V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Reaccredited with 'A++' Grade (4th Cycle) by NAAC
VIRUDHUNAGAR
Quality Education with Wisdom and Values

OUTCOME BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

REGULATIONS AND SYLLABUS

(with effect from Academic Year 2025 - 2026)

V.V.Vanniaperumal College for Women, Virudhunagar, established in 1962, offers 13 UG Programmes (Aided), 13 UG Programmes (SF), 13 PG Programmes and 6 Ph.D. Programmes. The curricula for all these Programmes, except Ph.D. Programmes, have been framed as per the guidelines given by the University Grants Commission (UGC) &Tamil Nadu State Council for Higher Education (TANSCHE) under Choice Based Credit System (CBCS) and the guidelines for Outcome Based Education (OBE).

The Departments of Commerce, English, History, Mathematics, Biochemistry and Tamil upgraded as Research Centres offer Ph.D. Programmes as per the norms and regulations of Madurai Kamaraj University, Madurai and do not come under the purview of CBCS.

A. CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose Courses from the prescribed Courses. The CBCS is followed as per the guidelines formulated by the UGC. The performance of students is evaluated based on the uniform grading system. Computation of the Cumulative Grade Point Average (CGPA) is made to ensure uniformity in evaluation system.

List of Programmes in which CBCS/Elective Course System is implemented

UG PROGRAMMES

Arts & Humanities	:	History (E.M. & T.M.), English, Tamil
Physical & Life Sciences	:	Mathematics, Zoology, Chemistry, Physics, Biochemistry, Home Science - Nutrition and Dietetics, Costume Design and Fashion, Microbiology, Biotechnology, Computer Science, Information Technology, Data Science, Computer Applications and Computer Applications - Graphic Design
Commerce & Management	:	Commerce, Commerce (Computer Applications), Commerce (Professional Accounting), Business Administration

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PG PROGRAMMES

Arts & Humanities	:	History, English, Tamil
Physical & Life Sciences	:	Mathematics, Physics, Chemistry, Biochemistry, Home Science - Nutrition and Dietetics, Biotechnology, Computer Science and Computer Applications (MCA) *
Commerce & Management	:	Commerce, Business Administration (MBA) *

* AICTE approved Programmes

OUTLINE OF CHOICE BASED CREDIT SYSTEM – UG

1. Core Courses
2. Elective Courses
   - Generic Elective Courses
   - Discipline Specific Elective Courses (DSEC)
   - Non Major Elective Courses (NMEC)
3. Skill Enhancement Courses (SEC)
4. Environmental Studies (EVS)
5. Value Education
6. Self-Study Courses (Online)
7. Extra Credit Courses (Self Study Courses) (Optional)

Name of the Course	Course Code	Semester	Department	
			Offered by	Offered for
Introduction to Tourism	24UHIN11	I	History (E.M)	Students other than B.A. History Discipline
Indian Constitution	24UHIN21	II		
சுற்றுலா ஓர் அறிமுகம்	24UHIN11	I	History (T.M)	
இந்திய அரசியலமைப்பு	24UHIN21	II		
Popular Literature and Culture	24UENN11	I	English	Students other than B.A. English Discipline
Philosophy for Literature	24UENN21	II		
அடிப்படைத் தமிழ் இலக்கணம் - I	24UBTN11	I	Tamil	students who have chosen Part I Hindi
அடிப்படைத்தமிழ்-II	24UBTN21	II		
பேச்சுக்கலைத்திறன்	24UTAN11	I	Tamil	Students other than B.A. Tamil Discipline
பயன்முறைத் தமிழ்	24UTAN21	II		

Basic Hindi - I	24UBHN11	I	Hindi	All Discipline students
Basic Hindi - II	24UBHN21	II		
Everyday Banking/ Practical Banking	24UCON11N/ 24UCON11	I	Commerce (Aided)	Students other than Commerce Discipline
Basic Accounting Principles	24UCON21	II		
Everyday Banking	24UCON11N	I	Commerce (Self)	
Emotional Intelligence	24UCON21N	II		
Everyday Banking/Self- Employment and Startup Business	24UCON11N/ 24UCCN11	I	Commerce C.A.(Self)	
Fundamentals of Marketing	24UCCN21	II		
Everyday Banking/ Practical Banking	24UCPN11N/ 24UCPN12N	I	Commerce Professional Accounting	
Basic Accounting Principles	24UCPN21N	II		
Basics of Event Management	24UBAN11	I	Business Administration	Students other than B.B.A. Discipline
Managerial Skill Development	24UBAN21	II		
Quantitative Aptitude -I	24UMTN11	I	Mathematics	Students other than B.Sc. Mathematics Discipline
Quantitative Aptitude – II	24UMTN21	II		
Physics for EveryDay Life	24UPHN11	I	Physics	Students other than B.Sc. Physics Discipline
Astrophysics	24UPHN21	II		
Food Chemistry	24UCHN11	I	Chemistry	Students other than B.Sc. Chemistry Discipline
Dairy Chemistry	24UCHN21	II		
Ornamental fish farming and Management	24UZYN11	I	Zoology	Students other than B.Sc. Zoology Discipline
Biocomposting for Entrepreneurship	24UZYN21	II		
Foundations of Baking and Confectionery	24UHSN11	I	Home Science – Nutrition and Dietetics	Students other than B.Sc. Home Science – Nutrition and Dietetics Discipline
Women's Health and Wellness	24UHSN21	II		
Nutrition and Health	24UBCN11	I	Biochemistry	Students other than B.Sc. Biochemistry Discipline
Life Style Diseases	24UBCN21	II		

