென்னை -4
3. கணினி தமிழ் முனைவர் இல சுந்தரம் விகடன் பிரசுரம்
4. வகைமை நோக்கி இலக்கிய வரலாறு நியூ செஞ்சுரி புக் ஹவுஸ் சென்னை

பார்வை நூல் :-

1. க. த. திருநாவுக்கரசு திருக்குறள் நீதி இலக்கியம் சென்னை பல்கலைக்கழகம் வெளியீடு
2. தமிழ் இலக்கிய வரலாறு ஜெயம் ஜனகா பதிப்பகம்
3. அற இலக்கியத்தில் வாழ்வியல் விழுமியங்கள் செம்முதாய்பதிப்பகம் சென்னை

BSC232LH01	LANGUAGE – II ( HINDI – II )	L	T	P	C
		3	1	0	3

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)

**UNIT –I INTRODUCTION TO HINDI GRAMMAR:**

- Identification of different Tenses
- Differences of *Sakarmak* & *Akarmak* sentences
- Correction of Sentences pertaining to different tenses
- Past Tense with special context to *Ne Pratyay*
- Future Tense with examples

**UNIT – II SPEAKING *Right* HINDI:**

- Conversations at different places and contexts
- Topics related to different tenses and making sentences
- Usage of Sentences according to the direction
- Usage of complex sentences and different styles of expression

**UNIT – III LANGUAGE WRITING IN HINDI:**

- Paragraph setting
- Comprehensive paragraph
- Paragraph writing
- Simple translation of sentences

**UNIT – IV HINDI LITERATURE – INTRODUCTION TO OLD POETRY:**

- Tulasi Das ke Dohe – Kanthasth evam Vyakhya bhag
- Rahim ke Dohe- Kanthasth evam Vyakhya bhag
- Tatparya and Kanthasthikaran
- Summary and annotation part

**UNIT – V HINDI LITERATURE-INTRODUCTION TO POETRY and PROSE:**

- Bharat ki Ekataa : Ramdhari Singh Dinkar
- “Hum Honge Kamiyab” by Girija Kumar Mathur

**TEXT BOOK:**

- HINDI SOURABH**, (Prepared by Department of Hindi, SCSVMV)

**REFERENCES:**

- “Come Let us Learn Hindi” : Dr. Alok Pandey, Published by Milind Prakashan, Hyderabad 2013
- Pankhudiyan 1&2 : Dr. Madhu Dhawan, Lekhan Prakashan, New Delhi 2011
- Sabari Hindi Bodhini – Shabari Prakashan, Selam, Tamil Nadu, 2012.

BSC232LS01	LANGUAGE – II ( SANSKRIT – II )	L	T	P	C
		3	1	0	3

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)

**UNIT - I भाग: - क**

**Poetry:** सुभाषितमालाI - 1 to 6 Slokas

**Prose:** Lessons 1 to 3 (From Sanskrit Pravesika)

**UNIT - II भाग: - ख**

**Poetry:** सुभाषितमालाII - 1 to 8 Slokas

**Prose:** Lessons 4 to 6 (From Sanskrit Pravesika)

**UNIT - III भाग: - ग**

**Grammar:**

1. 1.अच्सन्धिः
2. 2.हल्सन्धिः

**UNIT - IV भाग: - घ**

**Essays:**

- 1.अस्माकदेशः
- 2.दीपावलीमहोत्सवः
- 3.संस्कृतप्रचारस्यआवश्यकता

**UNIT - V भाग: - ङ**

**Slokas (Verses):**

1. Sowndaryalahari (10 Slokas)

**TEXT BOOKS:**

1. **Subhashitamala**, Prepared by Dept. of Sanskrit and Indian Culture, SCSVMV University.
2. **Sowndaryalahari**

<b>BSC232E02</b>	<b>ENGLISH – II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

**(For Students admitted from 2023 onwards)**

**(Common to B.C.A. / B.Sc. (Computer Science / Data Science / Cyber Security))**

**OBJECTIVES**

- To encourage the students to read English essays and appreciate it
- To get inspiration from the great speeches by elite personalities
- To enhance the language skills through literature
- To be familiar with English grammar and its usage
- To get the ability to construct grammatically correct and meaningful sentences

**OUTCOMES**

Students will be able to:

- Read and appreciate the text in English language
- Present the ideas in their own words
- Comprehend the significance of literature in learning language
- Understand that grammar and vocabulary can create different meanings.
- Write and speak with proper usage of grammar.

**SYLLABUS**

**UNIT – I PROSE**

1. Stephen Leacock : My Lost Dollar
2. O.Henry : The Last Leaf
3. G.K.Chesterton : On Running after One’s Hat

**12**

**UNIT – II GREAT SPEECHES**

1. Steve Jobs : Stanford Commencement Address
2. Albert Einstein: The Common language of Science
3. Bill Gates : The Future of Innovation

**12**

**UNIT – III ONE ACT PLAY**

Rabindranath Tagore : Chitra (A Play in One Act)

**12**

**UNIT – IV GRAMMAR – I**

1. Relative pronouns
2. Adverbs
3. Prepositions
4. Phrasal verbs
5. Idioms

**12**

**UNIT – V      GRAMMAR – II**

1. Active Voice & Passive Voice
2. Infinitives & Gerunds
3. Conditionals
4. Collocations
5. American and British words

**12**

**TOTAL : 60**

**TEXT BOOKS:**

1. Aggarwala, N. K. *A senior English Grammar & Composition*. New Delhi: Goyal Brothers. 1995.
2. <http://www.theatrehistory.com/plays/chitra001.html>

<b>BSC232T03</b>	<b>OBJECT ORIENTED PROGRAMMING WITH C++</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / B.Sc. (Data Science) / B.Sc. (Cyber Security)**

### **COURSE OBJECTIVES**

- To introduce the basic concepts of Object Oriented Programming.
- To acquire knowledge on C++ functions.
- To become aware of significant classes and Objects.
- To impart knowledge on inheritance and polymorphism concepts in C++.
- To explore various file I/O Operations.

### **COURSE OUTCOMES**

- Understand the basic concepts and need of Object oriented programming.
- Explain the various keywords and Tokens in C++.
- Describe the various class concepts in C++.
- Explain the basic principles of inheritance and polymorphism
- Examine the various file I/O operations.

## **SYLLABUS**

### **UNIT - I**

Introduction to C++ - Principles Of Object Oriented Programming (OOP) – Basic Concepts of OOP - Benefits of OOP – Applications of OOP – Tokens – Keywords – Identifiers – Variables – Operators – Manipulators - Expressions.

**12**

### **UNIT - II**

Decision Making Statements – Looping Statements - Functions - Main Function - Function Prototyping – Passing Parameters to Functions - Values Return by Functions – Inline Functions - Friend Functions.

**12**

### **UNIT - III**

Classes and Objects - Constructors and Destructors - Types of Constructor - Inheritance – Types of Inheritance – Function Overloading - Operator Overloading.

**12**

### **UNIT - IV**

Pointers - Virtual Functions and Polymorphism - Managing Console I/O operations - Templates Introduction – Function templates

**12**



**UNIT – V**

Working with Files – Classes for File Stream Operations – Opening and Closing of a File – Updating a File - End of File Deduction.

**12****TOTAL: 60****TEXT BOOKS:**

1. Herbert Schildt(2017), "C++ Complete Reference", Fourth edition, TMH,
2. Bjarne Stroustrup, (2013) "The C++ programming language", Addison Wesley,
3. Balaguruswamy, "Programming in C++", 5<sup>th</sup> Edition, Tata McGraw Hill Education Private Limited, 2011.

**REFERENCE BOOKS:**

1. Paul J.Deitel , Harvey M.Deitel, "C++: How To Program", Prentice Hall, 2010
2. Robert Lafore, "Object Oriented programming Using C++". Waite's Group, 1999.

<b>BSC232T04</b>	<b>DATA STRUCTURES AND ALGORITHMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)**

**OBJECTIVES**

- To gain knowledge in designing algorithms to solve problems.
- To understand the concept of linear and nonlinear data structures.
- To know the concept of various sorting and searching techniques.
- To apprehend the tree traversal and searching
- To acquire knowledge in graph traversal and searching.

**OUTCOMES**

- Compute and Analyze algorithms for efficiency using asymptotic notations.
- Develop knowledge about basic data structures like arrays, linked list, trees.
- Solve problems by applying suitable data structure.
- Define graph and illustrate graph traversal.
- Design and develop projects requiring implementation of the data structure.

**SYLLABUS**

**UNIT – I**

Definition of a Data structure - primitive and composite Data Types- Asymptotic notations.  
Arrays - Operations on Arrays.

**12**

**UNIT – II**

Sorting - Bubble sort - Insertion sort - Selection sort - Quick sort - Merge sort - Searching -  
Linear search - Binary search..

**12**

**UNIT – III**

Stacks – Operations on Stack-Applications of Stack - Infix to Postfix Conversion -recursion -  
Queues - Operations on Queues, Circular Queue.

**12**

**UNIT – IV**

Introduction to single and double Linked lists - Representation – operations on single linked  
list - Linked stacks and queues.

**12**

**UNIT – V**

Trees - Binary Trees - Memory representation - Traversal algorithms - Binary search trees -  
Graph - Definition, Types of Graphs, Graph Traversal – BFS and DFS.

**12**

**TOTAL: 60**

**TEXT BOOKS:**

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2017.
2. Seymour Lipschutz Theory and Problems of Data Structures, Tata Mc.Graw Hill First Edition, Reprint 2013
3. Jean-Paul Tremblay, Paul G. Sorenson, 'An Introduction to Data Structures with Application', TMH, 2017.

**REFERENCE BOOKS:**

1. E. Horowitz and S. Shani Fundamentals of Data Structures in C++, Galgotia Pub. 1999, E- book 2012.
2. R. Kruse C.L. Tondo and B. Leung, Data Structures and Program design in C, PHI, 2nd Edition, 1997.

<b>BSC232A05</b>	<b>MATHEMATICAL FOUNDATION TO COMPUTER SCIENCE – II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA**

### **COURSE OBJECTIVES**

- To learn mathematical induction and recurrence relations
- To understand the concepts of lattices and Boolean algebra.
- To study basic algebraic systems
- To acquire knowledge about the basics of graph theory

### **COURSE OUTCOMES**

- Apply different techniques of proof
- Understand the basics of graphs and trees
- Solve recurrence relations
- Identify monoids and submonoids
- Simplify Boolean polynomials using K map

## **SYLLABUS**

### **UNIT – I MATHEMATICAL INDUCTION AND RECURRENCE RELATIONS**

Mathematical induction-Techniques of proof-Mathematical induction – Recurrence - An introduction - Polynomials and their evaluations - Recurrence relations - Solution of first-order homogenous (Linear) relations.

**12**

### **UNIT – II RECURRENCE RELATIONS**

Solution of non-homogeneous relations-Generating functions-Some common recurrence relations-Primitive recursive functions-Recursive and partial recursive functions.

**12**

### **UNIT – III ALGEBRAIC SYSTEMS**

Binary operations- Algebraic systems- Semigroups and monoids-Homomorphism and isomorphism of semigroups and monoids-Properties of homomorphisms-Subsemigroups and Submonoids -Groups-Order of a group-Subgroup of a group-Cyclic groups - Cosets-Normal subgroups.

**12**

### **UNIT – IV LATTICES AND BOOLEAN ALGEBRA**

Lattices- Some properties of lattices-New lattices-Modular and distributive lattices (definition only, results without proof) -Boolean algebras-Boolean polynomials- Karnaugh map- Switching circuits.

**12**

**UNIT – V    GRAPHS AND TREES**

Cut set and cut vertices-Eulerian and Hamiltonian Graphs – Networks-Planar graphs-Spanning trees-Shortest path problem.

**12****TOTAL: 60****TEXT BOOKS:**

1. Dr. M. K. Venkataraman, Dr.N.Sridharan, N. Chandarasekaran, Discrete Mathematics, The National Publishing Company, Chennai.  
(For Unit-I Chapter IV Full and Chapter V (5.1 to 5.4)  
Unit-II Chapter V (5.5 to 5.9)  
Unit-III Chapter VII (7.1 to 7.12)  
Unit-IV Chapter X (10.1 to 10.8)  
Unit-IV Chapter XI (11.7 - 11.10)

**REFERENCE BOOKS:**

1. J. P Tremblay R Manohar, Discrete Mathematics Structures with Applications to Computer Science, McGraw Hill International Edition.
2. Kenneth H. Rosen, Discrete Mathematics and its Applications, 6<sup>th</sup> Edition, Tata McGraw Hill, New Delhi. (2007).

<b>BSC232P06</b>	<b>OOPS WITH DATA STRUCTURES LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>5</b>	<b>2</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / B.Sc. (Data Science) / B.Sc. (Cyber Security)

### **COURSE OBJECTIVES**

- To be able to get trained in programming skills using C++
- To help the students to write the programs using Inheritance and friend functions.
- To learn and write the programs for Stack and Queue operations.
- To learn and write the programs for Sorting Techniques.
- To impart the knowledge to write the program for Binary Search

### **COURSE OUTCOMES**

- Ability to implement application programs using C++ Language
- Able to implement Inheritance and Friend functions concepts
- Understand and implement Stack and Queue operations.
- Knowledge on implementing the Sorting Techniques.
- Knowledge on implementing Binary Search

### **LIST OF EXERCISES**

1. Write a C++ Program to display Fibonacci Series Using Classes and Object
2. Write a C++ Program to find the Mean Value Using Friend Function
3. Write a C++ Program to Implement Inline Function
4. Write a C++ Program to pass Complex Number Object as Argument.
5. Write a C++ Program To Implement This Pointer
6. Write a C++ Program To Implementation of Stack using Array
7. Write a C++ Program To Implementation of Queue using Array
8. Write a C++ Program To Arrange the list of numbers in ascending order using Bubble Sort
9. Write a C++ Program to arrange the list of numbers in ascending order using Insertion Sort.
10. Write a C++ Program To Program to implement Binary Search

<b>BSC232V07</b>	<b>YOGA</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)**

**OBJECTIVES OF THE COURSE:**

- To impart the students with basic concepts of Yoga for health and wellness.
- To familiarize the students with health-related Exercise and Yoga for Overall growth and development
- To create a foundation for the professionals in Physical Education and Yoga.
- To impart the basic knowledge and skills to teach Yoga activities.

**LEARNING OUTCOME / SKILLS:**

- Students will be able to understand the basic principles and practices of Yoga.
- Students will be able to instruct Yoga practices for Healthy Living.
- To develop professionalism among students to conduct, organize Yoga events at schools and community level.

**SYLLABUS**

**INTRODUCTION TO YOGA**

1. Basic Principles of Yogic practices
2. Word meaning and definitions of Yoga
3. Different schools of Yoga
4. Mithahara, Pathya Apatyha in Yogabhyasa.
5. Ashtanga Yoga
6. Shitalikarna Vyayama / Physical Cultural Exercises
7. Introduction to Pranayama
8. Yoga to enhance memory and concentration.

**PRACTICAL DEMONSTRATION OF YOGA**

1. Shitalikarna Vyayama / Physical Cultural Exercises
2. Suryanamaskara
3. Standing Asanas- Ardachakrasana, Padahasthasana, Ardhatichakrasana, Trikonasana.
4. Sitting Asanas – Paschimottasana, Bhadrasana, Vakrasana, Vajrasana.
5. Prone posture Asanas – Makarasana, Bhujangasana, Shalabhasana, Dhanurasana.
6. Supine posture Asanas – Ardha pavana Mukthasana, Purna Pavana Mukthasana, Sethubhandasana, Uttanapadasana.
7. Pranayama- Nadishodhana Pranayama, Bhastrika Pranayama, Bramari Pranayama.
8. Dhyana – Shavasana.

**TOTAL: 20**

**TEXT BOOKS:**

1. Dr Nagendra H R. & Dr Nagarathna R., Samagra Yoga Chikitse. Swami Vivekananda Yoga Prakasana, Bengaluru, 2002.
2. Dr Nagendra H.R. & Dr Nagarathna R. Integrated approach of Yoga Therapy for Positive Health, Swami Vivekananda Yoga Prakasana, Bengaluru, 2006.

**REFERENCES:**

1. Kumar, Ajith, Yoga Pravesha. Bengaluru: Rashtrothanna Prakashana., 1984.
2. D.M Jyoti, Yoga and Physical Activities, lulu.com3101, Hills borough, NC27609, United State,2015.



<b>BSC232V08</b>	<b>FUNDAMENTALS OF CYBER SECURITY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>

**(For Students admitted from 2024 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cognitive Systems)**

### **COURSE OBJECTIVES**

- To introduce the basic concepts of cyber security
- To acquire knowledge on cyber threats and attacks
- To become aware of significant security technologies and tools
- To impart knowledge on cipher methods and cryptographic algorithms
- To gain knowledge about physical security and digital forensics

### **COURSE OUTCOMES**

- Understand the basic concepts, need, approaches, principles and components of security.
- Explain the various cyber threats and attacks.
- Describe the various Security Technologies and Tools.
- Explain the basic principles of cryptography and algorithms.
- Able to explain importance of digital forensics

### **SYLLABUS**

#### **UNIT – I INTRODUCTION TO CYBER SECURITY**

Introduction – Need for Security – Security Approaches – Principles of Security.

6

#### **UNIT – II CYBER SECURITY – THREATS & ATTACKS**

Threats: Intellectual Property - Software Attacks –Theft – Hardware Failures.

6

#### **UNIT – III SECURITY TOOLS & TECHNOLOGIES**

Firewall and VPNs – Intrusion, Detection and Prevention Systems

6

#### **UNIT – IV CRYPTOGRAPHY**

Cryptology Terminology - Cipher methods – Cryptographic Algorithms

6

#### **UNIT – V PHYSICAL SECURITY AND DIGITAL FORENSICS**

Physical Access Controls – Fire Security and Safety.

6

**TOTAL: 30**

**TEXT BOOKS:**

1. Michael E. Whitman, Herbert J. Mattord," Principles of Information Security", CENGAGE Learning, 4<sup>th</sup> Edition, 2012.