Social and Preventive Medicine	24UMBN11	I	Microbiology	Students other than B.Sc. Microbiology Discipline
Nutrition and Health Hygiene	24UMBN21	II		
Herbal Medicine	24UBON11	I	Biotechnology	Students other than B.Sc. Biotechnology Discipline
Organic Farming and Health Management	24UBON21	II		
Basics of Fashion	24UCFN11	I	Costume Design And Fashion	Students other than B.Sc. Costume Design And Fashion Discipline
Interior Designing	24UCFN21	II		
Introduction to HTML	24UCSN11N	I	Computer Science	Students other than Computer Science Discipline
Office Automation	24UCSN21N	II		
Basics of Internet	24UITN11N	I	Information Technology	
Data Analysis using Spreadsheet	24UITN21N	II		
Fundamentals of Information Technology	24UDSN11	I	Data Science	
Computer Fundamentals	24UDSN21	II		
Web Designing	24UCAN11N	I	B.C.A.	
Fundamentals of Computers	24UCAN21N	II		
Organic Farming	24UBYN11	I	Botany	All Discipline students
Nursery and Landscaping	24UBYN12	I		
Mushroom Cultivation	24UBYN21	II	Botany	
Medicinal Botany	24UBYN22	II		
Library and Information Science - I	24ULSN11	I	Library Science	All Discipline students
Library and Information Science - II	24ULSN21	II		
Cadet Corps for Career Development I	24UNCN11	I	National Cadet Corps	students who have chosen NCC as Part V course
Cadet Corps for Career Development II	24UNCN21	II		

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B. OUTCOME BASED EDUCATION (OBE) FRAMEWORK

The core philosophy of Outcome Based Education rests in employing a student - centric learning approach to measure the performance of students based on a set of pre-determined outcomes. The significant advantage of OBE is that it enables a revamp of the curriculum based on the learning outcomes, upgrade of academic resources, quality enhancement in research and integration of technology in the teaching –learning process. It also helps in bringing clarity among students as to what is expected of them after completion of the Programme in general and the Course in particular. The OBE directs the teachers to channelize their teaching methodologies and evaluation strategies to attain the PEOs and fulfill the Vision and Mission of the Institution.

Vision of the Institution

The founding vision of the Institution is to impart Quality Education to the rural womenfolk and to empower them with knowledge and leadership quality.

Mission of the Institution

The mission of the Institution is to impart liberal education committed to quality and excellence. Its quest is to mould learners into globally competent individuals instilling in them life-oriented skills, personal integrity, leadership qualities and service mindedness.

B.1 Programme Educational Objectives, Programme Outcomes and Programme Specific Outcomes

It is imperative for the institution to set the Programme Educational Objectives (PEOs), Programme Outcomes (POs) and Course Outcomes (COs), consistent with its Vision and Mission statements. The PEOs and the POs should be driven by the mission of the institution and should provide distinctive paths to achieve the stated goals. The PEOs for each Programme have to fulfil the Vision and Mission of the Department offering the Programme.

Vision of the Department of Information Technology

To Promote Academic Excellence and create groomed, technically competent and skilled intellectual IT Professionals

Mission of the Department of Information Technology

- To uplift rural students through advanced quality education in Information Technology.

- To enhance Employability opportunity due to knowledge
- To provide Moral values to turn out to be a responsible citizen
- To develop graduates to meet the challenges of the rapidly changing world.

Programme Educational Objectives (PEOs) of B.Sc. Information Technology Programme
The students will be able

PEO1	to be prepared to gain employment as an IT Professional
PEO2	to function effectively as individuals in the workplace, growing into highly technical or project management and leadership roles.
PEO3	to develop graduates to meet the challenges of the rapidly changing world.

Key Components of the Mission Statement	**P**rogramme **E**ducational **O**bjectives (**PEO**s)		
	PEO1	PEO2	PEO3
Uplift Rural Students	✓		✓
Enhance employability opportunity	✓	✓	✓
provide moral values to turn out to be a responsible citizen		✓	
develop graduates to meet the challenges of the rapidly changing world		✓	✓

B.1.2 Programme Outcomes (POs)

POs shall be based on Graduate Attributes (GAs) of the Programme. The GAs are the attributes expected of a graduate from a Programme in terms of knowledge, skills, attitude and values. The Graduate Attributes include Disciplinary Knowledge, Communication Skills, Critical Thinking, Problem Solving, Analytical Reasoning, Research Related Skills, Co-operation/Team Work, Scientific Reasoning, Reflective Thinking, Information/Digital Literacy, Multicultural Competence, Moral and Ethical Awareness/Reasoning, Leadership Qualities and Lifelong Learning.

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

1. apply effectively the acquired knowledge and skill in the field of Arts, Physical Science, Life Science, Computer Science, Commerce and Management for higher studies and employment. (*Disciplinary Knowledge*)
2. articulate innovative thoughts and ideas proficiently in both in spoken and written forms. (*Communication Skills)*
3. identify, formulate and solve problems in real life situations scientifically / systematically by adapting updated skills in using modern tools and techniques. (*Scientific Reasoning and Problem Solving)*
4. critically analyse, synthesize and evaluate data, theories and ideas to provide valid suggestions through assignments, case studies, Internship and projects for the fullfillment of the local, national and global developmental needs. (*Critical Thinking and Analytical Reasoning)*
5. use ICT in a variety of self-directed lifelong learning activities to face career challenges in the changing environment. (*Digital Literacy, Self - directed and Lifelong Learning)*
6. self-manage and function efficiently as a member or a leader in diverse teams in a multicultural society for nation building. (*Co-operation/Team Work and Multicultural Competence)*
7. uphold the imbibed ethical and moral values in personal, professional and social life for sustainable environment. (*Moral and Ethical Awareness)*

B.1.3 Programme Specific Outcomes (PSOs)

Based on the Programme Outcomes, Programme Specific Outcomes are framed for each UG Programme**.** Programme Specific Outcomes denote what the students would be able to do at the time of graduation. They are Programme specific. It is mandatory that each PO should be mapped to the respective PSO.

PROGRAMME SPECIFIC OUTCOMES

On completion of the B.Sc. Information Technology programme, the students will be able to

PO1 - *Disciplinary Knowledge*

PSO 1.a. apply the principles and working of the hardware and software aspects of computer systems incorporated with the knowledge of related courses to pursue higher studies.

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PSO 1.b. identify and solve Technical problems by applying mathematical foundations and algorithmic principles in IT environment to meet industrial challenges and get better placement.

PO2 - *Communication Skills*

PSO 2. a. design and implement a secure and reliable information communication system by using concepts of computer networks, network security and information theory.

PSO 2. b. develop technical project reports and present them orally among the users.

PO3 - *Scientific Reasoning and Problem Solving*

PSO 3. characterize, illustrate and analyze a computer system, component, or algorithm to meet desired needs and to solve computational problems in real world based on their research career pursuits.

PO4 - *Critical Thinking and Analytical Reasoning*

PSO 4. critically analyze the techniques in IT to provide technology based on clusions to transform innovative ideas into reality.

PO5 - *Digital Literacy, Self - directed and Lifelong Learning*

PSO 5.a: use and apply current technical concepts and practices in the core Information Technologies of human computer interaction, programming and networking for higher studies, research activities and to become successful career, entrepreneurship..

PSO 5.b: be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas by self-directed and lifelong learning.

PO6 - Cooperation/Team Work and Multi-Cultural Competence

PSO 6: work effectively as a member or leader of a team to achieve project target.

PO7 - Moral and Ethical awareness

PSO 7: demonstrate a sense of societal and ethical responsibility in their professional endeavours.

PO-PEO Mapping Matrix

Attainment of PEOs can be measured by a PO-PEO matrix. PEOs should evolve through constant feedback from alumnae, students, industry, management, *etc*. It is mandatory that each PEO should be mapped to at least one of the POs.

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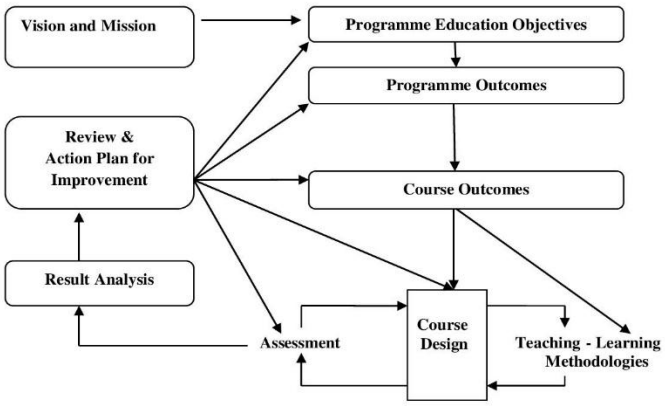
PEOs / POs/PSOs	PEO1	PEO2	PEO3
PO1/PSO1.a	-	✓	✓
PO1/PSO1.b	✓	✓	✓
PO2/PSO2.a	✓	✓	-
PO2/PSO2.b	✓	✓	-
PO3/PSO3	-	✓	✓
PO4/PSO4.a	-	✓	✓
PO4/PSO4.b	✓	✓	-
PO5/PSO5	✓	✓	-
PO6/PSO6	-	✓	✓
PO7/PSO7	-	-	✓

B.1.4 Course Outcomes (COs)

Course Outcomes are narrow statements restricted to the Course contents given in five units. Course Outcomes describe what students would be capable of, after learning the contents of the Course. They reflect the level of knowledge gained, skills acquired and attributes developed by the students after learning of Course contents. COs are measurable, attainable and manageable in number. COs contribute to attain POs in such a way that each CO addresses at least one of the POs and also each PO is reasonably addressed by adequate number of COs.



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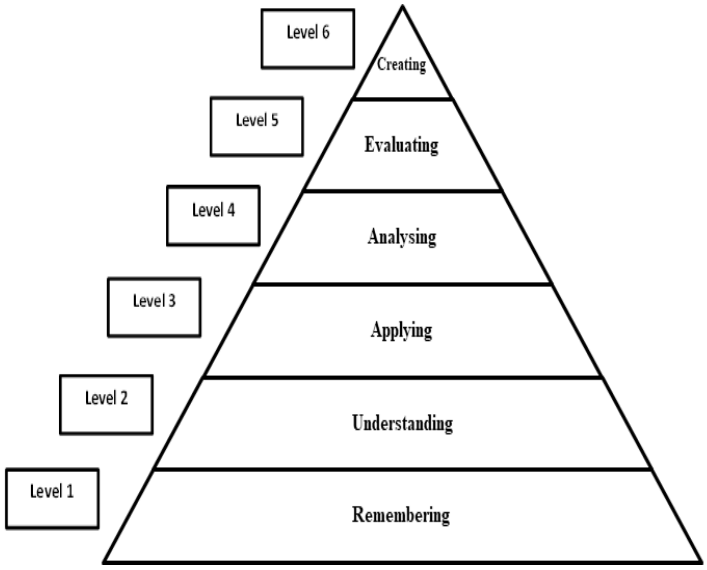
It is important to determine the methods of assessment. A comprehensive assessment strategy may be outlined using the revised Bloom's Taxonomy levels.