**REFERENCE BOOKS:**

1. William Stallings," Cryptography and Network Security – Principles and Practice", Pearson Education, 7<sup>th</sup> Edition.2017.
2. Atul Kahate," Cryptography and Network Security", Mc Graw Hill, 4<sup>th</sup> Edition, 2019.

BSC233LT01	LANGUAGE – III ( TAMIL – III )	L	T	P	C
		3	1	0	3

(For Students admitted from 2023 onwards)  
Common to B.C.A. / B.Sc.(Computer Science)

#### நோக்கம்

- காப்பிய இலக்கியங்களையும் அறிவியல் நோக்கில் பார்வையிடலும் பக்தி இலக்கியங்களின் வழி சமயச் சான்றோர்களை அறிதல் மற்றும் படைப்பிலக்கிய பயிற்சி அளித்தல்
- காப்பிய இலக்கியங்களை அறிவியல் தொழில்நுட்பத்தின் வழி கற்றுக் கொடுத்தல்
- கைவினைப் பொருட்கள் குறித்த தொழில்நுட்பத்தைக் கற்றுக்கொடுத்தல்மாணவர்களுக்கு மன அழுத்தம் நீங்கவும் உற்சாகத்தை பெரும் நோக்குடன் கலைகள் மற்றும் விளையாட்டுகள் கற்றுத் தரப்படுகிறது
- பக்தி இலக்கியத்தின் வாயிலாக சமயச் சான்றோர்களையும் மானிடர்களின் துயர் நீக்கும் பதிகங்களையும் மகான்களையும் அறிமுகம் செய்தல்
- தமிழ் புலவர்கள் இயற்றிய இலக்கியங்களின் வழி கணித அறிவியல் சார்ந்த செய்திகளை கற்றுக் கொடுத்தல்
- ஐந்து மாணவர்கள் தங்களுக்குள் இருக்கும் திறமையை வெளிப்படுத்தும் விதமாக அவர்களின் தனித்திறன் ஊக்கப்படுத்த பயிற்சி அளிக்கப்படுதல்

#### பயன்

- காப்பிய இலக்கியங்களில் அருவிகள் தொழில்நுட்பத்தை அறிந்து கொள்ளுதல் பக்தி இலக்கியங்களின் வழி பக்தி நெறிகளை உணர்ந்து கொள்ளுதல் சிறந்த படைப்பாளராக பயிற்சியில் தேர்ச்சி பெறுதல்
- காப்பிய இலக்கியங்களில் அறிவியல் தொழில்நுட்பத்தை அறிந்து கொள்ளுதல்
- மாணவர்கள் கைவினைப் பொருட்கள் உருவாக்கும் திறன் குறித்து அறிந்து கொள்ளுதலும் பயிற்சிப் பட்டறையின் வாயிலாக கைவினைப் பொருட்களை உருவாக்குதல். விளையாட்டு,கலைகள் மூலம் மாணவர்கள் உற்சாகம் பெறுகின்றனர். நமது பழமையை பாரம்பரியத்தை அறிய உறுதுணை புரிகின்றது விளையாட்டுக்களினால் வெற்றி தோல்வியை ஏற்றுக்கொள்ளும் மனப்பக்குவமும் உடல் ஆரோக்கியத்தையும் பெறுகின்றனர்.
- பக்தி இலக்கியத்தின் வழி வாழ்வியல் விழுமியங்கள் ஆன்மீகம் சார்ந்த செய்திகளை கற்றுக் கொள்ளுதலும் துன்பங்களை போக்கும் பாடல்களை அறிந்து கொள்ளுதல்.
- தமிழ் இலக்கியங்களின் ஊடாக கணித அறிஞர்களின் சூத்திரங்களையும் பயன்பாட்டையும் தமிழ் புலவர்களின் பாடல்கள் வழி கற்றுக் கொள்ளுதல்

#### பாடத்திட்டங்கள்

அலகு - I காப்பியம்

சிலப்பதிகாரம் - வஞ்சி காண்டம், சீவக சிந்தாமணி - நாமகள் இளம்பகம், கம்ப ராமாயணம்- யுத்த காண்டம் மீட்சி படலம் ,சீறாப்புராணம்- திருநின்ற சருக்கம், தேம்பாவணி -பாயிரம்

12

அலகு - II கலைகள்மற்றும் விளையாட்டுகள்

மண்பாண்டங்கள் -மூங்கில் குடைகள் வளைதல் - பாய் முடைதல் - பட்டு நெசவு செய்தல் - மண் பொம்மைகள் செய்தல் - கூடை பின்னுதல் - கலைஞர்கள் அணியும் அணிகலன் செய்தல் திட்டம்- தெருக்கூத்து- கரகாட்டம் - வில்லுப்பாட்டு -கணியான் கூத்து - ஓயிலாட்டம் - தோல்பாவை கூத்து- சிலம்பாட்டம் -வளரி-புலியாட்டம் - தமிழர்களின் விளையாட்டு(PROJECT)

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அலகு - III பக்தி இலக்கியம்

சைவ சமயம் - திருஞானசம்பந்தர்- கோளாறு பதிகம், திருநாவுக்கரசர் -சொல் துணை வேதியன்- நமச்சிவாய பதிகம், மாணிக்கவாசகர்- திருவாசகம் -போற்றி திரு அகவல், திருக்குறிப்புத் தொண்ட நாயனார்- வைணவ சமயம் -பொய்யாழ்வார், சாக்கம் - காஞ்சி காமாட்சி அம்மன்- ஆதிசங்கரரும் காமாட்சி அம்மன்

12

அலகு - IV இலக்கியமும் கணித அறிவியலும்

போதையனார் கர்ணம் கண்டறிதல் - குறுக்கையூர் காரி நாயனார் கணக்கதிகாரம் - என் அறிதல் - நில வளம்அறிதல் - நூட்ப அறிதல் - களஞ்சியறிதல் - எடை அறிதல்- நாழிகை அறிதல்- அகவை அறிதல் - தேவகாலம் அறிதல்- வெற்றிலை கணக்கு- நெல் விற்பனை கணக்கு- பால் கணக்கு- முத்து கணக்கு - ரத்தின வாணிபக் கணக்கு -வெள்ளரிக்காய் கணக்கு- கற்பூர கணக்கு

12

அலகு - V படைப்பிலக்கிய பயிற்சி

கவிதை,சிறுகதை, நூல் மதிப்பீட்டு பயிற்சி ஏதேனும் ஒரு கருவை கொடுத்து கதை கவிதை எழுதச் செய்தல்

12

TOTAL : 60

பாடநூல் :-

1. சிலப்பதிகாரம் புலியூர் தேசிகன் பாரிநிலையம் சென்னை-108
2. மணிமேகலைபுலியூர் தேசிகன் பாரிநிலையம் சென்னை-108
3. சீவக சிந்தாமணிபுலியூர் தேசிகன் பாரிநிலையம் சென்னை-108
4. சீறாப்புராணம்புலியூர் தேசிகன் பாரிநிலையம் சென்னை-108
5. கவின்மிகு கைவினைப் பொருட்கள் செய்முறையும் விளக்கமும் நர்மதா பதிப்பகம்
6. கணக்கு அதிகாரம் கொறுக்கையூர் காரி நாயனார் திருநெல்வேலி தென்னிந்திய சைவ சித்தாந்த நூல் பதிப்பு கழகம் திருநெல்வேலி
7. பெரிய புராணம்புலியூர் தேசிகன் பாரிநிலையம் சென்னை-108

பார்வை நூல் :-

1. தமிழ் இலக்கியங்களில் வாழ்வியல் சிந்தனைகள் பல்லவி பதிப்பகம் ஈரோடு-11
2. வகைமை நோக்கி தமிழ் இலக்கிய வரலாறு,பாக்கிய மேரி,நியூ செஞ்சுரி புக் ஹவுஸ் சென்னை

<b>BSC233LH01</b>	<b>LANGUAGE – III</b> <b>( HINDI – III )</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)

**UNIT –I INTRODUCTION TO VOCABULARY:**

- Sabd Rachana and Sabd Vichar
- Prefix and Suffix practices
- Correction of Sentences pertaining to NE pratyay
- Chahiye* and *Apna* Usage

**UNIT – II HINDI LITERATURE – OLD POETRY:**

- Kabir ke Dohe
- Vrind Ke Dohe
- Kanthasthikaran aur Vyakhya bhag

**UNIT – III HINDI LITERATURE – MODERN POETRY:**

- “Jhanda ooncha rahe Hamara” by Shyam lal Parshad
- Selected 2 poems from Famous Hindi poets ( Nirala and Dinkar)

**UNIT – IV HINDI LITERATURE- PROSE:**

- Mundan : Harishankar parsaayee
- Teen kahaaniyaan (Bhoot, Galib and others)

**UNIT – V HINDI Grammar:**

- Translation of Sentences
- Different Usage of tense
- Tense Changing
- Sentence changing as per given direction (Ling and Vachan)

**TEXT BOOKS:**

- HINDI SOURABH** (Prepared by Department of Hindi, SCSVMV)

**REFERENCES:**

- Dinkar ka Kavya : Jagmohan sharma, Rashtriya Hindi Sahitya Parishad, New Delhi 2016
- Hindi Kavya me Rashtriya Ekatha : Krishna Bhavuk, Hindi Sahitya Parishad, New Delhi 2016
- Rashtriyatha aur Hindi Cinema : Kumar Bhaskar, Hindi Sahitya parishad, New Delhi

<b>BSC233LS01</b>	<b>LANGUAGE – III ( SANSKRIT – III )</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)

**Unit - I भाग: - क**

**Eloquence of Mahabharata** 1-15 Verses

**Unit - II भाग: - ख**

**Eloquence of Mahabharata** 16-30 Verses

**Unit - III भाग: - ग**

**Hitopadesa** - Prologue

- Stories -
1. Old Tiger and Traveller
  2. Cat and Vulture

**Unit - IV भाग: - घ**

**Hitopadesa** - Stories -

1. Pair of Crows
2. Pair of Tittibhas
3. Rabbits and Elephant

**Unit - V भाग: - ङ**

**Hitopadesa** - Stories -

1. Jackal
2. Crane and Crab
3. Camel

**TEXT BOOKS:**

1. **Eloquence of Mahabharata**, Prepared by Dept. of Sanskrit and Indian Culture, SCSVMV University.
2. **Hitopadesa** - Compiled by Dept. of Sanskrit and Indian Culture, SCSVMV University.

<b>BSC233E02</b>	<b>ENGLISH – III</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

**(For Students admitted from 2023 onwards)  
(Common to B.C.A. / B.Sc.(Computer Science )**

**OBJECTIVES**

- To use listening strategies to identify the main ideas from different sources.
- To identify the characteristics of effective speaking and to express the ideas with proper vocabulary and sentence formation.
- To activate and reinforce the basic skills – grammar, vocabulary, pronunciation and writing.
- To use the required writing conventions when creating a paragraph or any type of writing.
- To apply LSRW skills in regular practice.

**OUTCOME**

Students will be able to:

- Use cohesion mechanism to distinguish different ideas
- Speak with a reasonable degree of fluency and accuracy.
- Understand and use proper vocabulary, grammar and make use of language resources (e.g dictionary and thesaurus)
- Describe, analyze and present the information clearly, concisely and logically.
- Comprehend and use the strategies of LSRW in real time.

**SYLLABUS**

**UNIT – I LISTENING**

Introduction to listening – Listen for gist and respond – Listen for details and key words to understand specific meaning – Listen and respond to questions and requests for personal information – Listen to simple conversations in everyday contexts and respond – Listen to lectures, presentations and other suitable listening materials from electronic media, and take notes – Listen to telephone calls and respond; keep notes while listening – Listening to announcements (railway/bus stations/airport/stadium announcement, etc.) – Listening to radio and TV – Common barriers to the listening process.

**12**

**UNIT – II SPEAKING**

Use conversation starters: Introducing oneself, introducing others, small talk about family, friends, hobbies, profession, studies, etc. – Use of a dictionary for pronunciation practice – Summarize academic readings and lectures, and make presentations – Describe graphs, tables, and charts – Describe machines and their functions, e.g. computers and hardware – Describing processes, e.g. how to download apps in mobile handsets – Ask for and give permission, seek clarification, offer and respond to offers – Ask questions and respond to questions politely – Congratulate people on their success, apologize.

**12**

### **UNIT – III READING**

Reading comprehension – Four modes of reading (oral reading to an audience, oral reading to oneself, silent reading, silent reading while listening) – Pre-/during-/post-reading activities – Reading to enrich vocabulary – Skimming through reading texts and determine two or more main ideas or themes – Scanning through reading texts to understand and explain how key details support the – main ideas or themes.

**12**

### **UNIT – IV WRITING**

Basic paragraph structure: main idea, supporting sentences, use of examples, conclusion – Use basic sentence structures to write a paragraph; use cohesive devices to connect sentences in a paragraph – Use transitional devices for cohesion and for contrast paragraph internally and between paragraphs (The above structures and devices to be consciously used in all writing tasks) – Understand and use text structures in paragraphs: - sequencing, comparing and contrasting, relating cause and effect, problems and problem solving – Write informal letters, applications, and official letters of request and denial – Write official e-mails, memos and notices.

**12**

### **UNIT – V ACTIVITIES ON LSRW**

Teacher and student made activities on Listening, Speaking, Reading and Writing

**12**

**TOTAL : 60**

### **TEXT BOOKS:**

1. Ramesh, M.S. Business Communication. New Delhi: R. Chand & Co. 2003
2. FitzGerald, Helen. Cross Cultural Communication. Melbourne: Hospitality Press. 2002



<b>BSC233T03</b>	<b>RELATIONAL DATA BASE MANAGEMENT SYSTEMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)**

### **COURSE OBJECTIVES**

- To understand the different database models and language queries to access databases.
- To understand the normalization forms in building an effective database tables
- To protect the data and the database from unauthorized access and manipulation
- To recognize the importance of database analysis and design in the implementation of any Database application and to understand the process of drawing the ER-Diagrams.
- To get the knowledge of the roles of transaction processing and concurrency control.

### **COURSE OUTCOMES**

- Define, manipulate, and control a relational database management system
- Build a database management system that satisfies relational theory
- Design SQL based applications
- Discuss normalization techniques with simple examples.
- Describe transaction processing and concurrency control concepts.

## **SYLLABUS**

### **UNIT – I**

Database – Database Management Systems – Benefits of DBMS – Levels of Abstraction – Database Models – Database Design: Entities – Attributes – Entity Sets – Relationship – Keys – ER Diagram

**12**

### **UNIT – II**

Introduction to RDBMS – Codd’s Rules for DBMS – Normalization – First Normal Form – Keys and Functional Dependencies – Second Normal Form – Third Normal Form – BCNF.

**12**

### **UNIT – III**

Introduction to SQL – SQL Query Language – Data Types – Operators – DDL Commands: Create – Delete – truncate – drop. DML Commands: Insert – Delete – Update. DCL Commands: Grant – Revoke. Built in Functions: Numeric – String – Aggregate – Date and Time – Miscellaneous Functions.

**12**

### **UNIT – IV**

Interactive SQL Statements: Group By – Having – In Statement – Sub-queries. Join statements: Inner join – Outer join – Cross join – Self Joins. Set Operations: Union – Intersect – Minus.

**12**

**UNIT – V**

PL/SQL – PL/SQL Block – Data Types – Control Structures – Procedures – Functions –  
Cursor: Implicit Cursor – Explicit Cursor – Trigger

**12****TOTAL: 60****TEXT BOOKS:**

1. Abraham Silberchatz, Henry F. Korth, S. Sudarshan, Database System Concepts, 6<sup>th</sup> Edition, McGraw-Hill, 2010 .... (Unit - 1)
2. Ivan Bayross, SQL, PL/SQL The Programming Language of ORACLE, 4<sup>th</sup> Revised Edition, BPB Publications 2009 ... (Unit - 2 to 5)

**REFERENCE BOOKS:**

1. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems, 3<sup>rd</sup> edition, McGraw-Hill 2003.
2. Date, C.J., An Introduction to Database Systems, 8<sup>th</sup> Edition, Addison Wesley, 2004.

<b>BSC233T04</b>	<b>COMPUTER SYSTEM ARCHITECTURE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**  
**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science)**

**COURSE OBJECTIVES**

- To impart knowledge on various types of Registers and Microinstructions
- To discuss about the Data path design and Processor design in detail.
- To discuss about the registers, interface and communication in I/O devices.
- To understand the Input /Output interfaces – and modes of transfer
- To understand the types of memory organizations.

**COURSE OUTCOMES**

- Classify the various types of registers, microinstructions and addressing modes.
- Design the data path for processor
- Demonstrate the usage of Memory Organization.
- Describe about the I/O devices.
- Explain the characteristics, structure, communication and synchronization of multiprocessor

**SYLLABUS**

**UNIT – I**

Instruction Codes – Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle – Memory Reference Instructions – Input – Output and Interrupt. **12**

**UNIT – II**

Central processing unit: General register organization – Stack organization – Instruction formats – Addressing modes **12**

**UNIT – III**

Computer Arithmetic: Addition - subtraction – Multiplication – Division Algorithms. **12**

**UNIT – IV**

Input – Output organization: Peripheral devices – Input /Output interfaces – modes of transfer – Direct Memory Access (DMA) **12**

**UNIT – V**

Memory organization: memory hierarchy – main memory – Auxiliary memory – Associative memory – Cache memory **12**

**TOTAL: 60**

**TEXT BOOK:**

1. Computer System Architecture – M.MorrisMano, Pearson India, Third Edition, 2007.

**REFERENCE BOOKS:**

1. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software interface”, Elsevier, Third Edition, 2005
2. Carl Hamacher, ZvonkoVranesic and SafwatZaky, “Computer Organization”, Tata McGraw Hill, Fifth Edition, 2002

<b>BSC233A05</b>	<b>APPLIED PHYSICS – I</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**COURSE OBJECTIVES**

- Gain knowledge in the elastic behaviour of a material and bending behaviour of beams and analyse the expression for young's modulus.
- Analyse waves and oscillations. Study the basic properties and production of ultrasonics by different methods.
- Understand the basic principle of laser and characteristics. Understand the theory of types of lasers.
- Understand the basic concepts of optical fibres. Understand the applications part of optical fibre into communications systems.
- Learn the basic knowledge on the working of various semi-conductor devices and knowledge on basic digital electronic gates

**COURSE OUTCOMES**

- Understand the properties, elastic behaviour of a material and bending of beams and analyse the expression for young's modulus.
- Experience the diverse applications of acoustics and sound waves. Learn the basic properties and production of ultrasonic's by different methods.
- Have gained adequate knowledge on laser fundamentals types & applications
- Acquire basic knowledge on various types fiber and signal propagation through fiber optics.
- Understand the principles and concepts of Electronics, Electrical devices like PN Junction diodes, Zener diode as Peak Clipper and FET.