BLOOM'S TAXONOMY



CO – PO Mapping of Courses

After framing the CO statements, the COs framed for each Course is mapped with POs based on the relationship that exists between them. The COs which are not related to any of the POs is indicated with (-), signifying Nil. Measurement Mapping is based on Four Points Scale [High (H), Medium (M), Low (L) and Nil (-)]. For calculating weighted percentage of contribution of each Course in the attainment of the respective POs, the weights assigned for H, M and L are 3, 2and 1 respectively.

CO-PO/PSO Mapping Table (Course Articulation Matrix)

PO/PSOs / COs	PO1/ PSO1	PO2/ PSO2	PO3/ PSO3	PO4/ PSO4	PO5/ PSO5	PO6/ PSO6	PO7/ PSO7
CO1							
CO2							
CO3							
CO4							
CO5							

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ELIGIBILITY FOR ADMISSION

Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Tamil Nadu or any other examination accepted by Academic Council with Mathematics as one of the subjects.

DURATION OF THE PROGRAMME

The candidates shall undergo the prescribed course of study for a period of three academic years (six semesters).

MEDIUM OF INSTRUCTION

English

COURSES OFFERED

Part I	:	Tamil/Hindi Course
Part II	:	English
Part III	:	Core Courses
		Elective Courses • Generic Elective Courses • Discipline Specific Elective Courses
		Self Study Course - online
Part IV	:	Skill Enhancement Courses (SEC)
		Elective Course (NMEC)
		Environmental Studies Value Education
		Internship/Industrial Training
		Self-Study Course - online
Part V	:	National Service Scheme/ Physical Education/ Youth Red Cross Society/ Red Ribbon Club/ Science Forum/ Eco Club/ Library and Information Science/ Consumer Club/ Health and Fitness Club/ National Cadet Corps/ Rotaract Club

B.2 EVALUATION SCHEME

B.2.1.PART II

Components	Internal Assessment Marks	Summative Examination Marks	Total Marks
Theory	15	60	100
Practical	5	15	
Assignment	5	-	
Three Periodic Tests - Average of the best two will be considered			

B.2.2.Part I & PART III - Core Courses, Elective Courses (Generic, DSEC)

Components	Internal Assessment Marks	External Examination Marks	Total Marks
Theory	25	75	**100**

INTERNAL ASSESSMENT

Distribution of Marks

Theory

Mode of Evaluation			Marks
Periodic Test		:	15
Assignment	K3 Level	:	5
Quiz	K1 Level	:	5
Total		**:**	**25**

Three Periodic Tests - Average of the best two will be considered
Two Assignments - Better of the two will be considered
Three Quiz Tests - Best of the three will be considered

Practical

Mode of Evaluation		Marks
Practical Test*	:	30
Record & Performance	:	10
Total	**:**	**40**

*Average of the two practical tests will be considered

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Question Pattern for Internal Tests **Duration: 2 Hours**

Section	Q.No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 4	Multiple Choice	4	4	1	4
B	5 -6	Internal Choice - Either … or Type	3	3	7	21
C	8 -9	Internal Choice - Either… or Type	2	2	10	20
					Total	**45***

*The total marks obtained in the Periodic Test will be calculated for 15 marks

SUMMATIVE EXAMINATION

Question Pattern **Duration: 3 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 -10	Multiple Choice	10	10	1	10
B	11 - 15	Internal Choice – Either …or Type	5	5	7	35
C	16 - 18	Internal Choice – Either… or Type	3	3	10	30
					Total	**75**

PROJECT

Assessment by Internal Examiner Only

Internal Assessment

Distribution of Marks

Mode of Evaluation	:	Marks
Project work and Report	:	60
Presentation and Viva –Voce	:	40
Total	**:**	**100**

B.2.3 PART IV - Skill Enhancement Courses, Non Major Elective Courses and Foundation Course

B.2.3.1 FOUNDATATION COURSE

INTERNAL ASSESSMENT
Distribution of Marks
Theory

Mode of Evaluation			**Marks**
Periodic Test		:	15
Assignment	K2 Level	:	5
Quiz	K1 Level	:	5
Total		**:**	**25**

Three Periodic Tests - Average of the best two will be considered

Two Assignments - Better of the two will be considered

Three Quiz Tests - Best of the three will be considered

Question Pattern for Periodic Tests **Duration: 1 Hour**

Section	**Q.No.**	**Types of Question**	**No. of Questions**	**No. of Questions to be answered**	**Marks for each Question**	**Total Marks**
A	1 - 3	Internal Choice Either …or Type	3	3	5	15
B	4	Internal Choice Either …or Type	1	1	10	10
	Total					**25***

*The total marks obtained in the Periodic Test will be calculated for 15 marks

SUMMATIVE EXAMINATION

Mode of Evaluation		**Marks**
Summative Examination	:	50
Online Quiz (Multiple Choice Questions - K2 Level)	:	25
Total	**:**	**75**