**SYLLABUS**

**UNIT – I      PROPERTIES OF MATTER**

Elasticity - Stress – Strain – Hooke’s law – Moduli of elasticity- Poisson’s ratio- Elastic behaviour of Material – Factors affecting Elasticity – Young’s modulus by cantilever-Non - uniform Bending

**12**

**UNIT – II      TECHNICAL ACOUSTICS**

Reverberation time - Acoustics of buildings – Reverberation, echo, creep, focusing, standing wave, Principles to be observed in the Acoustical design of an Auditorium – Noise Pollution – Absorption coefficient - Ultrasonics -Generation – Piezoelectric method –Applications of Ultrasonics in industries.

**12**

### **UNIT – III LASER**

Principles – Einstein theory of spontaneous and stimulated emission – Population inversion - Nd: YAG laser, CO<sub>2</sub> laser – Applications of Lasers in 3D profiling, computer peripherals such as CD-ROM.

**12**

### **UNIT – IV FIBER OPTICS**

Types of Optical Fibers – step index – graded index single mode – multiple mode fiber – acceptance angle – Numerical aperture – applications in engineering and medicine.

**12**

### **UNIT – V ELECTRONICS**

P-N Junction and P-N Junction Diode - Zener Diode – V-I Characteristics – Zener diode as Peak Clipper- Field Effect Transistors (FET) –Types – Junction Field Effect Transistor (JFET)– Static and Transfer Characteristics.

**12**

### **REFERENCES:**

1. Properties of Matter - D.S. Mathur. (Unit I), 2010
2. Sound – Brijilal & Subramanian. (Unit II), 2018
3. Engineering Physics - M.N. Avadhanulu. (Unit II &III), 2018
4. Introduction to Fiber Optics - Ghatak. (Unit IV), 2012
5. Basic Electronics (Solid State) – B.L Thereja (Unit V), 2007

### **TEXT BOOKS:**

1. Venkatramanan, Raja, Sundarrajan, “Applied Physics for Engineers”, SCITECH Publishers, 2011
2. R.K.Gaur & S.L.Gupta , “Modern Engineering Physics”, Dhanpat Rai publications, 2011
3. A.S. Vasudeva, “Modern Engineering Physics”, S. Chand & Company Ltd., 2013
4. Bhattacharya, Bhaskaran, “Engineering Physics”, Oxford Publications, 2010

<b>BSC233P06</b>	<b>RDBMS LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>6</b>	<b>2</b>

**(For Students admitted from 2023 onwards)**  
**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science)**

**COURSE OBJECTIVES**

- To give practical training in design and implementation of relational data bases for the selected set of problems.
- To understand and write queries for DDL, DML and DCL Commands.
- To impart the knowledge to implement Sub queries and Joins.
- To learn to implement PL/SQL programs for simple problems.
- To impart the knowledge to implement PL/SQL programs for database access.

**COURSE OUTCOME**

- Ability to implement DDL, DML and DCT commands.
- Understand and Implements Sub queries and Joins.
- Implements PL/SQL Program for simple problems.
- Ability to implements functions in PL/SQL.
- Implements PL/SQL programs for Database access.

**LIST OF EXERCISES**

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS.
3. Sub-queries and JOINS
4. PL/SQL program for inserting record into employee table.
5. PL/SQL program for selecting records from employee table whose name begin with 'a'
6. PL/SQL block to generate EVEN, ODD numbers less than n using any one looping statement.
7. PL/SQL program to display employee names from employee able, those who are in department no.10 using cursor.
8. PL/SQL Program to Raise an Application Error when the Employee Salary is Greater than 3000 using Employee Table.
9. PL/SQL program to copy the content of one Table to another Table.
10. PL/SQL program to find the biggest among two numbers using function.

<b>BSC233V07</b>	<b>SOFT SKILLS - I</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA

### **COURSE OBJECTIVES**

- To understand the basic English Grammar usage and Vocabulary.
- To sensitize students the significance of nonverbal communication and academic writing.
- To improve students ability to speak fluently and interactively.
- To learn basic concepts of number system
- To understand basic idea about general aptitude

### **COURSE OUTCOMES**

- Use basic grammar in both short conversation and writing.
- Convey information and thoughts in a good manner
- Communicate fluently.
- Able to solve number problems
- Able to understand and solve different quantitative problems

### **SYLLABUS**

#### **UNIT – I GRAMMAR-I:**

Parts of Speech-Tenses-Modal Verbs-Vocabulary – One word substitution, Homophones and Homonyms, phrasal verbs

#### **UNIT – II WRITING AND COMMUNICATION:**

Forms of Non-Verbal Communication – Kinesics, Proxemics, chronemics and effective use of Body language -Effective use of Audio-visual aides and modes of presentation-Note-making, Precise writing, structure of paragraph, Review a book/journal

#### **UNIT – III SPEAKING:**

Introducing Oneself -Greetings and Introduction-Short Group Conversations-Extempore speech – Practice

#### **UNIT – IV APTITUDE SKILLS – I:**

Numbers – H.C.F & L.C.M – Decimal Fractions – Simplifications – Square root & Cube roots

#### **UNIT – V APTITUDE SKILLS – II:**

Problems on Ages – Percentage – Surds & Indices – Profit & Loss – Ratio & Proportion



**TEXT BOOKS:**

1. Greenbaum, Sidney, "The Oxford English Grammar", Clarendon Press, 1996.
2. Hartley and Bruckmann, "Business Communication", Routledge, 2006.
3. R S Aggarwal, "Quantitative Aptitude for Competitive Examinations", S.Chand Publications,2017

**REFERENCES:**

1. R S Aggarwal,"A Modern Approach to Non-Verbal Reasoning", S.Chand Publications,2017.

BSC234LT01	LANGUAGE – IV ( TAMIL – IV )	L	T	P	C
		3	1	0	3

(For Students admitted from 2023 onwards)  
(Common to B.C.A. / B.Sc.(Computer Science))

நோக்கம்

- சங்க இலக்கியத்தின் வாயிலாக அகப்புறக் கோட்பாடுகளை அறிதல்- பக்தி இலக்கியங்களின் வாயிலாக பண்பாட்டுக் கலாச்சாரம் போன்ற வாழ்வியல் விழுமியங்களை கற்று அறிதல்- உரைநடை இலக்கியங்களின் வழியாக மாணவர்களுக்கு வாசித்து திறனை ஊக்குவித்தல்- மாணவர்களுக்கு படைப்பாற்றலைத் தூண்டுதல்
- தமிழர்களின் அகப்புற கோட்பாடுகளை சங்க இலக்கியத்தின் வாயிலாக கற்றுக் கொடுத்தல். தமிழர்களின் வீரம் கொடை அறம் சார்ந்த நிகழ்வுகளை ஊடகங்கள் வழி பதிவு செய்தல்
- உரைநடை இலக்கியத்தின் வாயிலாக மாணவர்களின் வாசிப்புத்திறனை மேம்படுத்துதல்
- சமயச் சான்றோர்களையும் அவர்களின் பாடல்களையும் கற்றுக் கொடுத்தல்
- பயண நூல்களில் வாயிலாக ஒரு ஊரின் முக்கிய சிறப்புகளையும் முக்கிய இடங்களையும் தலைவர்களையும் எடுத்துரைத்ததல்
- தனி மனிதன் உரிமைகள் பற்றிய மாணவர்களை அறியச் செய்தல் பெண்ணுரிமை பற்றியும் மனிதர்களுக்கான ஒவ்வொரு உரிமைகளை தெரிந்து கொள்ளுதல் நோக்கமாகும்

பயன்

- சங்க இலக்கியத்தின் வழி அகப்புறக் கோட்பாடுகளை அறிந்து கொள்ளுதல்- பக்தி இலக்கியங்களின் வழி பண்பாடு கலாச்சார விழுமியங்களை அறிந்து கொள்ளுதல், சிறந்த படைப்பாளராக பன்முகத்திறன் பயிற்சி பெற்று தேர்ச்சி பெறுதல்
- தமிழர்களின் அகப்புறக் கோட்பாடுகளை அறிந்து கொண்டு ஏதேனும் ஒரு ஊடகத்தின் வழி தான் கற்றவற்றை வெளிப்படுத்துதல்
- மாணவர்கள் தங்கள் வாசிப்பு திறனை மேம்படுத்தி தமிழினை தங்கு தடை இன்றி படித்தல்
- சமயச் சான்றோர்களின் பாடல்களைப் படித்து மனனம் செய்து தங்கள் வாழ்க்கையின் நிகழ்வுகளில் பயன்படுத்துதல்
- ஒரு ஊரின் முக்கிய சிறப்புகளையும் முக்கிய இடங்களையும் தலைவர்களையும் சிறப்பினை அறிந்து போற்றுதல்
- மனித உரிமை பற்றிய புரிதல் மனித உரிமை ஆணையம் குறித்து அறிதல் ஒவ்வொரு மனிதர்களும் தனக்கான உரிமையை அறிந்து கொள்ளுதல்

### பாடத்திட்டங்கள்

அலகு - I சங்க இலக்கியம்

தமிழகத்தின் தாவரங்களுக்கும் விலங்குகளும், தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள், தமிழர்கள் போற்றிய அறக்கோட்பாடு, சங்க காலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி, சங்ககாலத்தில் தமிழர்களின் எழுத்தறிவும் கல்வியும், வீரம் கொடை அறம் சார்ந்த நிகழ்வுகளின் காட்சி பதிவு - திரைப்படம், தொலைக்காட்சி, வானொலி, இதழ்கள் திட்டம் (PROJECT)

12

அலகு - II உரைநடை

சங்க நெறிகள் முனைவர் வ.சு.ப மாணிக்கம் - தமிழர் பண்பாடு ஒரு விளக்கம் -டாக்டர் சோ. நா. கந்தசாமி விருந்தோம்பல் நேற்று இன்று நாளை சரளா ராஜ கோபாலன்

12

அலகு - III பக்தி இலக்கியம்  
கௌமாரசமயம்- திருப்புகழ்- அருணகிரிநாதர்- கணா பத்தியம்- விநாயகர் அகவல்கள் -சரஸ்வதி அந்தாதி  
-கம்பர்

12

அலகு - IV பயண நூல் (வழி காட்டி)  
காஞ்சிபுரம் ஒரு தரிசன வழிகாட்டி கோவில்கள் -மடங்கள் -புகழ் பெற்ற இடங்கள்

12

அலகு - V மனித உரிமைகள்  
மனித உரிமை பற்றிய புரிதல் - மனித உரிமை வரலாறு பண்புகளும் அறிதல் - ஒவ்வொரு  
மனிதர்களும் உள்ள உரிமைகளைத் தெரிந்து கொள்ளுதல்- குழந்தைகளின் உரிமைகள் -  
கொத்தடிமைகள் -பெண் உரிமை

12

பாடநூல் :-

1. தமிழக வரலாறு மக்கள் பண்பாடு கேகே பிள்ளை தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் கழகம்
2. வகைமை நோக்கி தமிழ் இலக்கிய வரலாறு, பாக்கிய மேரி,நியூ செஞ்சுரி புக் ஹவுஸ் சென்னை
3. சங்க இலக்கியம் பாரிநிலையும் சென்னை 108
4. காஞ்சிபுரம் ஒரு தரிசன வழிகாட்டி தங்கத்தாமரை பதிப்பகம் அடையாறு சென்னை 20
5. கீழடி வைகை நதிக்கரையில் சங்க கால நாகரிகம் தொல்லியல் துறை வெளியீடு
6. முனைவர் . ஜெ. தியாகராஜன் மனித உரிமைகள் நிர்மலா பதிப்பகம் மதுரை -1

பார்வை நூல் :-

1. தமிழ் இலக்கியங்களில் வாழ்வியல் சிந்தனைகள் பல்லவி பதிப்பகம் ஈரோடு-11

<b>BSC234LH01</b>	<b>LANGUAE – IV ( HINDI – IV )</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)**

**UNIT –I INTRODUCTION TO FUNCTIONAL HINDI:**

- Raj Bhasha Rashtra Bhasha and Sampark Bhasha
- Functional Hindi- Introduction

**UNIT – II INTRODUCTION TO OFFICIAL LANGUAGE TERMINOLOGY:**

- Technical usage of Official Terminology
- Introduction to Official Language – Glossary

**UNIT – III HISTORY OF HINDI LITERATURE:**

- Introduction to History of Hindi Literature
- The different periods of Hindi Literature – an Outlook
- Pakshiyon se udnaa seekha : Abdul Kalam

**UNIT – IV HISTORY OF HINDI LITERATURE- FAMOUS PERSONALITIES:**

- Famous Hindi Poets
- Famous Hindi Prose Writers

**UNIT – V LETTER WRITING:**

- Different models of Letters – Practice
- Personal Letters- Practice
- Official Letters - Practice

**TEXT BOOKS:**

- HINDI SOURABH** (Prepared by Department of Hindi, SCSVMV) & material of Translation prepared by Department of Hindi.

**REFERENCES:**

- Hindi Sahitya ka naya Ithihas : Dr. Ramkumar Varma, Rajkamal Prakashan 1997.
- Pramukh Kala Jayi Hindi kavi : KrishnaDev Jhari, Hindi Sahitya Parishad, New Delhi 2016.
- Aadhunik Hindi Kavitha : Dr. Jagadish Chandra Sharma, Hindi Sahitya parishad, New Delhi 2016.

<b>BSC234LS01</b>	<b>LANGUAGE – IV ( SANSKRIT – IV )</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)**

**UNIT - I भाग: - क**

**Ramodantam** - Balakanda 1-20 Verses

**UNIT - II भाग: - ख**

**Ramodantam** - Balakanda 21-30 Verses

**UNIT - III भाग: - ग**

**Vyasavacanabhagavatam** (From Kathamukham to Putanavadha)

**UNIT - IV भाग: - घ**

**Vyasavacanabhagavatam** (From Sakatabhanga to Devendragarva Bhanga)

**UNIT - V भाग: - ङ**

**Poets of Sanskrit** - Kalidasa, Bharavi, Magha, Sriharsa.

**TEXT BOOKS:**

1. **Ramodantam** - R.S. Vadhyar & Son, Palaghat.
2. **VyasavacanaBhagavatam** - K.Srinivasacari, The little flower & Co, Madras.
3. **History of Sanskrit literature.**

<b>BSC234E02</b>	<b>ENGLISH – IV</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

**(For Students admitted from 2023 onwards)  
(Common to B.C.A. / B.Sc.(Computer Science))**

**OBJECTIVES**

- To comprehend the significance of communication and its purpose
- To listen actively, speak clearly and using proper language in telephone conversation.
- To apply effective communication skills in a variety of public and interpersonal settings
- To build the professional skills needed for career development and to present it effectually and ethically.
- To utilize the strategies of Verbal and Nonverbal communication in various facets of presentation

**OUTCOME**

- Understand the importance of communication and its techniques
- Use proper language and speak convincingly and pleasingly.
- Interact proficiently and ethically
- Present professional skills in an effectual way.
- Apply the essential components of a presentation.

**SYLLABUS**

**UNIT – I COMMUNICATION**

Communication: Meaning, Nature, Importance and Purpose of Communication - Types of Communication - Process of Communication – Communication Network in an Organization – Strategy for Effective Communication – Verbal and Non- Verbal Communication – Barriers to Communication – Essentials of Good Communication – Communication Techniques.

**12**

**UNIT – II TELEPHONIC SKILLS**

Basics of telephone communication – how to handle calls – telephone manners – leaving a message – making requests – greeting and leave taking over phone(etiquette) – asking for and giving information – giving instructions – listening for tone / mood and attitude at the other end handling the situations especially trouble shooting – teleconference handling – handling Tele interviews for Call Centres

**12**

### **UNIT – III EFFECTIVE COMMUNICATIONS**

Making enquiry & requests – Answering general questions – railway enquiry – looking for accommodation – asking about a course – asking for / and giving directions.

**12**

### **UNIT – IV CAREER SKILLS**

Applying for job – Cover letters – Resume and Effective Profiling – Interviews – Group discussions. Importance and Factors Involving Job Interview – Characteristics of Job Interview – Job Interview Process – Job Interview Techniques – Manners and etiquettes to be maintained during an interview – Sample Questions Commonly asked During Interview.

**12**

### **UNIT – V PRESENTATION SKILLS**

Presentation Skills – Interviews – Public Speaking – Preparing a Speech – Organising the Speech – Special Occasion Speeches – self-introduction.

**12**

**TOTAL : 60**

### **TEXT BOOK:**

1. Kavita Tyagi, Padma Misra. Professional Communication. New Delhi: PHI Learning Pvt. Ltd. 2011

<b>BSC234T03</b>	<b>JAVA PROGRAMMING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**  
**Common for B.Sc. (CS) / BCA / B.Sc. (Cyber Security)**

**COURSE OBJECTIVES**

- To identify Java language components and how they work together in applications
- To learn the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
- To learn how to extend Java classes with inheritance and dynamic binding and how to use exception handling in Java applications
- To understand how to design applications with threads in Java
- To understand how to use Java APIs for program development

**COURSE OUTCOMES**

- Able to realize the concept of Object Oriented Programming & Java Programming Constructs
- Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords
- Apply the concept of exception handling and Input/ Output operations
- Able to design the applications of Java & Java applet
- Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit

**SYLLABUS**

**UNIT – I JAVA BASICS**

The History and Evolution of Java - Overview of Java – Program Structure -Data Types, Variables, Arrays, Operators -Control Statements- Classes - Objects – Methods - Constructors- this keyword – finalize() method -- Method Overloading - Constructor Overloading.

**12**

**UNIT – II INHERITANCE, PACKAGES AND INTERFACE**

**Inheritance:** Member Access and Inheritance – Multilevel Hierarchy - Method Overriding – Dynamic Method Dispatch - Keywords: Abstract – Super - Final – Static - **Packages:** Defining a Package - Access Protection - Importing Packages. **Interfaces:** Defining an Interface - Implementing Interfaces.

**12**

**UNIT – III EXCEPTION HANDLING AND STRING HANDLING**

**Exception Handling** – Concepts of exception handling, Exception types, uncaught exceptions, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. **String Handling** – Special String operations, Character Extraction, String Comparison, Modifying a string and String Buffer.



12

**UNIT – IV MULTI THREADING AND I/O PACKAGES:**

**Multithreading** – Java thread model, creating threads, creating multiple threads, inter-thread communication Thread Priorities – Synchronization – Deadlock. **Java I/O Streams** – Stream classes, Byte Streams, Character Streams, and Exploring Java.io. Package - Java Scanner Class, Wrapper Classes.

12

**UNIT – V APPLETS AND EVENT HANDLING**

**Applets** – Applet Basics, Applet architecture, Applet skeleton, Applet initialization and termination, simple applet display methods, simple banner applet, creating applets, passing parameters to applets. AWT – Working with Windows, Graphics and Text – Using AWT Controls – Layout Managers. **Event Handling** - Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes.

12

**TOTAL : 60**

**TEXT BOOKS:**

1. Java the complete reference, 7<sup>th</sup> edition, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson education.

**REFERENCES:**

1. Herber Schildt “Java : A Beginner’s Guide”, 7<sup>th</sup> Edition, Oracle Press, Tata McGraw Hill, Education, 2017
2. Cay S.Horstmann, “Core java volume 1- Fundamentals”, 10<sup>th</sup> Edition Prentice Hall, 2016.
3. Rajkumar Buyya, ThamaraiSelvi S. and Xingchen Chu, “Object Oriented Programming with Java Essentials and Applications”, Tata McGraw Hill Publishing Company, New Delhi, 2011.
4. Herber Schildt “The Complete Reference – Java 2“, 11<sup>th</sup> Edition, Oracle press, Tata McGraw Hill, Education, 2019.
5. Somasundaram. K, “Programming in Java2”, 10<sup>th</sup> Edition, Jaico Publishing House, Mumbai, 2010.

<b>BSC234T04</b>	<b>OPERATING SYSTEMS AND SYSTEM ADMINISTRATION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA

**COURSE OBJECTIVES:**

- To impart knowledge on different types of Operating System
- To learn and implement the concept of Process Management
- To observe the concept of storage management
- To understand the concept of I/O and file systems
- To learn the basics of Linux Programming

**COURSE OUTCOMES:**

- Understand the fundamental components of a computer operating system.
- Apply the concepts of CPU scheduling, synchronization and deadlocks in real computing problems.
- Demonstrate the different memory and I/O management techniques used in Operating Systems.
- Design and construct the Memory management systems in the modern operating system.
- Have practical exposure to the concepts of Windows, Linux and shell Programming

**SYLLABUS**

**UNIT – I INTRODUCTION**

Introduction - Operating system structures - System components - OS services - System calls - System structure -Resources Processes - Threads - Device management.

**12**

**UNIT – II PROCESS MANAGEMENT**

Processes - Process concepts - Process scheduling - Operations on processes - Cooperating processes - CPU scheduling -Basic concepts -Scheduling criteria - Scheduling algorithms.

**12**

**UNIT – III SYNCHRONIZATION AND DEADLOCKS**

The critical section problem - Semaphores - Classic problems of synchronization - Critical regions - Monitors-Dead locks -Deadlock characterization -Prevention - Avoidance - Detection - Recovery.

**12**

**UNIT – IV MEMORY MANAGEMENT**

Storage Management Strategies - Contiguous Vs. Non-Contiguous Storage Allocation - Fixed and Variable Partition Multiprogramming - Paging -Segmentation - Paging/Segmentation Systems - Page Replacement Strategies.

**12**

**UNIT – V      WINDOWS, LINUX ADMINISTRATION**

LINUX Security – LINUX Protection System – LINUX Authorization – LINUX Security Analysis – LINUX Vulnerabilities – Windows Security – Windows Protection System – Windows Authorization – Windows Vulnerabilities.

**12**

**TOTAL: 60**

**TEXT BOOKS:**

1. Abraham Silberschatz, Peter Galvin and Gagne, “Operating System Concepts”, Addison Wesley, 10<sup>th</sup> Edition, 2018.
2. Harvey M. Deitel,” Operating System”, Addison Wesley, 3<sup>rd</sup> Edition, 2004.

**REFERENCES:**

1. Gary Nutt,” Operating System, A modern perspective”, Addison Wesley, 3<sup>rd</sup> Edition, 2004.
2. Richard Peterson, “Linux: The Complete Reference”, Tata McGraw Hills, 6<sup>th</sup> Edition, 2008.

<b>BSC234A05</b>	<b>APPLIED PHYSICS – II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

(For Students admitted from 2023 onwards)

**COURSE OBJECTIVES:**

- Properties and synthesis of Nanomaterials
- Properties of para, dia, ferro, Ferri and antiferro magnetism
- Preparation, properties and applications of SMA, Metallic glasses and Bio materials.
- Characteristics of special purpose diodes [PIN diode, Photo diode, LCD and LCD]
- IC Fabrication and Logic gates

**COURSE OUTCOMES:**

- Understand the properties, Synthesis of nano materials and bending of beams, analyse Physical vapour deposition method and applications of nano materials
- Experience the diverse applications of Magnetic materials and properties. Learn the basic properties of dielectric materials
- Adequate knowledge on engineering materials, metallic glasses and superconductors
- Basic knowledge on various types of optoelectronic devices and applications
- Knowledge on the principles and concepts of Integrated circuits, Classification of IC's by Structure and function, linear and digital integrated circuits, fabrication of IC components

**SYLLABUS**

**UNIT – I NANO PHYSICS**

Introduction to Nano materials - Quantum confinement –Properties of nano materials – Synthesis of nano materials – Top down and bottom up approach – Ball milling and Physical vapour deposition method – applications of nano materials – CNTs

**12**

**UNIT – II MAGNETISM AND DIELECTRICS**

Types of Magnetic materials (Dia,Para and Ferro)– properties – Application- Floppy Disc - Dielectrics- Basic Definitions –Dielectric Breakdown – Dielectric loss– Internal field – Classius- Mossotti relation. Application of Dielectric materials

**12**

**UNIT – III ENGINEERING MATERIALS**

Introduction and Properties of Metallic glasses – Shape memory alloys – Bio materials - Superconductors- Introduction – Meissner effect – Type I & Type II superconductors – High Tc Superconductors

**12**

#### **UNIT – IV OPTOELECTRONIC DEVICES**

Photomultiplier Tube –Photo Conductive cells – P-N junction Photodiode – PIN Photodiode-  
Avalanche Photodiodes - Light Emitting Diode (LED) – Liquid Crystal Display (LCD)

**12**

#### **UNIT – V INTEGRATED CIRCUITS & LOGIC GATES**

Introduction –Scale of Integration - Classification of IC's by Structure and function – Linear  
and Digital Integrated Circuits- Fabrication of IC Components – Logic Gates- Positive and  
Negative Logic- The OR, AND, NOT Gates – Symbols and Truth table for Logic Operations  
– Universal Gates – The NAND & NOR gates – Symbols and Truth Table for Logic  
operations

**12**

**TOTAL: 60**

#### **REFERENCES:**

1. R. Murugesan, “Modern Physics”, S. Chand (Unit I), 2019.
2. M.N. Avadhanulu, “Engineering Physics”, S. Chand (Unit II&III ), 2018.
3. P.K. Palanisamy, “Engineering Physics”, Scitech Publications (Unit II &III), 2010.
4. B.L Thereja, “Basic Electronics (Solid State)”, S. Chand (Unit IV & V), 2007.

#### **TEXT BOOKS:**

1. R.K.Gaur & S.L.Gupta, “Modern Engineering Physics”, Dhanpat Rai Publications, 2019
2. A.S. Vasudeva , “Modern Engineering Physics”, S. Chand & Company Ltd. 1999
3. Bhattacharya, Bhaskaran, “Engineering Physics”, Oxford Publications, 2013
4. Venkatramanan, Raja, Sundarrajan, “Applied Physics for Engineers”, SCITECH, 2011.

<b>BSC234P06</b>	<b>JAVA PROGRAMMING LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>6</b>	<b>2</b>

**(For Students admitted from 2023 onwards)**  
**Common for B.Sc. (CS) / BCA / B.Sc. (Cyber Security)**

**COURSE OBJECTIVES**

- To develop programs using core java.
- To develop programs using Inheritance and Interfaces.
- To develop programs using exception handling.
- To implement the Thread concepts.
- To develop a web application using Applet.

**COURSE OUTCOMES**

- Implement the basic java programming concept and OOPs concept like Encapsulation, Polymorphism and inheritance.
- Applying an interface, exception and user define packages.
- Implement the String and String buffer classes.
- Implement the Inter thread concept using an Applet.
- Develop a web application using an Applet and Events.

**LIST OF EXERCISES**

1. Program to illustrate the concept of Class and Objects.
2. Program to illustrate the concept of Method overloading.
3. Program to illustrate the concept of Constructor overloading.
4. Program to illustrate the concept of Multiple Inheritance using interface.
5. Program to illustrate the concept of Exception handling.
6. Program to illustrate the concept of Packages.
7. Program to illustrate the concept of Multithreading.
8. Program to illustrate the concept of String and String Buffer.
9. Program to illustrate the concept of Graphic function using an Applet.
10. Program to perform the basic arithmetic operation using Event handling in an Applet.

<b>BSC234V07</b>	<b>SOFT SKILLS – II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA**

**COURSE OBJECTIVES**

- To familiarize students the importance and appropriate usage of grammatical structures.
- To impart knowledge on various interpersonal, intrapersonal communication and the qualities of leadership.
- To introduce students to various technologies that influence our communication conduct in order to achieve targeted communication goals and objectives.
- Effort has been made to accommodate fundamental, mathematical aspects to instil confidence among students
- To demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions

**COURSE OUTCOMES**

- Use grammatical structures in extended conversations and discussions
- Comprehend the significance of various types of communication and its application.
- Interact effectively and uprightly.
- Use their logical thinking and analytical thinking to solve quantitative questions
- Enhance the aptitude round clearing ability in interview process

**SYLLABUS**

**UNIT – I REMEDIAL ENGLISH GRAMMAR AND USAGE:**

Prepositions and words followed by prepositions-Concord (Agreement of the Verb with the Subject) - Error Analysis (Correction of Errors in a given sentence - errors in the use of words -Errors of Indianisms - use of slang - errors in punctuation)-Words commonly misspelt-Often confused words

**UNIT – II SOFT SKILLS FOR LEADERSHIP AND TEAM MANAGEMENT:**

Qualities of a Good Leader - Decision Making- Intrapersonal skills - Interpersonal skills Problem solving - Critical thinking - Negotiation skills

**UNIT – III ELECTRONIC COMMUNICATION:**

Internet, e-mail - Video conferencing - Blogging and Websites - Phone calls and Voice messages - Text Messages

**UNIT – IV APTITUDE SKILLS – III:**

Problems on Numbers – Partnership – Time & Work – Time & Distance – Problems on Trains

**UNIT – V APTITUDE SKILLS – IV:**

Permutation & Combination – Probability – True Discounts – Banker’s Discount – Odd Man out & Series

**TEXT BOOKS:**

1. Raman Meenakshi and Prakash Singh, “Business Communication”, 2<sup>nd</sup> Edition, Oxford Press, 2012.
2. Simon Sweeney, “English for Business Communication”, Cambridge University Press, 2003.
3. R S Aggarwal, “Quantitative Aptitude for Competitive Examinations”, S.Chand Publications, 2017

**REFERENCES:**

1. Jaggan Saneja, “Quantitative Aptitude Simplified”, 1<sup>st</sup> Edition, Notion Press, 2017.



<b>BSC235T01</b>	<b>C# AND .NET PROGRAMMING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)  
Common for B.Sc. (CS) / BCA / B.Sc. (Data Science)**

### **OBJECTIVES**

- To understand the foundations of CLR execution and .NET Framework.
- To develop background knowledge as well as core expertise in C#
- To learn the object oriented concepts
- To be aware of application development in .NET (Window Application and ADO.NET).
- To impart the knowledge on creation of web based applications on .NET (ASP.NET).

### **OUTCOMES**

- List the major elements of the .NET frame work
- Explain how C# fits into the .NET platform.
- Analyze the basic structure of a C# application
- Debug, compile, and run a simple application.
- Design and develop Console, Window and Web based applications on .NET using C#.

### **SYLLABUS**

#### **UNIT – I INTRODUCTION TO .NET**

NET Framework Architecture -.NET Framework Class Hierarchy- the System Namespace - **Introducing C#:** Data Types - Value and Reference Types, Boxing and Unboxing. Flow Control: Branching, Switching and Looping - Arrays –Jagged Arrays.

**12**

#### **UNIT – II OBJECT ORIENTED CAPABILITIES**

Classes and Objects – Inheritance - Polymorphism Abstract Classes-Sealed Classes- Partial Classes- Overriding – Overloading - Indexers and Properties – Delegates - Exception Handling- File IO – Serialization and Deserialization.

**12**

#### **UNIT – III WINDOW APPLICATIONS**

Window Forms – Properties – Events - **Controls:** Label – Textbox – Dutton – Radio Button – Check Box – List Box – Combo Box - Timer - Mouse and Keyboard Events – Designing Menus – Building MDI Applications- Common Dialog Controls – Rich Textbox Control.

**12**

#### **UNIT – IV DATABASE AND ADO.NET**

Sql Database – Data Controls : Grid view – List View – Form View – Details View – Repeater - **ADO.NET:** ADO.NET Architecture - ADO.NET Managed Providers: SQL Managed Provider-OLEDB Managed Provider - Accessing Data using ADO.NET - Reports.

**12**

## **UNIT – V    ASP.NET**

Introducing ASP.NET web forms – The Life Cycle of an ASP.NET Web Page - Server Controls: Textbox – List controls – File Upload – Link Button- Image Button, Calendar – Radio Button - Checkbox - Validation Controls-Data Binding-Building Database Applications.

**12**

**Total: 60**

### **TEXT BOOKS**

1. Ben Albahari and Joseph Albahari, C# 7.0 in a Nutshell, O'Reilly; 7<sup>th</sup> Edition, 2017.
2. Andrew Troelsen, Philip Japikse, “C# 6.0 and the .NET 4.6 Framework”, 7<sup>th</sup> Edition, Apress, 2015.
3. Greg Buczek, ASP.NET Developer's Guide, Tata McGraw Hill Education, 2017.

### **REFERENCES**

1. Herbert Schildt, “The Complete Reference: C# 4.0”, 1<sup>st</sup> Edition, Tata McGraw Hill, 2012.
2. Michael Otey, Denielle Otey, ADO.NET Complete Reference, Tata McGraw Hill, 4<sup>th</sup> reprint 2005

<b>BSC235T02</b>	<b>CLOUD COMPUTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science)**

**OBJECTIVES:**

- To learn the Basic concept and technologies of Cloud Computing.
- To learn the principle of Abstraction, Virtualization and load balancing.
- To know about the core issues in cloud security.
- To learn the different type of interoperability and storage issues in modern cloud.
- To learn about the mobile cloud and mobile services.

**COURSE OUTCOMES:**

- Describe the main concepts, key technologies, strengths and limitations of Cloud computing.
- Outline the principle of abstraction, virtualization, load balancing, capacity planning and cloud based services.
- Identify the core issues in cloud security and apply remedial measures.
- Determine the various interoperability and storage issues in modern cloud.
- Discover the key Smartphone web features.

**SYLLABUS**

**UNIT – I INTRODUCTION:**

Defining Cloud computing – Cloud Types – Characteristics of Cloud computing – Cloud Architecture – Cloud Computing Stack – Infrastructure as a Service – Platform as a Service – Software as a Service – Identity as a Service – Compliance as a Service – Parallel Processing: Introduction – Distributed Processing: Introduction.

**12**

**UNIT – II PLATFORMS AND CLOUD BASED SERVICES:**

Abstraction and Virtualization – Load Balancing and Virtualization – Hypervisors – Machine Imaging – Porting Applications – Capacity Planning – Google Web Services – Amazon Web Services – Microsoft Cloud Services.

**12**

**UNIT – III MANAGING AND SECURING THE CLOUD:**

Administrating the Cloud – Cloud Management Products – Cloud Management Standards – Securing the Cloud – Securing Data – Establishing Identity and Presence.

**12**

**UNIT – IV CLOUD BASED STORAGE AND PRODUCTIVITY SOFTWARE:**

Digital Universe – Provisioning Cloud Storage – Cloud Backup Solutions – Cloud Storage Interoperability – Using Productivity Applications – Online Office Systems.

**12**

**UNIT – V MOBILE CLOUD AND MOBILE WEB SERVICES:**

Mobile Market – Smart Phones with the Cloud – Mobile Web Services – Service Types – Service Discovery – Using SMS – Defining WAP and Other Protocols – Performing Synchronization.

**12**

**TOTAL: 60**

**TEXT BOOKS:**

1. Barrie Sosinsky, “Cloud Computing Bible”, 1<sup>st</sup> Edition, Wiley Publishing, 2015. For Unit I, II, III, IV, V
2. S.K. Basu, “Parallel And Distributed Computing: Architectures And Algorithms”, PHI Learning Private limited -Delhi, 2016. For Unit - I

**REFERENCES:**

1. Thomas Erl, Zaigham Mahood, Richard Puttini, “Cloud Computing, Concept, Technology and Architecture”, Prentice Hall, USA 2013.
2. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, 1<sup>st</sup> Edition, Morgan Kaufmann Publishers, USA, 2017.