Question Pattern **Duration: 2 Hours**

Section	Q.No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Internal Choice - Either … or Type	5	5	6	30
B	6 - 7	Internal Choice – Either… or Type	2	2	10	20
	Total					**50**

B.2.3.2 Skill Enhancement Course - Entrepreneurial skills

INTERNAL ASSESSMENT ONLY

Distribution of Marks

Mode of Evaluation		Marks
Periodic Test	:	15
Assignment	:	5
Quiz	:	5
Model Examinations	:	60
Online Quiz	:	15
Total	**:**	**100**

Question Pattern for Periodic Tests **Duration: 1 Hour**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1- 3)	Internal Choice – Either Or Type	3	3	5	15
B Q. No.(4)	Internal Choice – Either Or Type	1	1	10	10
Total					**25**

*The total marks obtained in the Periodic Test will be calculated for 15 marks

Two Periodic Tests - Better of the two will be considered

Two Assignments - Better of the two will be considered

Two Quiz Tests - Better of the two will be considered

Question Pattern for Model Examination **Duration: 2 Hours**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1-5)	Internal Choice – Either Or Type	5	5	6	30
B Q. No.(6- 8)	Internal Choice – Either Or Type	3	3	10	30
Total					**60**

B.2.3.3 Skill Enhancement Courses/ Non Major Elective Courses

INTERNAL ASSESSMENT

Distribution of Marks

Theory

Mode of Evaluation			**Marks**
Periodic Test		:	15
Assignment	K3 Level	:	5
Quiz	K2 Level	:	5
Total		**:**	**25**

Three Periodic Tests - Average of the best two will be considered

Two Assignments - Better of the two will be considered

Three Quiz Tests - Best of the three will be considered

Question Pattern for Periodic Tests

Duration: 1 Hour

Section	Q.No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 3	Internal Choice - Either …or Type	3	3	5	15
B	4	Internal Choice – Either …or Type	1	1	10	10
	Total					**25***

*The total marks obtained in the Periodic Test will be calculated for 15 marks

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SUMMATIVE EXAMINATION

Mode of Evaluation		**Marks**
Summative Examination	:	50
Online Quiz (Multiple Choice Questions - K2 Level)	:	25
Total	**:**	**75**

Question Pattern **Duration: 2 Hours**

Section	**Q.No.**	**Types of Question**	**No. of Questions**	**No. of Questions to be answered**	**Marks for each Question**	**Total Marks**
A	1 - 5	Internal Choice - Either … or	5	5	6	30
B	6 - 7	Internal Choice – Either… or Type	2	2	10	20
	Total					**50**

B.2.4 PART IV- ENVIRONMENTAL STUDIES / VALUE EDUCATION

INTERNAL ASSESSMENT ONLY

Evaluation Pattern

Mode of Evaluation		**Marks**
Periodic Test	:	15
Assignment - K3 Level	:	10
Online Quiz (Multiple Choice Questions - K2 Level)	:	25
Poster Presentation - K3 Level		10
Report - K3 Level		10
Model Examination	:	30
Total	**:**	**100**

Three Assignment - Best of the three will be considered

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Question Pattern for Periodic Tests **Duration: 1 Hour**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1- 3)	Internal Choice – Either Or Type	3	3	6	18
B Q. No.(4)	Internal Choice – Either Or Type	1	1	12	12
Total					**30**

*The total marks obtained in the Periodic Test will be calculated for 15 marks

Question Pattern for Model Examination **Duration: 2½ Hours**

Section	Q.No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Internal Choice - Either … or Type	5	5	6	30
B	6 - 8	Internal Choice – Either… or Type	3	3	10	30
	Total					**60***

*The total marks obtained in the Model Examination will be calculated for 30 marks

B. 2. 5 PART IV- Internship / Industrial Training

Internship / Industrial Training is mandatory for all the Students

- **Internship:** Students have to involve in a designated activity, working in an organization under the guidance of an identified mentor for a period of 15 days.
- **Industrial Training:** Student has to undertake in-plant training in industries individually or in group for a period of 15 days.
- Internship / Industrial Training must be done during the fourth semester holidays
- **Internal Assessment only.**

		Marks
Onsite Learning/Survey	:	50
Report	:	25
Viva-Voce	:	25
Total		**100**

B.2.5 SELF STUDY COURSE

B.2.5.1 PART III – Discipline Specific Quiz – Online

- Assessment by Internal Examiner only
- Question Bank is prepared by the Faculty Members of the Departments for all the Core and Elective Courses offered in all the Semesters.
- No. of Questions to be taken 700.
    - Multiple Choice Question pattern is followed.
    - Online Test will be conducted in VI Semester for 100 Marks.
    - Model Examination is conducted after two periodic tests.

Distribution of Marks

Mode of Evaluation		Marks
Periodic Test	:	25
Model Examination	:	75
	:	**100**

Two Periodic Tests - Better of the two will be considered

B.2.5.2 PART IV - Practice for Competitive Examinations – Online

Assessment by Internal Examiner only

- Question Bank prepared by the Faculty Members of the respective Departments will be followed.
- Multiple Choice Question pattern is followed.
- Online Test will be conducted in V Semester for 100 Marks.
- Model Examination is conducted after two periodic tests.