<b>BSC235T03</b>	<b>WEB TECHNOLOGY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**Common for B.Sc.(CS) and BCA**

**(For Students admitted from 2023 onwards)**

**COURSE OBJECTIVES:**

- This course will introduce students to the World Wide Web and scripting languages.
- The emphasis is on the contemporary use of mark-up and scripting to create effective and attractive web sites.
- To develop the most important technologies that is being used today by web developers to build a wide variety of web applications.
- To understand and practice web development techniques on client-side
- Web applications using technologies such as HTML, Javascript, Angular JS and PHP.

**COURSE OUTCOMES:**

- The students should be able to create HTML5 documents, manipulation of images, tables, links and realize the power of Cascading Style Sheets (CSS).
- The learner will have an in-depth knowledge-on writing client-side JavaScript and to integrate JavaScript into web pages.
- The learner will gain a good practical knowledge on writing successful HTML/PHP code utilizing MySQL database.
- The learner will get exposed to handle and design rich client presentation using Angular JS.
- The learner will have an in-depth knowledge on structural framework for dynamic web apps

**SYLLABUS**

**UNIT – I HTML5 AND CSS**

Introduction to Web development – Websites – Languages – Tools - Structure of HTML – Contents: Text, Links, Images, Lists, Tables, Global Attributes, Form - Definition, Elements, Submission- Cascading Style Sheets - Applying Styles – References: Keywords, Id Attribute, Class Attribute, Other Attributes, Pseudo-Classes – Properties: Text, Colors, Sizes, Background, Borders, Shadows, Gradients, Filters, Transformations, Transitions, Animations.

**12**

**UNIT – II JAVASCRIPT**

Introduction to JavaScript – Variables, Conditionals and Loops, Control Transfer Instructions – Functions: scope, anonymous, standard function – Objects – methods, constructor, inheritance - keywords, constructors - Standard objects: String Objects, Array Objects, Date Objects, Math Object, Window Object, Document Object, Element Objects, Creating Element Objects – Events – Debugging – error event, exception – APIs

**12**

**UNIT – III PHP**

Introduction to PHP – Expressions and Control flow – PHP functions and objects – Array – Form handling – Cookies, Sessions and Authentication.

**12****UNIT – IV PHP and MySQL**

Introduction to MySQL – Making a Connection – Handling Errors - Creating Tables – Insert, Update and Delete Records with PHP - Retrieving data using Select.

**12****UNIT – V ReactJS and AngularJS**

**Basic of ReactJS** - Angular JS: Basics of AngularJS – MVC – Filters and Modules – Directives – Working with Forms – Creating and Using Services.

**12****TOTAL : 60****TEXT BOOKS:**

1. J.D. Gauchat, HTML5 for Masterminds, Third Edition, 2017
2. Robin Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, Oreilly, Third Edition, 2014.
3. Basarat Ali Syed, Beginning Node.js, Apress publications, 2014.
4. Ravi Kant Soni, AngularJS for java developers, Apress publications, 2017,

**REFERENCES:**

1. Deitel&Deitel, Goldberg, Internet and World Wide Web – How to Program, Fifth Edition, Pearson Education Asia, 2012
2. Tom Butler & Kevin Yank, PHP & MySQL – Novice to Ninja, Sixth edition, SitePoint, 2012
3. A. Ravichandran, Internet and Web Technology, Khanna Book Publishing Company, first Edition, 2013.
4. Steceb Holzner PHP: The Complete Reference, Tata McGraw Hill, 2007
5. Pawel Kozlowski and Peter Bacon Darwin, Mastering Web Application Development with Angular JS, Packt Publishing, 2013.

**E- REFERENCES**

1. <https://nptel.ac.in/courses/106105084/>

<b>BSC235TE04A</b>	<b>COMPUTER GRAPHICS AND MULTIMEDIA SYSTEMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**Common for B.Sc.,(CS) and BCA  
(For Students admitted from 2023 onwards)**

### **OBJECTIVES**

- To introduce Two and Three-dimensional graphical structure.
- To design 2D and 3D methods and Models
- To explore the visible surface detection with illumination and color models.
- To understand the concepts involved in multimedia and basis tools.
- To gain knowledge on Multimedia compression and animations.

### **COURSE OUTCOMES**

On completion of the course, the student will be able to

- Identify the various line & circle drawing algorithm.
- Study the various transformations in 2D and 3D objects.
- Understand the concepts of curves and surface.
- Apply transformation and clipping algorithm in 2D and 3D objects.
- Design Illumination and color models

### **SYLLABUS**

#### **UNIT – I**

Overview of graphics systems: Video display devices – Raster-scan systems – Random-scan systems – Graphics monitors and workstation – Input devices – Hard-copy devices – Graphics software.

**12**

#### **UNIT – II**

Output primitives: Points and lines – Line-drawing algorithms – Circle generating algorithms – Attributes of output primitives: Line attributes – Curve attributes – Color and Grayscale levels - Area-fill attributes – Character attributes – Bundled attributes.

**12**

#### **UNIT – III**

Two-dimensional Geometric transformations: Basic transformations – Matrix representations – Composite transformations – Other transformations – Two dimensional viewing – Viewing pipeline – window-to-viewport coordinate transformation – Three dimensional concepts – translation – rotation – scaling – shears.

**12**

#### **UNIT – IV**

Introduction to Multimedia –Components of Multimedia – Sound – Image – Text, hypertext – hypermedia – Applications of Multimedia

**12**

**UNIT – V**

Animation: Animation techniques – Morphing – Video – Compression - Virtual Reality.

**12**

**TOTAL : 60**

**TEXT BOOKS:**

1. Donald Hearn, M.Pauline Baker, Computer graphics - C Version, Second Edition, Pearson, Sixteenth Impression, 2012.
2. Unit – I (Chapter 2)
3. Unit – II (Chapter – 3 : 3.1, 3.2, 3.5, Chapter – 4 : 4.1 to 4.6)
4. Unit – III (Chapter 5.1 to 5.4, Chapter 6.1 to 6.3, Chapter 9.1, 9.2, Chapter 11.1 to 11.4)
5. Anirban Mukhopadhyay, Arup Chattopadhyay, Introduction to Computer Graphics and Multimedia, Second Edition, Vikas Publishing House PVT Ltd., 2009.
6. Unit – IV & V (Chapter 9).

**REFERENCES:**

1. RanjanParkekh, Principles of Multimedia, McGraw Hill Pvt. Ltd. Thirteenth Reprint, 2011.



<b>BSC235TE04B</b>	<b>DIGITAL MARKETING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)**

**COURSE OBJECTIVES:**

- To provide students with an overview and understanding of marketing with a specific emphasis on digital Marketing
- To learn the fundamental concept of internet marketing
- To understand basic idea about how to make an effective advertisements
- To study the need and importance of social media marketing
- To understand various emerging platforms in digital marketing

**COURSE OUTCOMES:**

- Able to identify the importance of the digital marketing for marketing success.
- Articulate innovative insights of internet marketing enabling a competitive edge
- Able to explain various search engine advertisements
- Gain knowledge on Social Media Marketing and Web Analytics
- Able to apply and analysis various emerging digital marketing tools for success of any business.

**SYLLABUS**

**UNIT – I INTRODUCTION**

Objectives – Evolution of Digital Marketing from Traditional to the Modern Era – Web Advertising – Current Trends – The Emergence of digital Marketing as a Tool – POEM Framework.

**12**

**UNIT – II INTERNET MARKETING**

Objectives – Internet Marketing – Digital Marketing Framework – Digital Marketing Mix - E mail Marketing – Online PR

**12**

**UNIT – III SEARCH ENGINE ADVERTISING**

Search Advertisements – Ad Placement – Ad Ranks – Display Marketing – Programmable Digital Marketing – You Tube Marketing

**12**

**UNIT – IV SOCIAL MEDIA MARKETING**

Social Media Strategies Cycle – Social Media Marketing Characteristics – Face Book Marketing – Importance of LinkedIn Marketing

**12**

**UNIT – V EMERGING PLATFORMS**

Instagram and Snapchat – Difference between Instagram and Snapchat – Digital Marketing Strategies through Instagram and Snapchat Marketing – Instagram Marketing.

**12**

**TOTAL: 60**

**TEXT BOOKS:**

1. Rajan Gupta, Supriya Madan, “Digital Marketing”, BPB Online, 2023

**REFERENCE:**

1. Seema Gupta, “Digital Marketing”, McGraw Hill Education, 2020.
2. Puneet Bhatia, “Fundamentals of Digital Marketing”, 2<sup>nd</sup> Edition, Pearson Education, 2019.

<b>BSC235TE05A</b>	<b>MANAGEMENT INFORMATION SYSTEM</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)**

**COURSE OBJECTIVES**

- To describe the role of information technology and decision support systems in business.
- To introduce the fundamental principles of computer-based information systems analysis.
- To enable the students to understand the various knowledge representation methods.
- To enable the students to use information to assess the impact of the Internet and Internet technology on electronic commerce
- To provide the theoretical models used in database management systems to answer business questions.

**COURSE OUTCOMES**

- Relate the basic concepts and technologies used in the field of management information systems;
- Compare the processes of developing and implementing information systems.
- Outline the role of the ethical, social, and security issues of information systems.
- Translate the role of information systems in organizations, the strategic management processes, with the implications for the management.
- Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization.

**SYLLABUS**

**UNIT – I**

Introduction: Definition of key terms – Management Information, System – Nature and Scope of MIS - Kinds of System; Systems Approach – Classification of MIS

**12**

**UNIT – II**

Organization for MIS: Structure for Management; Information requirements at various levels of Management; Manual vs. computerized information system; Data Bank Concept; Types of Computer-Based /applications

**12**

**UNIT – III**

Data Base Management: Meaning of Data-Base; Electronic Data-Base; DBMS – Objectives – Technical Overview – Data Aggregates – Physical and Logical Structures; System Security

**12**

**UNIT – IV**

System Development Stages: Investigation, Analysis Design, Construction, Testing, Implementation, Maintenance

**12****UNIT – V**

MIS in functional areas of Management: MIS for Marketing, Human Resource, Operations, Finance, General Management – Decision Making.

**12****TOTAL: 60****TEXT BOOKS**

1. Goyal, Management Information Systems, Managerial Perspectives, Macmillan India Limited, New Delhi, 2014.
2. Jawadekar, W.S., “Management Information Systems”, Tata McGraw Hill Private Limited, New Delhi, 2009.
3. Kenneth C. Laudon and Jane P. Laudon: “Management Information Systems” 9/e, Pearson Education, New Delhi.

**REFERENCE BOOKS**

1. Mahadeo Jaiswal, Monika Mital: “Management Information System”, Oxford University Press, New Delhi, 2008.
2. Murthy C.S.V.: “Management Information System”, Himalaya Publications, New Delhi, 2008.
3. Panneerselvam R.: “Database Management System”, PHI Private Limited, New Delhi, 2008.

<b>BSC237AE05B</b>	<b>MANAGEMENT PRINCIPLES AND PRACTICE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA**

**OBJECTIVES**

- To understand the basic concepts of management
- To understand the basic concepts of Planning Process
- To understand the basic concepts of Organizing And Staffing
- The students to learn the Directing and Communicating.
- They have familiar with Coordinating and Controlling.

**COURSE OUTCOMES**

- The ability to understand concepts of business management, principles and function of management.
- The ability to explain the process of planning and decision-making.
- The ability to create organization structures based on authority, task and responsibilities.
- The ability to explain the principles of direction, importance of communication, barrier of communication, motivation theories and leadership styles.
- The ability to understand the requirement of good control system and control techniques.

**SYLLABUS**

**UNIT – I INTRODUCTION TO MANAGEMENT**

Introduction –Meaning, Evolution of management thought, Pre-Scientific Management Era, Classical Management Era, Neo-Classical Management Era, Modern Management Era; Nature and Characteristics of Management - Scope and Functional areas of Management; Management as a Science, Art or Profession; Management and Administration; Principles of Management.

**12**

**UNIT – II PLANNING AND DECISION MAKING**

Nature, Importance and Purpose of Planning - Planning Process; Objectives; Types of plans - Decision making- Importance and steps; MBO and MBE.

**12**

**UNIT – III ORGANIZING AND STAFFING**

Nature and purpose of Organization; Principles of Organizing; Delegation of Authority; Types of Organization - Departmentation, Committees; Centralization vs Decentralization of Authority and Responsibility, Span of Control; Nature and importance of Staffing.

**12**

#### **UNIT – IV DIRECTING AND COMMUNICATING**

Meaning and Nature of Direction, Principles of Direction; Communication - Meaning and Importance, Communication Process, Barriers to Communication, Steps to overcome Communication Barriers, Types of Communication; Motivation theories – Maslow’s Need Hierarchy Theory, Herzberg’s Two Factor Theory, Mc.Gregor’s X and Y theory. Leadership – Meaning, Formal and Informal Leadership, Characteristics of Leadership; Leadership Styles – Autocratic Style, Democratic Style, Participative Style, Laissez Faire Leadership Styles, Transition Leadership, Charismatic Leadership Style..

**12**

#### **UNIT – V COORDINATING AND CONTROLLING**

Coordination Meaning, Importance and Principles. Controlling-Meaning and steps in controlling, Essentials of Effective Control system, Techniques of Control.

**12**

**TOTAL : 60**

#### **TEXT BOOKS:**

1. Stephen P. Robbins, Management, Pearson
2. Koontz and O’Donnell, Management, McGraw Hill.
3. L M Prasad, Principles of management, Sultan Chand and Sons

#### **REFERENCE BOOKS:**

1. V.S.P Rao / Bajaj, Management process and organization, Excel Books.GH25
2. T. Ramaswamy: Principles of Management, HPH.

<b>BSC235P06</b>	<b>C# LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>

**(For Students admitted from 2023 onwards)  
Common for B.Sc. (CS) / BCA / B.Sc. (Data Science)**

### **OBJECTIVES**

- To Introduce to .Net IDE Component Framework.
- To learn Programming concepts in .Net Framework.
- To update and enhance skills in writing Windows applications.
- To study about the data connectivity using ADO.NET.
- To impart knowledge to create website using ASP.Net Controls.

### **OUTCOMES**

- Write various Console applications using C# Language in the .NET Framework.
- Debug and run a window application.
- Create data binding applications using ADO.Net connectivity.
- Perform Database operations for Windows Form and web applications.
- Design user interactive web pages using ASP.Net.

### **LIST OF EXERCISES**

1. Console Application to implement the concept of Class and Interface using C#
2. Console Application for Exception Handling using C#
3. Console Application for Serialization and DeSerialization using C#
4. Console Application to implement Jagged Array using C#
5. Console Application to implement Properties and Indexers using C#
6. Designing Window Application using Basic Controls.
7. Designing Notepad using Menu option.
8. Window application to connect with database and manipulate the records in the database using ADO.NET.
9. Web Application to perform validation using validation controls.
10. Web application to Connect with the database using ADO.NET and manipulate the records.

<b>BSC235P07</b>	<b>WEB TECHNOLOGY LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>

**Common for B.Sc.,(CS) and BCA  
(For Students admitted from 2023 onwards)**

**LIST OF EXERCISES**

1. Write a HTML Code to design the class time table using table tags and to apply the styles.
2. Write a HTML Code to design a login form and validate it using JavaScript
3. Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.
4. Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.
5. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
6. Write a PHP program to display a digital clock which displays the current time of the server.
7. Write the PHP programs to do the following: a. Implement simple calculator operations. b. Find the transpose of a matrix. c. Multiplication of two matrices. d. Addition of two matrices.
8. Write a PHP program to demonstrate the PHP Regular and expressions.
9. Write a PHP program to Develop student registration form and display all the submitted data on another page.
10. Write a PHP program to sort the student records which are stored in the database..

**REFERENCES:**

1. J.D. Gauchat, HTML5 for Masterminds, Third Edition, 2017
2. Robin Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, Oreilly, Third Edition, 2014.
3. Basarat Ali Syed, Beginning Node.js, Apress publications, 2014.
4. Ravi Kant Soni, AngularJS for java developers, Apress publications, 2017,
5. Deitel&Deitel, Goldberg, Internet and World Wide Web – How to Program, Fifth Edition, Pearson Education Asia, 2012
6. Tom Butler & Kevin Yank, PHP & MySQL – Novice to Ninja, Sixth edition, SitePoint, 2012
7. A. Ravichandran, Internet and Web Technology, Khanna Book Publishing Company, first Edition, 2013.
8. Steceb Holzner PHP: The Complete Reference, Tata McGraw Hill, 2007
9. Pawel Kozlowski and Peter Bacon Darwin, Mastering Web Application Development with Angular JS, Packt Publishing, 2013.

**E- REFERENCES**

1. <https://nptel.ac.in/courses/106105084/>



<b>BSC236T01</b>	<b>PROGRAMMING WITH PYTHON</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)

### OBJECTIVES

- To learn the fundamentals of writing Python scripts
- To learn python control structures.
- To define python functions and other data structures.
- To do input / output with files in python
- To impart the knowledge on database operations.

### OUTCOMES:

- Implement python control structures.
- Illustrate the concept of strings and its manipulation.
- Manipulate object oriented programming concepts in python
- Understand the various graphic methods to solve different problems.
- Demonstrate file and database operations.

### SYLLABUS

#### UNIT – I

Python Basics: Data types – input to python program – Strings basics – Operators in Python – Functions: Basics of functions – Passing variables in a function call – function arguments – Modules in Python – Recursion

**12**

#### UNIT – II

Control Statements, Arrays and Strings : if - if...else – if... elif...else – While Loop – for Loop – Range function – String : Creating, initializing and accessing elements of a string – Traversing a string – string operations – String functions versus string methods.

**12**

#### UNIT – III

List – Tuples – Dictionaries – Regular Expressions: File Operations: Basic of File operation - Reading and Writing a file – Python exception: Basic concepts of exceptions in Python – user defined exceptions – built-in exceptions

**12**

#### UNIT – IV

Object Oriented Programming: Introduction to OOPS –OOPs concept related specifically related to Python – Inheritance and namespace – Basics of NumPy, SciPy and Pandas.