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Subject wise Allotment of Marks

Subject		Marks
Tamil	:	10
English	:	10
History	:	10
Mathematics	:	10
Current affairs	:	10
Commerce, Law & Economics	:	10
Physical Sciences	:	10
Life Sciences	:	15
Computer Science	:	5
Food and Nutrition	:	5
Sports and Games	:	5
Total	**:**	**100**

Distribution of Marks

Mode of Evaluation		Marks
Periodic Test	:	25
Model Examination	:	75
Total	**:**	**100**

Two Periodic Tests - Better of the two will be considered

B.2.6. Part V – Extension Activities

INTERNAL ASSESSMENT ONLY

Distribution of Marks

Mode of Evaluation		Marks
Attendance	:	5
Performance	:	10
Report/Assignment/Project/Camp/Practical	:	10
Total	**:**	**25***

*The marks obtained will be calculated for 100 marks

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B.2.7 Transfer of credits earned through MOOC (UGC recognized Courses)

- Students can opt for minimum of
  - 12 weeks Courses for Core Courses
  - 8 weeks Courses for Elective Courses
  - 4 weeks Courses for Skill Enhancement Course
- The Online Courses opted by the students will be verified and approved by the Head of the Department and forwarded to the Controller of Examinations through the Principal.
- Students are required to register for the equivalent Online Courses through the Institution's SWAYAM-NPTEL Local Chapter after submitting a Permission letter to the Head of the Department.
- The Course should be completed before the beginning of that particular Semester in which the selected Course is offered.
- The student should submit the Course Completion Certificate immediately after receiving it, to the Department.
- The Head of the Department has to send the list of the students and their Course Completion Certificates to the Controller of Examinations through the Principal.
- The students who have submitted the Completion Certificate are exempted from appearing the Periodic Tests and Summative Examinations of the respective course but without any exemption for class attendance.
- Credits allotted for the particular Course in the Curriculum will be transferred after the completion of the Online Course
- Students can earn up to 10 credits within the mandatory credits requirements of the Degree Programme by completing UGC recognised Online Courses.

B.2.8 EXTRA CREDIT COURSES (OPTIONAL)

2.8.1 Extra Credit Course offered by the Department.

Assessment by Internal Examiner Only (To be conducted along with the III Periodic Test)

Distribution of Marks

Mode of Evaluation		**Marks**
Quiz (Multiple Choice Questions)	:	25
Model Examination	:	75
Total	**:**	**100**

Question Pattern for Model Examination

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q.No.(1-5)	Internal Choice-Either or Type	5	5	7	35
B Q.No.(6-9)	Internal Choice-Either or Type	4	4	10	40
				Total	**75**

2.8.2 Extra credit Course offered by MOOC (Massive Open Online Course)

- The Courses shall be completed within the first V Semesters of the Programme.
- The allotment of credits is as follows **(Maximum of 10 credits)**

4 weeks Course - 1 credit
8 weeks Course - 2 credits
12 weeks Course - 3 credits

ELIGIBILITY FOR THE DEGREE

- The candidate will not be eligible for the Degree without completing the prescribed Courses of study, lab work, *etc.*, and a minimum Pass marks in all the Courses.
- No Pass minimum for Internal Assessment.
- Pass minimum for External Examination is 27 marks out of 75 marks for Core Courses, Elective Courses (Generic Elective, DSEC Courses)
- Pass minimum for External Examination is 18 marks out of 50 marks for Skill Enhancement Courses and Non Major Elective Courses (NMEC).
- The aggregate minimum pass percentage is 40 marks for all Courses.
- Pass minimum for External Practical Examination is 21 marks out of 60 marks.

Attendance

- The students who have attended the classes for 76 days (85%) and above are permitted to appear for the Summative Examinations without any condition.
- The students who have only 60-75 days (66% - 84%) of attendance are permitted to appear for the Summative Examinations after paying the required fine amount and fulfilling other conditions according to the respective cases.

- The students who have attended the classes for 59 days and less - up to 45 days (50%-65%) can appear for the Summative Examinations only after getting special permission from the Principal.
- The students who have attended the classes for 44 days or less (<50%) cannot appear for the Summative Examinations and have to repeat the whole semester.
- For Part V in UG Programmes, the students require 75 % of attendance to get a credit.
- For Certificate, Diploma, Advanced Diploma and Post Graduate Diploma Programmes, the students require 75% of attendance to appear for the Theory/Practical Examinations.

B.3 ASSESSMENT MANAGEMENT PLAN

An Assessment Management Plan that details the assessment strategy both at the Programme and the Course levels is prepared. The continuous assessment is implemented using an assessment rubric to interpret and grade students.

B.3.1 Assessment Process for CO Attainment

Assessment is one or more processes carried out by the institution that identify, collect and prepare data to evaluate the achievement of Course Outcomes and Programme Outcomes. Course Outcome is evaluated based on the performance of students in the Continuous Internal Assessments and in End Semester Examination of a Course. Target levels of attainment shall be fixed by the Course teacher and Heads of the respective departments.

Direct Assessment (rubric based)-Conventional assessment tools such as Term Test, Assignment, Quiz and End Semester Summative Examination are used

Indirect Assessment – Done through Course Exit Survey.

CO Assessment Rubrics

For the evaluation and assessment of COs and POs, rubrics are used. Internal assessment contributes 40% and End Semester assessment contributes 60% to the total attainment of a CO for the theory Courses. For the practical Courses, internal assessment contributes 50% and Semester assessment contributes 50% to the total attainment of a CO. Once the Course Outcome is measured, the PO can be measured using a CO-PO matrix.

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CO Attainment

Direct CO Attainment

Course outcomes of all Courses are assessed and the CO – wise marks obtained by all the students are recorded for all the assessment tools. The respective CO attainment level is evaluated based on set attainment rubrics.

Target Setting for Assessment Method

For setting up the target of internal assessment tools, 55% of the maximum mark is fixed as target. For setting up the target of End Semester Examination, the average mark of the class shall be set as target.

Formula for Attainment for each CO

Attainment = Percentage of students who have scored more than the target marks

$$\text{Percentage of Attainment} = \frac{\text{Number of Students who scored more than the Target}}{\text{Total Number of Students}} \times 100$$

Attainment Levels of COs

Assessment Methods	**Attainment Levels**	
Internal Assessment	Level 1	50% of students scoring more than set target marks in Internal Assessment tools
	Level 2	55% of students scoring more than set target marks in Internal Assessment tools
	Level 3	60% of students scoring more than set target marks in internal Assessment tools
End Semester Summative Examination	Level 1	50% of students scoring more than average marks in End Semester Summative Examination
	Level 2	55% of students scoring more than average marks in End Semester Summative Examination
	Level 3	60% of students scoring more than average marks in End Semester Summative Examination

Indirect CO Attainment

At the end of each Course, an exit survey is conducted to collect the opinion of the students on attainment of Course Outcomes. A questionnaire is designed to reflect the views of the students about the Course outcomes.

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Overall CO Attainment= 75% of Direct CO Attainment + 25 % of Indirect CO Attainment

In each Course, the level of attainment of each CO is compared with the predefined targets. If the target is not reached, the Course teacher takes necessary steps for the improvement to reach the target.

For continuous improvement, if the target is reached, the Course teacher can set the target as a value greater than the CO attainment of the previous year.

B.3.2 Assessment Process for Overall PO Attainment

With the help of CO - PO mapping, the PO attainment is calculated. PO assessment is done by giving 75% weightage to direct assessment and 25% weightage to indirect assessment. Direct assessment is based on CO attainment, where 75% weightage is given to attainment through End Semester Examination and 25% weightage is given to attainment through Internal assessments. Indirect assessment is done through Graduate Exit Survey and participation of students in Co-curricular/Extra-curricular activities.

PO Assessment Tools

Mode of Assessment	**Assessment Tool**	**Description**
Direct Attainment (Weightage -75%)	CO Assessment	This is computed from the calculated CO Attainment value for each Course
Indirect Attainment (Weightage - 25%)	Graduate Exit Survey 10%	At the end of the Programme, Graduate Exit Survey is collected from the students and it gives the opinion of the students on attainment of Programme Outcomes
	Co-curricular / Extracurricular activities 15%	For participation in Co-curricular / Extracurricular activities during the period of their study.

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Programme Articulation Matrix (PAM)

Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
Average Direct PO Attainment									
Direct PO Attainment in percentage									

Indirect Attainment of POs for all Courses

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
Graduate Exit Survey								
Indirect PO Attainment								

Attainments of POs for all Courses

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
Direct Attainment **(**Weightage - 75%)								
Indirect Attainment (Weightage - 25%)								
Overall PO Attainment								

Overall PO Attainment= 75% of Direct PO Attainment +
25% of Indirect PO Attainment (Graduate Exit Survey
& Participation in Co- curricular and
Extracurricular Activities)

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Expected Level of Attainment for each of the Programme Outcomes

POs	Level of Attainment
Attainment Value ≥70%	Excellent
60% ≤ Attainment Value < 70%	Very Good
50% ≤ Attainment Value < 60%	Good
40% ≤ Attainment Value < 50%	Satisfactory
Attainment Value <40%	Not Satisfactory

Level of PO attainment

Graduation Batch	Overall PO Attainment (in percentage)	Whether Expected Level of PO is Achieved? (Yes/No)

B.3.3 Assessment Process for PEOs

The curriculum is designed so that all the courses contribute to the achievement of PEOs. The attainment of PEOs is measured after 5 years of completion of the programme only through Indirect methods.

Target for PEO Attainment

Assessment Criteria	Target (UG)	Target (PG)
Record of Employment	15% of the class strength	30% of the class strength
Progression to Higher Education	50% of the class strength	5% of the class strength
Record of Entrepreneurship	2% of the class strength	5% of the class strength

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Attainment of PEOs

Assessment Criteria & Tool	**Weightage**
Record of Employment	10
Progression to Higher Education	20
Record of Entrepreneurship	10
Feedback from Alumnae	30
Feedback from Parents	10
Feedback from Employers	20
Total Attainment	**100**

$$\text{Percentage of PEO Attainment from Employment} = \frac{\text{Number of Students who have got Employment}}{\text{Target}} \times 100$$

$$\text{Percentage of PEO Attainment from Higher Education} = \frac{\text{Number of Students who pursue Higher Education}}{\text{Target}} \times 100$$

$$\text{Percentage of PEO Attainment from Entrepreneurship} = \frac{\text{Number of Students who have become Entrepreneurs}}{\text{Target}} \times 100$$

Expected Level of Attainment for each of the Programme Educational Objectives

POs	**Level of Attainment**
Attainment Value ≥70%	Excellent
60% ≤ Attainment Value < 70%	Very Good
50% ≤ Attainment Value < 60%	Good
40% ≤ Attainment Value < 50%	Satisfactory
Attainment Value <40%	Not Satisfactory

Level of PEO Attainment

Graduation Batch	**Overall PEO Attainment (in percentage)**	**Whether Expected Level of PEO is Achieved? (Yes/No)**

C. PROCESS OF REDEFINING THE PROGRAMME EDUCATIONAL OBJECTIVES

The College has always been involving the key stake holders in collecting information and suggestions with regard to curriculum development and curriculum revision. Based on the information collected the objectives of the Programme are defined, refined and are inscribed in the form of PEOs. The level of attainment of PEOs defined earlier will be analysed and will identify the need for redefining PEOs. Based on identified changes in terms of curriculum, regulations and PEOs, the administrative system like Board of Studies, Academic Council and Governing Body may recommend appropriate actions. As per the Outcome Based Education Framework implemented from the Academic Year 2020 -2021, the following are the Programme Structure, the Programme Contents and the Course Contents of B.Sc. Information Technology Programme.