**12**

#### UNIT – V

Python Advances: Graphical User Interface : GUI in Python – Root Window – Fonts and Colors – Containers – Canvas – Frame – Widgets : Button, Label, Message, Text, Scrollbar, Check and Radio Button – Spin and List box – Menu – Python’s Database Connectivity

**12**

**TOTAL: 60**

**TEXT BOOKS:**

1. Nageswara Rao R., “Core Python Programming”, 2<sup>nd</sup> Edition, Dreamtech Press, New Delhi, 2018.
2. J. Jose, Introduction to Computing and Problem Solving with Python, Khanna Publications, 2019.

**REFERENCES:**

1. Kent D Lee (2010) Python Programming Fundamentals.
2. David M Beazley (2009) Python Essential Reference.
3. John V Guttag. Introduction to Computation and Programming Using Python, Prentice Hall of India.

<b>BSC235T02</b>	<b>SOFTWARE ENGINEERING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc.(CS) / BCA / B.Sc.(Data Science) / B.Sc.(Cyber Security)**

**OBJECTIVES**

- To provide an insight into the process of software development life cycle
- To gain basic knowledge about pre-requisites for planning a software product
- To learn how to design software
- To study about basic idea about architectural design
- To gain knowledge about software testing strategies

**OUTCOMES**

- Understand and apply various phases of software development lifecycle for a given problem
- Analyze the requirements systematically and develop the model
- Ability to design and implement software projects
- Skill to design and develop software architecture
- Develop and apply various software testing strategies

**SYLLABUS**

**UNIT – I SOFTWARE AND SOFTWARE ENGINEERING**

Introduction – The Nature of Software – Software Process – Software Engineering Practice – Software Myths - Software Process Models: Waterfall Model, Prototype Model, Increment Model, Spiral Model, RAD model, Win-Win model, Agile Model

**12**

**UNIT – II UNDERSTANDING REQUIREMENTS AND REQUIREMENTS MODELING**

Requirements engineering, Requirement Elicitation Techniques - Software Requirement Specification – Data Modeling Concepts - Flow Oriented modeling – Creating a Behavioral Model.

**12**

**UNIT – III DESIGN ENGINEERING**

Design within the context of software engineering – Design Process and Design Quality - Design Concepts – The Design Model

**12**

**UNIT – IV CREATING AN ARCHITECTURAL DESIGN**

Software Architecture – Data Design – Architectural Styles and Patterns – Architectural Design – Transform Flow Mapping – Transaction Flow Mapping.

**12**

**UNIT – V SOFTWARE TESTING**

Software Testing fundamentals, White box testing - Black box testing - A Strategic Approach to Software Testing - System Testing.

**12**

**TOTAL : 60**

**TEXT BOOKS:**

1. Roger S.Pressman, “Software Engineering: A Practitioners Approach”, 7<sup>th</sup> Edition, Tata McGraw Hill, 2010.

**REFERENCES:**

1. Richard Fairley, Software Engineering Concepts – Tata McGraw Hill, 2010.
2. Wamans Jawadekar, Software Engineering Principles & Practices, Tata McGraw Hill, 2010.

<b>BSC237TE03B</b>	<b>MOBILE COMMUNICATIONS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**  
**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science)**

**OBJECTIVES:**

- To understand the basic concepts of mobile computing
- To be familiar with the network protocol stack
- To learn the basics of mobile telecommunication system
- To be exposed to Ad-Hoc networks
- To gain knowledge about different mobile platforms and application development

**OUTCOMES:**

- Outline the spread spectrum techniques and medium access schemes.
- Interpret the features of GSM and Satellite systems, Routing
- Determine the concepts of wireless LAN and Bluetooth.
- Illustrate the characteristics of mobile IP and demonstrate various Adhoc network protocols. .
- Exemplify the application environment and protocols

**SYLLABUS**

**UNIT – I WIRELESS COMMUNICATION FUNDAMENTALS**

Introduction: History of Wireless Communication – Wireless Transmission: Frequencies for Radio Transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulation – Spread Spectrum – Cellular Systems – Medium Access Control: Motivation for a specialized MAC – SDMA – FDMA – TDMA – CDMA

**12**

**UNIT – II TELECOMMUNICATIONS SYSTEMS**

GSM: Mobile Services – System Architecture - Protocols – Localization and Calling – Handover – Security – New Data Services – Satellite Systems: Basics – Routing – Localization – Handover.

**12**

**UNIT – III WIRELESS LAN**

Infra Red vs Radio Transmission – Infrastructure and Ad-hoc Network – IEEE 802.11: System Architecture – Protocol Architecture – Physical Layer – Medium Access Control (MAC) Layer – MAC Management – Bluetooth: User Scenarios – Architecture – Radio Layer – Baseband Layer – Link Manager Protocol – L2CAP.

**12**

#### **UNIT – IV MOBILE NETWORK LAYER**

Mobile IP: Goals, Assumptions and Requirements – Entities and Terminology – IP Packet Delivery – Agent Discovery – Registration – Tunneling and Encapsulation – Optimizations – Reverse Tunneling – IPv6 – IP Micro Mobility Support – Dynamic Host Configuration Protocol – Mobile Ad-hoc Networks: Routing – Destination Sequence Distance Vector – Dynamic Source Routing – Alternative Metrics – Overview Ad-hoc Routing Protocols.

**12**

#### **UNIT – V MOBILE TRANSPORT LAYER AND APPLICATION LAYER**

Mobile Transport Layer: Traditional TCP: Congestion Control – Slow Start – Fast Retransmit/Fast Recovery – Implications of Mobility – Classical TCP Improvements: Indirect TCP – Snooping TCP – Mobile TCP – Transaction Oriented TCP – TCP over 2.5/3G Wireless Networks.

Mobile Application Layer : Wireless Application Protocol: Architecture – Wireless Datagram Protocol – Wireless Transport Layer Security – Wireless Transaction Protocol – Wireless Session Protocol – Wireless Application Environment.

**12**

**TOTAL: 60**

#### **TEXT BOOKS:**

1. Jochen H Schiller, “Mobile Communications”, 2nd Edition, Pearson Education, New Delhi, 2018.

#### **REFERENCES:**

1. Raj Kamal, “Mobile Computing”, 2nd Edition, Oxford University Press, New Delhi, 2013.
2. Asoke K Talukder, “Mobile Computing: Technology Applications and Service Creation”, 2nd Edition, Mcgraw-Hill Education (India) Private Limited, New York, 2013.

<b>BSC236TE04A</b>	<b>COMPUTER NETWORKS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science)**

### **COURSE OBJECTIVES**

- To provide insight about networks, topologies, and the key concepts.
- To gain comprehensive knowledge about the layered communication architectures (OSI and TCP/IP) and its functionalities.
- To understand the principles, key protocols, design issues, and significance of each layers in ISO and TCP/IP.
- To know the basic concepts of network services.
- To know the basic concepts of various network applications.

### **COURSE OUTCOMES**

- Demonstrate different network models for networking links OSI, TCP/IP and get knowledge about various communication techniques, methods and protocol standards.
- Discuss different transmission media and different switching networks.
- Analyze data link layer services, functions and protocols like HDLC and PPP.
- Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols
- Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.

### **SYLLABUS**

#### **UNIT – I INTRODUCTION:**

Uses of Computer Networks-Network Hardware: PAN,LAN – WAN – MAN – Wireless - Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection-oriented and connectionless services – Service Primitives – Reference Models: OSI Reference Model – TCP/IP reference Model – Comparison of OSI and TCP/IP.

**12**

#### **UNIT – II PHYSICAL LAYER:**

Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. Wireless Transmission: Electromagnetic Spectrum – Radio Transmission – Microwave Transmission – Infrared and Millimeter Waves – Light Waves – Communication Satellites – Geo Satellites – Medium Earth orbit satellites – Low earth orbit satellites.

**12**

#### **UNIT – III DATA LINK LAYER**

Data link layer Design Issues -Error Detection and correction – Elementary Data-link Protocols: simplex protocol, stop and wait protocol, stop and wait protocol ARQ –Sliding Window Protocols: Go back N, Selective repeat protocol–Ethernet – Wireless LANs - Bluetooth.

**12**

#### **UNIT – IV NETWORK LAYER & TRANSPORT LAYER**

Network layer Design Issues - Routing algorithms: The optimality principle – Shortest path Algorithm – Flooding – Distance vector Routing – Link state Routing – Hierarchical Routing – Broadcast Routing – Multicast Routing.

Transport Services – Elements of Transport Protocol: - Addressing – Connection Establishment – Connection Release – Error control and flow control – multiplexing – crash recovery.

**12**

#### **UNIT – V APPLICATION LAYER**

DNS – E-mail – WWW – Symmetric Key Algorithms: DES – AES – Public Key Algorithms – RSA Algorithms.

**12**

**TOTAL: 60**

#### **TEXT BOOKS:**

1. Computer Networks — Andrew S Tanenbaum, Fifth Edition. Pearson Education/PHI
2. Data Communications and Networks – Behrouz A. Forouzan, Fifth Edition TMH.

#### **REFERENCE BOOKS:**

1. Data Communications and Networks- Achut S Godbole, Atul Kahate
2. Computer Networks, Mayank Dave, CENGAGE



<b>BSC236TE04B</b>	<b>DATA WAREHOUSING AND DATA MINING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA / B.Sc. (Data Science)

**COURSE OBJECTIVES:**

- To understand data warehouse concepts and architecture.
- To study the principles of data mining techniques.
- To learn the need and importance of pre-processing
- To understand and characterize the kinds of patterns that can be discovered by an association rule
- To learn various classification and clustering techniques

**COURSE OUTCOMES:**

- Design a Data warehouse system
- Able to understand and apply data mining functionalities
- Gain knowledge for pre-processing of data and able to apply on various datasets.
- Analyze the frequent patterns using association rule mining algorithms
- Design and deploy appropriate classification and clustering techniques

**SYLLABUS**

**UNIT – I**

**Introduction to Data warehouse** - Data warehouse architecture - Differences between OLAP and OLTP- A Multi dimensional data model - OLAP Operations in the Multidimensional Data Model - A three tier Data warehouse architecture – Data Ware house implementation.

**12**

**UNIT – II**

**Introduction to Data Mining** - Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy - Architecture of Data Mining Systems- Classification Of Data Mining Systems.

**12**

**UNIT – III**

**Association Rule Mining** – Apriori Algorithm – Frequent Pattern Growth algorithm - Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database.

**12**

#### **UNIT – IV**

**Classification** - Introduction – Issues – Decision Tree Induction –Bayesian Classification – KNN- Classification of Back Propagation –Prediction – Introduction – Classifier Accuracy.

**12**

#### **UNIT – V**

**Clustering** - Cluster Analysis – Types of Data in Cluster Analysis – Partitioning-Methods: K-Means – K- Medoids - Hierarchical Methods: Agglomerative hierarchical clustering method - Divisive Hierarchical Clustering method.

**12**

**TOTAL: 60**

#### **TEXT BOOKS:**

1. Alex Berson and Stephen J.Smith, —Data Warehousing, Data Mining & OLAP, Tata McGraw – Hill Edition, 35<sup>th</sup> Reprint 2016.
2. Jiawei Han , Micheline Kamber, “Data Mining Concepts and Techniques”, 3<sup>rd</sup> Edition, 2011, Harcourt India Pvt. Ltd- New Delhi.
3. Arum K Pujari, “Data Mining Techniques”, 3<sup>rd</sup> Edition, Universities Press, 2005

#### **REFERENCES:**

1. Pualraj Ponnaiah, Wiley, “Data Warehousing Fundamentals”, Student Edition, 2004.
2. K.P. Soman, ShyamDiwakar, V.Ajay, “Insight into Data Mining Theory and Practice”, Prentice Hall of India Pvt. Ltd - New Delhi, 2006.
3. Margaret H. Dunham, “Data Mining : Introduction and Advance Topics”, Pearson Education, 2003

<b>BSC236AE05A</b>	<b>ORGANIZATIONAL BEHAVIOR</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA/B.Sc. (Data Science)/B.Sc. (Cyber Security)**

**COURSE OBJECTIVES**

- To study the nature and scope of Organizational Behavior with different models
- To familiarize the concept of personality, perception and its significance
- To learn various theories of motivation and the formation of attitude.
- To identify the process used in developing communication and resolving conflicts.
- To understand the organizational structure and culture

**COURSE OUTCOMES**

- Demonstrate the applicability of the concept of OB to analyze the behavior of people in the Organization.
- Able to understand the determinants and attributes influencing for personality and perception.
- Understand the need and importance of motivation and able to apply with different types of organization.
- To develop creative and innovative ideas that could positively shape the organizations and enhance communication skills.
- To accept and embrace in working with different people from different cultural and diverse background in the workplace.

**SYLLABUS**

**UNIT – I ORGANIZATIONAL BEHAVIOR AND MODELS**

Definition - Nature and Scope of Organizational Behavior- Factors Influencing Organizational Behavior – Managerial Implications of Learning Organizational Behavior – Importance of Models of Organizational Behavior - Model of Organizational Behavior (Autocratic, Custodial, Supportive and Collegial Model)

**12**

**UNIT – II PERSONALITY AND PERCEPTION**

Characteristics of Personality – Determinants of Personality – Theories of Personality – Personality Attributes Influencing Organizational Behavior – Characteristics of Perception – Perceptual Process – Factors Influencing Perception

**12**

**UNIT – III MOTIVATION AND ATTITUDE**

Motivation Process – Motivators – Theories of Motivation – Attitude Formation – Factors Influencing Formation of Attitudes

**12**

**UNIT – IV COMMUNICATION BEHAVIOR**

Definition – Communication Process – Functions of Communication – Classification of Communication – Barriers of Communication – Improving Understanding in Communication.

**12**

**UNIT – V ORGANIZATIONAL STRUCTURE AND CULTURE:**

Organizational Structure Meaning – Types of Organization Structure – Significance of Organizational Culture – Dimensions of Organizational Culture – Drivers of Organizational Culture.

**12**

**TOTAL: 60**

**TEXT BOOKS:**

1. Sarma V.S.Veluri – “Organisational Behaviour An Interactive Learning Approach Text and Cases”, Jaico Publishing House, 2010

**REFERENCES:**

1. Fred Luthens, “Organizational Behavior-An Evidence Based Approach”, McGraw Hill International Edition, 12<sup>th</sup> Edition 2011.
2. Stephen P.Robbins, “Essentials of Organizational Behaviour”, Prentice Hall -6<sup>th</sup> Edition, 2000.

<b>BSC236AE05B</b>	<b>HUMAN RESOURCE MANAGEMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)

**COURSE OBJECTIVES:**

- To acquire fundamental knowledge about human resource management and system at various levels in general and in certain specific industries or organizations
- To understand structure and functions of job design and empowerment
- To develop relevant skills with respect to recruitment process
- To provide knowledge about training and development methods
- To enable the students to integrate and understanding the importance of compensation in order to take correct business decisions.

**COURSE OUTCOMES:**

- Ability to handle employee issues and evaluate the new trends in HRM
- To develop necessary skill set for application of various HR issues.
- Ability to plan human resources and implement techniques of job design
- Competency to recruit, train, and appraise the performance of employees
- Rational design of compensation and salary administration

**SYLLABUS**

**UNIT – I FROM PERSONAL MANAGEMENT TO HUMAN RESOURCES MANAGEMENT**

Evolution of Human Resources Management - Principles underlying Human Resources Management - Similarities between Personal Management and Human Resources Management- Human Resources in the Changing Environment - Changing Work Design- Human Resources Development Department and its Functions

**12**

**UNIT – II JOB DESIGN AND EMPOWERMENT**

Job Enrichment-Job Rotation-Shorter Work Week - Flexi time or Flexible Working Hours – Types of Empowerment – Importance of Empowerment

**12**

**UNIT – III RECRUITMENT AND SELECTION**

Man Power Recruitment Process-Recruitment and Selection-Man Power Selection Process – Selection Procedure

**12**

**UNIT – IV TRAINING AND DEVELOPMENT**

Needs of Training and Development – Induction Training and Levels of Training – Methods of Training – Training Programme – Management Development Programme – Employee Appraisal

**12**

**UNIT – V COMPENSATION ADMINISTRATION**

General Compensation – Executive Compensation – Job Evaluation – Pricing Evaluated Jobs – Role of Merit Rating in a Wage Program

**12**

**TOTAL: 60**

**TEXT BOOKS:**

1. Biswanath Ghosh, “Human Resource Management”, Vikas Publishing House Pvt. Ltd., 2010.

**REFERENCES:**

1. K.Aswathappa, “Human Resource Management”, 5<sup>th</sup> Edition, Tata McGraw Hill Publishing Company Ltd, 2008.
2. David A.Decenzo and Stephen P.Robbins, “Personnel/Human Resource Management”, 3<sup>rd</sup> Edition, Prentice Hall of India Pvt. Ltd, 1991

<b>BSC236P06</b>	<b>PYTHON LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>6</b>	<b>2</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Cyber Security)**

### **OBJECTIVES**

- To learn python fundamentals and control structures..
- To learn to implement python functions to solve problems.
- To use python data structures – lists, tuples, dictionaries to represent complex data.
- To do input / output with files in python.
- To learn to perform database operations.

### **OUTCOMES**

- Implement python control structures and loops.
- Implement the concept of strings and its manipulation.
- Implement object oriented programming concepts in python.
- Understand the various graphic methods to solve different problems.
- Implement database operations.

### **LIST OF EXERCISES**

1. Write a Program for checking whether the given number is a even number or not.
2. Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . ,1/10
3. Write a program using a for loop that loops over a sequence. What is sequence?
4. Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.
5. Find the sum of all the primes below two million. Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...
6. Write a program to count the number of characters in the string and store them in a dictionary data structure
7. Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.
8. Write a program combine lists that combines these lists into a dictionary.
9. Write a program to print each line of a file in reverse order.
10. Write a program to compute the number of characters, words and lines in a file.
11. Write a program to perform addition of two square matrices
12. Write a program to perform multiplication of two square matrices
  - a) Install packages requests, flask and explore them. using (pip)
  - b) Write a script that imports requests and fetch content from the page. Eg. (Wiki)
  - c) Write a simple script that serves a simple HTTP Response and a simple HTML Page.
13. Write a GUI for an Expression calculator using Tk
14. Write a program to implementing the following figures using Turtle.
15. Develop a python code to interact with Databases.

<b>BSC236P07</b>	<b>SOFTWARE DEVELOPMENT LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA**

**COURSE OBJECTIVES**

- To provide an idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases.
- To provide an idea of using various process models in the software industry according to given circumstances.
- To understand basic knowledge about data dictionary, Data Flow Diagram, E-R Diagram and so on.
- To understand need and importance of modularity
- To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project

**COURSE OUTCOMES**

- Understand the software engineering methodologies involved in the phases for project development
- Discuss and Analyses how to develop software requirements specifications for a given problem.
- Students will be able to decompose the given project
- Able to apply latest programming techniques
- Ability to develop product- startups implementing software process models in software engineering methods

**LIST OF EXERCISES**

A Possible set of applications may be the following

1. Web Based Applications
2. Mobile Based Applications
3. Automation of Banking, Electricity Bill, Departmental Store and so on
4. Online Booking System
5. Security Based Applications
6. IoT /Cloud based/Machine Learning/Artificial Intelligence
7. Block Chain Technologies



<b>BSC237T01</b>	<b>RESEARCH TRENDS IN COMPUTER SCIENCE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)

### **COURSE OBJECTIVES**

- To Practice various database domains suitable for research and explore various technically thrust areas of emerging database types.
- To gain knowledge and skills in Service Oriented Architecture and Web services
- To learn various advanced data structures, design, implement, and evaluate a computing- based solutions for tree traversals, probing and hashing
- To gain knowledge on various types of attacks and the protocols for network security to protect against the threats in the networks.
- To identify the emerging trends in Wireless Communication networks in the communication world and to know about various big data technologies.

### **COURSE OUTCOMES**

- Able to identify various database domains for research.
- Understand the concept of Service Oriented Architecture and Web services
- Design and implement computing based solutions for tree traversal, probing and hashing.
- Understand various types of attacks and the protocols to protect against the threats in networks.
- Able to identify the emerging trends in wireless communication networks.

## **SYLLABUS**

### **UNIT – I**

**Advanced databases:** Spatial and multimedia Databases: Spatial data – spatial databases – spatial data model – spatial queries – multimedia data bases – multimedia sources – image data bases Mobile databases

**12**

### **UNIT – II**

**XML and SOA: XML:** XML Basics - Components of XML- DTD-SOAP Message Structure-Web Services - Characteristics of SOA - Anatomy of SOA-SOA platform basics - SOA Support in J2EE.

**12**

### **UNIT – III**

**Advanced Data Structures:** AVL –Introduction to Red Black trees and Splay tree– B Trees Implementations – Tree Traversals- Spanning Trees – Graph Traversals: hash table Representation, hash functions - collision resolution - separate chaining open addressing - linear probing - quadratic probing -double hashing –rehashing.

**12**

#### **UNIT – IV**

**Security in Computing:** Attacks – Meaning of computer security – methods of defence – Cryptography – Program Security – Security in networks.

**12**

#### **UNIT – V**

**Emerging Technologies:** Wireless Communication – GSM – DECT – TETRA – IEEE standards – 802.11 – HiperLAN – WATM – WAP Architecture – Big Data Analytics – Big Data Technologies- Hadoop Architecture and streams.

**12**

**TOTAL: 60**

#### **TEXT BOOKS:**

##### **UNIT - I**

1. Abraham Silberschatz , Henry F. Korth , S. Sudarshan “ Database System concepts, 6th Edition, McGraw Hill Education, 2013.
2. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education
3. Alexis leon and Mathews Leon, Database Managements systems, Vikas Publishing House Ltd.,

##### **UNIT – II**

1. XML, Web services and the Data Revolution”- Frank. P.Coyle – Pearson Education, 2002
2. Service oriented Architecture: Concepts, Technology and Design- Thomas Erl- Pearson Education, 2005.

##### **UNIT – III**

1. Mark Allen Weiss, —Data Structures and Algorithm Analysis in C+, Pearson Education, 2002.
2. Aho Hopcroft Ullman, —Data Structures and Algorithm, Pearson Education
3. Horowitz Sahni, Rajasekaran , —Computer Algorithm, Galgotia, 2000.

##### **UNIT – IV**

1. Charles P. Pfleeger , Shari Lawrence Pfleeger , “Security in Computing”, Pearson 4th edition – 2016. Chapters 1,2, 3, 7

##### **UNIT – V**

1. Jochen Schiller, “Mobile Communication”, Pearson Education, 2014.
2. William Stallings, “Wireless Communications & Networks”, Pearson Education, 2014.
3. Arvind Sath, “Big Data Analytics: Disruptive Technologies for Changing the Game”, MC Press, LLC, 2012.
4. Garry Turkington, “Hadoop Beginner's Guide: Learn how to crunch big data to extract meaning from the data avalanche”, Packt Publishing Limited, 2013.
5. Uyles D.Black, “Data Communications & Distributed Networks”, Prentice Hall, 1997.

<b>BSC237TE02A</b>	<b>INTERNET OF THINGS (IoT)</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)**

**COURSE OBJECTIVES**

- To understand the concepts of Internet of Things
- To identify the various elements of an IoT System.
- To understand the various means of communication from Node / Gateway to Cloud Platforms.
- To transfer data from IoT devices to various cloud providers.
- To make students aware of various domain specific applications and challenges while implementing IoT solutions.

**COURSE OUTCOMES**

- Understand general concepts of Internet of Things (IoT)
- Recognize various devices, sensors and applications
- Apply design concept as IoT solutions
- Analyze various M2M and IoT architectures
- Evaluate design issues in IoT applications

**SYLLABUS**

**UNIT-I INTRODUCTION TO IoT**

Introduction to IoT, Current technological trends and future prospects- Evolution of IoT - IoT Devices - IoT Devices vs. Computers - Trends in the Adoption of IoT - Societal Benefits of IoT.

**12**

**UNIT-II ELEMENTS OF IoT**

Application Sensors & Actuators - Edge Networking (WSN) Gateways - IoT Communication Model WPAN & LPWA, Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex

**12**

**UNIT – III COMMUNICATION AND CONNECTIVE TECHNOLOGIES**

IoT Communication Model - Wireless medium access issues - Data aggregation & dissemination. Communication technologies, Long-range Wireless Protocols: LoRa WAN, Ingenu

**12**

**UNIT – IV IoT AND CLOUD**

Interoperability in IoT - Introduction to Arduino Programming - Integration of Sensors and Actuators with Arduino – Cloud computing in IoT, IoT in cloud architecture.

**12**

## **UNIT – V     DOMAIN SPECIFIC APPLICATIONS OF IoT**

Home automation, Industry applications, Surveillance applications, Other IoT applications -  
Introduction to different IoT tools, developing applications through IoT tools

**12**

**TOTAL: 60**

### **TEXT BOOKS**

1. Boswarthick, OmarElloumi., The Internet of Things: Applications and Protocols, Wiley publications., 2012
2. Dieter Uckelmann, Mark Harrison, Florian Michahelles., Architecting the Internet of Things, Springer publications. 2011.

### **REFERENCES**

1. Marco Schwartz Internet of Things with Arduino Cookbook, Packt Publications.
2. Peter Waher, “Learning Internet of Things”, PACKT publishing, Birmingham, Mumbai, 2005.

<b>BSC237TE02B</b>	<b>AGILE SOFTWARE ENGINEERING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA**

**COURSE OBJECTIVES**

- To understand the fundamentals and motivation of agile manifesto.
- To learn the need and importance of teamwork and stakeholders in a learning environment.
- To study time related issues in software projects.
- To understand need and importance of measures.
- To focus about quality aspects and delivery process with respect to cyclicity.

**COURSE OUTCOMES**

- Able to understand and explain the perspectives on software engineering and agile manifesto.
- Able to remember, understand, apply and evaluate the importance of teamwork with respect to their stakeholders.
- Able to remember, understand, examine and discuss the need and significance of time related problems in software projects.
- Able to remember, analyze and discuss about consequence of measures.
- Able to remember, understand, apply and discuss about quality and delivery process.

**SYLLABUS**

**UNIT-I INTRODUCTION TO AGILE SOFTWARE DEVELOPMENT**

Objectives –Three perspectives on software engineering – Agile manifesto–Application of agile software development–Agile software development in learning environment.

**12**

**UNIT – II TEAMWORK AND CUSTOMERS & USERS**

Objectives – A role scheme in agile teams – Dilemmas in team work – Teamwork in learning environment – the customer – User – Customers and users in learning environment.

**12**

**UNIT – III TIME**

Objectives – Time related problems in software projects – Tightness of software development methods – Sustainable pace – Time management of agile projects – Time in learning environments.

**12**

**UNIT-IV MEASURES**

Objectives – Why are measures needed – Who decides what is measured – What should be measured –When are measures taken–How are measures taken–Who takes the measures–How are measures used – Monitoring a large scale project by measures–Measures in learning environments.

**12**

## **UNIT-V QUALITY AND DELIVERY & CYCLICALITY**

Objectives – The agile approach to quality assurance – Test driven development – Measured TDD – Quality in learning environment – Delivery and Cyclicalilty in learning environments.

**12**

**TOTAL:60**

### **TEXT BOOKS**

1. OritHazzan, YaelDubinsky, “Agile Software Engineering”, Springer International Edition, 2011.
2. Jim Highsmith,“Agile Software Development Ecosystems”, Addison - Wesley Professional, 1<sup>st</sup> Edition, 2002.

### **REFERENCES**

1. AlistairCockburn,"Agile Software Development: The Cooperative Game", Addison-Wesley, 2<sup>nd</sup> Edition, 2007.
2. Torgeir Dingsøy, Tore Dybå, Nils Brede Moe, “Agile Software Development: Current Research and Future Directions”, Springer, 2014.

<b>BSC237TE04B</b>	<b>MACHINE LEARNING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)**

**COURSE OBJECTIVES:**

- To understand the need of Machine learning.
- To acquire the knowledge of various classification techniques.
- To study the various algorithms related to supervised and unsupervised learning.
- To learn the theoretical and practical aspects of probabilistic graphical models.
- To expose the applications of machine learning.

**COURSE OUTCOME:**

- Able to explain the need of machine learning and model building.
- Understand the concept to apply the supervised algorithms.
- Develop a skill to implement unsupervised algorithms for problem solving.
- Understand the concept of reassurance learning algorithms.
- Able to apply the learning algorithms in real world problem solving.

**SYLLABUS**

**UNIT – I INTRODUCTION TO MACHINE LEARNING**

Introduction to Machine learning: Type of Learning and Examples, basic concepts in machine learning, Computational Learning theory, Introduction to Parametric Models – Non-Parametric Models Probability Basics.

**12**

**UNIT – II SUPERVISED LEARNING**

Algorithms Supervised Machine Learning Algorithms, working of supervised machine learning algorithm, Naive Bayes algorithm, decision tree, Support Vector Machines, KNN, Random Forest algorithm.

**12**

**UNIT – III UNSUPERVISED LEARNING**

Clustering- K-means -EM Algorithm- Mixtures of Gaussians - Dimensionality Reduction - Factor analysis – Feature Selection - Principal Component Analysis - Probabilistic PCA - Independent components analysis - Singular Value Decomposition.

**12**

**UNIT – IV REINFORCEMENT LEARNING**

Reinforcement Learning Algorithms Reinforcement Machine Learning Algorithms, working of reinforcement machine learning algorithm, Finite Markov Decision Processes, Dynamic Programming, Monte Carlo Methods.

**12**

## **UNIT – V      INSTANCE BASED AND REINFORCEMENT LEARNING**

K Nearest Neighbour Learning-Locally Weighted Regression Radial Basis Function Cased Based Reasoning Q Learning and Q Function.

**12**

**TOTAL: 60**

### **TEXT BOOKS**

1. Ethem Alpaydm, Introduction to Machine Learning, The MIT Press Cambridge, Fourth Edition, MIT Press Hardcover,2020
2. Shai Shalev-Shwartz, Shai Ben-David, Understanding Machine Learning: From Theory to Algorithms, Cambridge University Press, 2014.

### **REFERENCE BOOKS**

1. V Kishore Ayyadevara, Pro Machine Learning Algorithms A Hands On Approach to Implementing Algorithms in Python and R, Apress, 2018.
2. Kevin P. Murphy, Probabilistic Machine Learning an Introduction. The MIT Press, 2022.



<b>BSC237TE03B</b>	<b>NETWORK SECURITY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA**

**OBJECTIVES:**

- To provide necessary foundations on issues related to network security
- To learn the available security services and mechanisms in the network.
- To understand about the construction and analyzing protocol in the secure communication.
- To know about the internet protocol security in the Internet.
- To learn about the software tools for the system security

**OUTCOME**

- Understand the concepts and foundations of computer security
- The different security goals and how they can be achieved by means of cryptography
- To understand the key generation and Exchange functions and hash and digital signature function.
- To implement various networking protocol.
- To identify vulnerabilities of IT systems.

**SYLLABUS**

**UNIT – I**

Introduction –Security attacks, Mechanisms and services - A model for Internet Security – Classical Encryption Techniques: Symmetric Cipher model, Substitution Techniques, Transposition Techniques, Steganography. 12

**UNIT – II**

Block Cipher Principles – The Data Encryption Standard – Strength of DES – Block Cipher Modes of Operations –Key Distribution-Triple DES 12

**UNIT – III**

Principles of public key cryptosystems – RSA Algorithm - Diffie Hellman Key Exchange Algorithm. Authentication-Secure Hash Functions and HMAC 12

**UNIT – IV**

Email Security- Pretty Good Privacy - S/MIME. IP Security- IP Security Architecture. 12

**UNIT – V**

System Security: Intruders, Viruses and Related Threats - Firewall Design Principles 12

**TOTAL: 60**

**TEXT BOOK:**

1. William Stallings, “Network Security Essentials – Applications and Standards”, 4<sup>th</sup> Edition, Pearson Education, 2011

**REFERENCE:**

1. Atul Kahate, “Cryptography and Network Security”, 3<sup>rd</sup> Edition, Tata McGraw-Hill, 2013.
2. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2015.
3. Charles P. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, 4<sup>th</sup> Edition, Pearson Education, 2007

<b>BSC237TE04A</b>	<b>BIG DATA ANALYTICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**  
**Common for B.Sc. (CS) / BCA / B.Sc. (Data Science)**

**COURSE OBJECTIVES**

- To understand fundamentals of Big Data and Hadoop
- To learn about file system configuration in HADOOP
- To learn Map Reduce concept of Hadoop in executing Task
- To learn the Queue Processing and stream processing of Data
- To learn about Hadoop Frameworks

**COURSE OUTCOMES**

- Able to apply Hadoop for analyzing Big Volume of Data
- Able to access, store, do operations on data as Files and directories
- Able to implement Map Reduce Concept in analyzing Big Data
- Able to implement event streaming using Kafka API
- Able to access volume of data with Hadoop Framework

**SYLLABUS**

**UNIT– I**

Types of Digital Data - Introduction to Big Data - Challenges of conventional systems - Web data – Evolution of Analytic scalability - Analytic Processes and Tools - Analysis vs Reporting -History of Hadoop - Apache Hadoop - Analyzing Data with Hadoop - Hadoop Streaming

**12**

**UNIT – II**

The Design of HDFS- HDFS Concepts- The Command-Line Interface- Hadoop File Systems- Data Flow- Parallel Copying with distcp- Hadoop Archives- Hadoop I/O: Data Integrity- Compression- Serialization

**12**

**UNIT – III**

Analyzing the Data with Hadoop- Hadoop Pipes- Map Reduce Types - Input Formats- Output Formats- Map Reduce Features – Map Reduce Works - Anatomy of a Map Reduce Job Run – Failures - Job Scheduling - Shuffle and Sort - Task Execution

**12**

**UNIT – IV**

Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators.

**12**

## **UNIT – V**

Hive : Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data

**12**

**TOTAL: 60**

## **TEXT BOOKS**

1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2012.
2. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007
3. Tom White, Hadoop: The Definitive Guide, O'Reilly, 2009

## **REFERENCES**

1. Paul Zikopoulos, Dirk DeRoos, Krishnan Parasuraman, Thomas Deutsch, James Gile, 72 David Corigan, "Harness the Power of Big Data The IBM Big Data Platform", Tata McGraw Hill Publications, 2012.
2. Kafka: The Definitive Guide- Real-Time Data and Stream Processing at Scale, by Gwen Shapira, Neha Narkhede ,Todd Palino

<b>BSC236T03</b>	<b>MOBILE APPLICATION DEVELOPMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**Common for B.Sc. (CS) and BCA  
(For Students admitted from 2023 onwards)**

### **COURSE OBJECTIVES**

- To introduce Android platform and its architecture.
- To learn activity creation and Android UI designing.
- To be familiarized with intent, broadcast receivers and internet services.
- To work with SQLite database and content providers.
- To integrate multimedia, camera and location based services in android application.

### **COURSE OUTCOMES**

- Understanding the concepts of android platform, architecture and features.
- Design user interface and develop activity for Android Application.
- Use Intent, Broadcast receivers and internet services in Android application.
- Applying methods to handling the data for an android application.
- Exploring ADB tool deployment and publishing of mobile apps.

### **SYLLABUS**

#### **UNIT-I      ANDROID FUNDAMENTALS, FRAGMENTS and INTENTS**

Introduction to Android - Obtaining the Required Tools, Creating Android Application, Anatomy of an Android Application. Using the Android Emulator, Activities, Fragments, and Intents: Understanding Activities, Linking Activities Using Intents, Fragments, Calling Built-In Applications Using Intents, Displaying Notifications.

**12**

#### **UNIT-II      USER INTERFACE**

Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation. Designing User Interface with Views: Using Basic Views, Using Picker Views, Using List Views to Display Long Lists, Displaying pictures and menus with views, using image views to display pictures, using menus with views.

**12**

#### **UNIT-III      DATA PERSISTENCE**

Saving and Loading User Preferences, Persisting Data to Files, Creating and Using Databases. Sharing Data in Android, Using a Content Provider, Creating Content Providers, Using the Content Provider.

**12**

#### **UNIT-IV      MESSAGING, NETWORKING and SERVICES**

SMS Messaging: Sending and Receiving – Sending email and networking–Downloading binary and text data files–Access Web services–Local and remote services.

**12**

## **UNIT–V LOCATION ACCESS and PUBLISHING ANDROID APPLICATIONS**

Location based services: Display map, zoom control, view and change, Marking, Geocoding, Get location-Publish Android applications and Deployment.

**12**

**TOTAL:60**

### **REFERENCES**

1. John Horton, “Android Programming for Beginners”, 1<sup>st</sup> Edition, Packt Publishing, India, 2015.
2. Paul Deitel, Harvey Deitel and Alexander Wald, “Android6 for Programmers an App - Driven Approach”, 3<sup>rd</sup> Edition, Pearson Education India, New Delhi, 2015.
3. Wei-MengLee, Beginning Android Application development, Wiley Publishing, 2012.
4. Reto Meier (2012), “Professional Android 4 Application Development”, Wrox Publications (JohnWiley, NewYork.
5. Zigurd Mednieks, Laird Dornin, Blake Meike G, Masumi Nakamura (2011), “Programming Android: Java Programming for the New Generation of Mobile Devices”, OReilly Media, USA

### **E-REFERENCES**

1. <http://developer.android.com>
2. <http://www.abhiandroid.com>
3. <http://www.vogella.com>

<b>BSC237AE05A</b>	<b>STATISTICAL METHODS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**Common for B.Sc. (CS) and BCA  
(For Students admitted from 2023 onwards)**

**COURSE OBJECTIVES**

- To develop a strong understanding of fundamental statistics concepts essential for data analysis
- To gain practical experience in analysing and interpreting data using statistical methods and tools commonly used in all aspects.
- To understand the principles and techniques of statistical inference, including hypothesis testing, confidence intervals, and estimation.
- To understand correlation and regression.

**COURSE OUTCOMES**

After completion of the course, students will be able to

- Demonstrate a strong understanding of theory and statistical concepts, and apply this knowledge to data analysis.
- Understand the principles of statistical inference, including hypothesis testing, confidence intervals, and estimation and be able to apply them to real-world data sets.
- Critically evaluate statistical results, identify statistical errors, and communicate results effectively to a non-technical audience.
- To find correlation coefficient and regression equations.

**SYLLABUS**

**UNIT – I BASIC STATISTICS**

Introduction- Collection of data - Classification and tabulation of data-Bar diagram-Simple bar diagram-Multiple bar diagram-Component bar diagram-Percentage bar diagram- Pie diagram – Pictogram-Graphical representation-Frequency polygon-Frequency curve-Cumulative frequency (Ogive curve).

**12**

**UNIT – II APPLIED STATISTICS**

Measures of central tendency: Averages-Mean-Median-Mode-Measures of dispersion - Range - Mean deviation - Quartile deviation - Standard deviation –Moments – Skewness - Kurtosis.

**12**

**UNIT – III CORRELATION AND REGRESSION**

Introduction- Types of correlation-Correlation coefficient- Properties - Rank correlation-Regression - Regression equation of lines.

**12**

#### **UNIT – IV TESTING OF HYPOTHESIS-LARGE SAMPLES**

Introduction-Standard error and sampling distribution-Test of significance for large samples- Difference between means of two samples - Difference between means of two standard deviations

**12**

#### **UNIT – V TESTING OF HYPOTHESIS-SMALL SAMPLES**

Test of significance for small samples-Properties - Difference between means of two samples- Testing the significance of paired observations-Chi-Square test for goodness of fit-F test analysis of variance.

**12**

**TIME: 60**

#### **TEXT BOOKS:**

1. Dr. P.R. Vittal, Business Statistics, Margham Publications, Chennai-17 (Unit I – chapter 1-4) (Unit II –chapter 5-7) (Unit III- Chapters 8 and 9)
2. Gupta S.P, Statistical Methods, 28th Edition, Sultan Chand and Sons. New Delhi, 1997. (Volume II - Unit IV& V-chapters 3,4 and 5)

#### **REFERENCE BOOKS:**

1. Gupta S.P, Statistical Methods, 28th Edition, Sultan Chand and Sons., New Delhi, 1997.
2. Montgomery Douglas C. and. Runger George C, Applied Statistics and Probability for Engineers, John Wiley & Sons, Inc,
3. Richard Isaac, The Pleasures of Probability, Springer Verlag, 1995.
4. Spiegel Murry R., Stephens Larry J. Statistics, (Schaum's Outline Series), McGraw Hill Company.
5. T. Veerarajan, Probability, Statistics and Random Processes, Third edition, Tata McGraw-Hill, New Delhi, 2010.



<b>BSC237AE05B</b>	<b>OPERATION RESEARCH</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**Common for B.Sc. (CS) and BCA  
(For Students admitted from 2023 onwards)**

**COURSE OBJECTIVES**

- To introduce the mathematical formulation of the problem to serve as tools in the development of science.
- To understand the LPP model and its solution.
- To focus on the transportation models to solve problems.
- To solve assignment problems using algorithms.
- To create network design and the solution on project analysis.

**COURSE OUTCOMES**

After completion of the course, students will be able to

- Formulate the LPP mathematically.
- To solve LPP using algorithms and also using graphical method.
- Solve transportation problem and assignment models in Data science.
- Design Network models and the solution on Project analysis.

**SYLLABUS**

**UNIT – I    LINEAR PROGRAMMING PROBLEM**

Introduction - Mathematical formulation of a linear programming problem - Graphical solution

**12**

**UNIT – II    LINEAR PROGRAMMING PROBLEM-SIMPLEX METHOD AND BIG M METHOD**

Simplex Method: Introduction - The Computational Procedure - Exceptional cases – Artificial variable techniques-Computational procedure

**12**

**UNIT – III    TRANSPORTATION PROBLEM**

Introduction- Matrix form of transportation problem -Transportation table - Loops in a transportation table - Finding initial basic feasible solution (NWC, LCM and VAM methods) - Moving towards optimality - Degeneracy in transportation problems- Transportation algorithm (MODI method) - Unbalanced transportation problems.

**12**

**UNIT – IV    ASSIGNMENT AND ROUTING PROBLEMS**

Assignment problem – Assignment algorithm - Hungarian assignment method –Unbalanced assignment problem-Routing problems - Travelling salesman problem

**12**

## **UNIT – V NETWORK MODELS**

Introduction-Basic components - Rules of network construction - Time calculations in networks - Critical path method (CPM) - PERT - PERT calculations - Advantages of a network (PERT/CPM)

**12**

**TOTAL: 60**

### **TEXT BOOKS:**

1. Kanti Swarup, P.K.Gupta and Man Mohan, Operations Research, Eighth Edition, Sultan Chand & Sons, New Delhi, 1999.
2. [Unit 1 – Ch 2 (2.1-2.3), Unit 2 – Ch 2 (2.6-2.7), Ch3 (3.3-3.5)
3. Unit 3 – Ch 6 (6.1-6.9), Unit 4 – Ch 7(7.1-7.4)Unit 5 – Ch 19 (19.1-19.10)]

### **REFERENCE BOOKS:**

1. H.A.Taha, Operations Research, Eighth Edition, Pearson Education India, 2008
2. Richard Bronson, Operations Research, (Schaum's Outline Series), Second Edition McGraw Hill Company, 2003.
3. S.Hillier and J.Liebermann, Operations Research, Sixth Edition, Mc Graw Hill Company, 1995.
4. J.K.Sharma, Operation Research (Theory and Applications), First Edition, Mac Millen Ltd., 1997.
5. Barry Render, Ralph M. Stair, Allynan Bacon, Quantitative Analysis for Management, Fifth Edition, Boston, 1994.

<b>BSC237P06</b>	<b>MINI PROJECT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>6</b>	<b>2</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA**

### **COURSE OBJECTIVES**

- To provide insights to the process of software development
- To enable student analytical and practical exposure by giving hands on experience with learned knowledge through different courses.
- To make the students to set the industrial exposure
- To implement the knowledge, technology, innovational ideas for solving the industrial problems
- To understand methodologies and professional way of documentation and communication.

### **COURSE OUTCOMES**

- Able to apply and develop modules using latest technologies.
- Able to apply and develop latest technologies
- Exercise team work in developing and integrating into a single project.
- Analyze the system for its productivity and feasibility.
- Exercise team work in developing and integrating into a single project.
- Prepare report on the application of emerging technologies in the selected industry

### **SYLLABUS**

A Possible set of applications may be the following

1. Automation of Departmental Store, E-Seva, Banking, Hospital Industry etc.,
2. Web applications using PHP MVC
3. Web applications using Angular, Node JS/ React JS
4. Web applications using Java Frameworks like Hibernate, Struts or Spring
5. Web applications using MVC, C# and .NET Programming
6. Machine Learning/Deep Learning using Python
7. Android using Java or Kotlin
8. Cryptography using C# or JAVA or GO or PHP etc.,
9. Data Analytics using Python, R etc.,
10. Digital Image Processing using Java or Python, MATLAB etc.,
11. Natural Language Processing using Java, Python, R and so on
12. Networking using Java, GO, Python and so on

<b>BSC238T01</b>	<b>ARTIFICIAL INTELLIGENCE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

(For Students admitted from 2023 onwards)

Common for B.Sc. (CS) / BCA / B.Sc. (Data Science) / B.Sc. (Cyber Security)

**OBJECTIVES:**

- To understand the various characteristics of Intelligent agents
- To learn about the different search strategies in AI
- To learn the knowledge representation using Mapping issues, Function and predicates.
- To illustrate the logical representation, Semantic Network Representation, Frame Representation.
- To learn techniques for solving problems with complete and uncertain models.

**COURSE OUTCOMES:**

- Apply the basic principles of Artificial Intelligence (AI) in problem space and search programs.
- Demonstrate the various heuristic search techniques.
- Interpret the techniques to represent and manipulate the knowledge.
- Implement the knowledge representation techniques and structures.
- Explore techniques for solving problems with complete and uncertain models.

**SYLLABUS**

**UNIT – I INTRODUCTION AND PROBLEM SPACES**

Artificial Intelligence: AI Problems – Assumption – Technique – Model – Criteria – Problems – Problem Spaces and Search: Definition – Production Systems – Characteristics – Issues in the Design of Search Programs.

12

**UNIT – II HEURISTIC SEARCH TECHNIQUES**

Heuristic Search Techniques: Generate and Test – Hill Climbing – Best-First Search – Problem Reduction – Constraint Satisfaction – Means-Ends Analysis.

12

**UNIT – III FUNDAMENTALS OF KNOWLEDGE REPRESENTATION**

Knowledge Representation Issues: Representations and Mappings – Approaches – Issues – Frame Problem – Using Predicate Logic: Representing Simple Facts in Logic – Instance and ISA Relationships – Functions and Predicates – Resolution – Deduction.

12

**UNIT – IV KNOWLEDGE REPRESENTATION AND STRUCTURES**

Representing Knowledge Using Rules: Procedural Versus Declarative Knowledge – Logic Programming – Reasoning – Matching – Control Knowledge – Weak Slot-and-Filler Structures: Semantic Nets – Frames – Strong Slot-and-Filler Structures: Conceptual Dependency – Scripts – CYC.

12

## **UNIT – V REASONING**

Symbolic Reasoning Under Uncertainty: Non monotonic Reasoning – Logics – Issues – Problem Solver – Implementation – DFS –BFS – Statistical Reasoning: Probability and Bayesian Theorem – Bayesian Networks –Introduction to Generative AI..

**12**

**TOTAL: 60**

### **TEXT BOOK:**

1. Elaine Rich, Kevin Knight, Shivashankar B.Nair, “Artificial Intelligence”, 3<sup>rd</sup> Edition, McGraw Hill Education Pvt. Ltd., 2018.

### **REFERENCE:**

1. Russell Stuart, Norvig Peter, “Artificial Intelligence: A Modern Approach”, 3rd Edition, Pearson Education, 2016.
2. Parag Kulkarni, Prachi Joshi, “Artificial Intelligence –Building Intelligent Systems”, PHI Learning Private Ltd, 2015.

<b>BSC238AE02A</b>	<b>HUMAN VALUES AND PROFESSIONAL ETHICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

(For Students admitted from 2023 onwards)

(Common to B.C.A. / B.Sc. (Computer Science / B.Sc. (DS) / B.Sc. (Cyber Security)

### **OBJECTIVES**

- To describe the significance of value inputs in a classroom and applying them in their life and profession.
- To learn about values and skills, happiness and accumulation of physical facilities.
- To enable the students to understand the value of harmonious relationship.
- To enable the students to know the role of human being in society and nature.
- To provide the theoretical idea about ethical and unethical practices.

### **COURSE OUTCOMES**

- Understand the significance of value inputs in a classroom and start applying them in their life and profession.
- Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
- Understand the value of harmonious relationship based on trust and respect in their life and profession.
- Understand the role of a human being in ensuring harmony in society and nature.
- Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

## **SYLLABUS**

### **UNIT – I INTRODUCTION TO VALUE EDUCATION**

Value Education, Definition, Concept and Need for Value Education - The Content and Process of Value Education - Self-Exploration as a means of Value Education -. Happiness and Prosperity as parts of Value Education

**12**

### **UNIT – II HARMONY IN THE HUMAN BEING**

Human Being is more than just the Body - Harmony of the Self (Ī) with the Body - Understanding Myself as Co-existence of the Self and the Body - Understanding Needs of the Self and the Needs of the Body

**12**

### **UNIT – III HARMONY IN THE FAMILY AND SOCIETY AND HARMONY IN THE NATURE**

Family as a basic unit of Human Interaction and Values in Relationships - The Basics for respect and today's Crisis - Affection, Care, Guidance, Reverence, Glory, Gratitude and Love - Comprehensive Human Goal: The Five dimensions of Human Endeavour

**12**

**UNIT – IV SOCIAL ETHICS**

The Basics for Ethical Human conduct - Defects in Ethical Human Conduct - Holistic Alternative and Universal order - Universal Human Order and Ethical Conduct

**12****UNIT – V PROFESSIONAL ETHICS**

Value Based Life and Profession -. Professional Ethics and Right Understanding - Competence in Professional Ethics - Issues in Professional Ethics – The Current scenario - Vision for Holistic Technologies, Production System and Management Models

**12****TOTAL: 60****TEXT BOOKS**

1. A.N.Tripathy, Human Values, New Age International Publishers, 2019.
2. Bajpai.B.L., Indian Ethos and Modern Management, New Royal Book Co., Lucknow, Reprinted, 2004.

**REFERENCE BOOKS**

1. Bertrand Russell, Human Society in Ethics and Politics, 2009.
2. Corliss Lamont, Philosophy of Humanism, 2007.
3. Bhatia, R. & Bhatia, A Role of Ethical Values in Indian Higher Education, 2015

<b>BSC238AE02B</b>	<b>ETHICAL HACKING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**(For Students admitted from 2023 onwards)**

**Common for B.Sc. (CS) / BCA/B.Sc. (Data Science)/B.Sc. (Cyber Security)**

**OBJECTIVES**

- To know the theory and practices of finding the vulnerabilities.
- To find the different attacks and then defining the appropriate security policy.
- To take action to detect or prevent the attacks and thus reduce the damages.
- To understand the concept of Web Server Hacking.
- To understand the concept of Firewalls

**OUTCOMES**

- To describe the basics of the ethical hacking.
- Ability to learn technical foundations of hacking.
- Able to perform the foot printing and scanning.
- Demonstrate the techniques for system hacking.
- Characterize the malware and their attacks.

**SYLLABUS**

**UNIT – I INTRODUCTION TO ETHICAL HACKING**

Security Fundamental - Security Testing - Hacker and Cracker – Descriptions - Test Plans-keeping it legal - Ethical and Legality- Process - The Ethical Hacker’s Process.

**12**

**UNIT – II FOOTPRINTING AND SCANNING**

Information Gathering - Determining the Network Range - Finding Open Ports and Access Points - OS Fingerprinting Services - Mapping the Network Attack Surface.

**12**

**UNIT – III MALWARE THREATS AND SESSION HIJACKING**

Viruses and Worms- Trojans - Covert Communication - Keystroke Logging and Spyware – Malware Counter Measures- Sniffers - Session Hijacking - Denial of Service.

**12**

**UNIT – IV WEB SERVER HACKING AND ATTACKS**

Web Server Hacking - Web Application Hacking - Database Hacking - Wireless Technologies – Mobile Security and Attacks: Wireless Technologies – Wireless LANs.

**12**

**UNIT – V CASE STUDY**

Intrusion Detection Systems - Firewalls - Honeypots - Physical Security - Social Engineering – Case Studies: Intrusion detection Real Secure Tripwire Dragon Snort.

**12**

**TOTAL: 60**



**TEXT BOOKS:**

1. Michael Gregg, "Certified Ethical Hacker", Pearson IT Certification, 3<sup>rd</sup> Edition, 2019.
2. Roger Grimes, "Hacking the Hacker", Wiley, 1st Edition, 2017

**REFERENCES:**

1. Ankit Fadia, "The Unofficial Guide to Ethical Hacking", Laxmi Publications, 2nd Edition, 2006.
2. Randy Weaver, Dawn Weaver, Dean Farwood, "Guide to Network Defense and Countermeasures", Cengage Learning, Third edition, 2014.

<b>BSC238P08</b>	<b>PROJECT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>21</b>	<b>12</b>

**(For Students admitted from 2023 onwards)**

**COURSE OBJECTIVES**

- To understand the software engineering methodologies for project development.
- To gain knowledge on recent technologies
- To develop software products in various domains
- To improve their communication and presentation skill
- To get training for testing the software products

**COURSE OUTCOME**

- Analyze and design software in an efficient manner
- Understand the features of current technologies
- Implement the applications in various domains
- Create Test Plan and apply various testing methods
- Able to communicate and present the software product

**INSTRUCTIONS**

1. Students have to do projects in an Industry / Research Organization / In house.
2. Students must attend the review meeting as per the guidelines.
3. The software products will be developed and tested in various domains using current technologies.
4. After completion of the project, students should submit Project completion certificate.
5. The document related to the Project should be prepared as per the guidelines and should be submitted on time.
6. Students may have to publish the papers based on their project work before submission of the Project Document.