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BACHELOR OF SCIENCE INFORMATION TECHNOLOGY (UG) (2025)

Outcome Based Education with Choice Based Credit System

Programme Structure - Allotment of Hours and Credits

For those who joined in the Academic Year 2024-2025 and after

Components	Semester						Total Number of Hours / Credits
	I	II	III	IV	V	VI	
Part I: Tamil /Hindi	6(3)	6(3)	6 (3)	6(3)	-	-	24 (12)
Part II: English	6(3)	6(3)	6 (3)	6(3)	-	-	24 (12)
Part III: Core, Allied and DSEC Courses:							
Core Course	5(5)	5(5)	5(5)	5(5)	6 (6)	6(5)	32 (31)
Core Course	-	-	-	-	6 (6)	6(5)	12 (11)
Core Course	-	-	-	-	-	-	-
Core Course Practical	5 (3)	5 (3)	5(3)	4(3)	5 (3)	6 (3)	30 (18)
Core Course Project	-	-	-	-	1 (1)	-	1 (1)
DSEC	-	-	-	-	5 (4)	5 (4)	10 (8)
DSEC Practical	-	-	-	-	5 (3)	5 (3)	10 (6)
Elective Course I (Allied)	4 (4)	4 (4)	4 (4)	4 (4)	-		16 (16)
Elective Course I Practical I(Allied)	-	-	-	-	-	-	-
Elective Course II (Allied)	-	-	-	-	-	-	-
Elective Course II Practical I(Allied)	-	-	-	-	-	-	-
Self-Study Course	-	-		-	-	0 (1)	0 (1)
Part IV: Skill Enhancement Courses, Elective Courses, Ability Enhancement Compulsory Courses, Self-Study Course and Internship/Industrial Training							
SEC	2(2)	-	1 (1)	2 (2)	-	-	5 (5)
SEC	-	2 (2)	2 (2)	2 (2)	-	2 (2)	8 (8)
Elective Course (NME)	2(2)	2(2)	-	-	-	-	4 (4)
Value Education	-	-	-	-	2 (2)	-	2 (2)
Environmental Studies	-	-	1 (0)	1 (2)	-	-	2 (2)
Self-Study Course	-	-	-	-	0 (1)	-	0 (1)
Internship /Industrial Training	-	-	-	-	0 (1)	-	0 (1)
Part V: Extension Activities	-	-	-	-	-	0 (1)	0 (1)
Total	**30 (22)**	**30 (22)**	**30 (21)**	**30 (24)**	**30 (27)**	**30 (24)**	**180 (140)**
Extra Credit Course (Self-Study Course)					0 (2)	-	0 (2)

DSEC: Discipline Specific Elective Course GEC: Generic Elective Course

SEC: Skill Enhancement Course

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Programme Code – 2025

Semester I

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part I**		Tami / Hindi	24UTAG11/ 24UHDG11	6	3	3	25	75	100
2	**Part II**		English	24UENG11	6	3	3	25	75	100
3	**Part III**	**Core Course - 1**	Programming in C	24UITC11	5	5	3	25	75	100
4		**Core Course - 2 Practical- 1**	C Programming Practical	24UITC11P	5	3	3	40	60	100
5		**Elective Course -1**	Digital Logic Fundamentals	24UITA11	4	4	3	25	75	100
6	**Part IV**	**Non Major Elective - 1**	Basics of Internet	24UITN11N	2	2	2	25	75	100
7		**SEC - 1**	Fundamentals of Computers	24UITF11	2	2	2	25	75	100
				Total	**30**	**22**				**700**

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Semester II

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part I**		Tami / Hindi	24UTAG21/ 24UHDG21	6	3	3	25	75	100
2	**Part II**		English	24UENG21	6	3	3	25	75	100
3	**Part III**	Core Course - 3	Java Programming	24UITC21	5	5	3	25	75	100
4		Core Course – 4 Practical- 2	Java Programming and Data Structures Practical	24UITC21P	5	3	3	40	60	100
5		Elective Course -2	Resource Management Techniques	24UITA21	4	4	3	25	75	100
6	**Part IV**	Non Major Elective – 2	Data Analysis using Spreadsheet	24UITN21N	2	2	2	25	75	100
7		SEC – 2 Practical – 1	Multimedia Practical	24UITS21P	2	2	2	40	60	100
				Total	**30**	**22**				**700**

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Semester III

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part I**		Tami / Hindi	24UTAG31 24UHDG31	6	3	3	25	75	100
2	**Part II**		English	24UENG31	6	3	3	25	75	100
3	**Part III**	Core Course – 5	Relational Database Management System	24UITC31	5	5	3	25	75	100
4		Core Course – 6 Practical- III	RDBMS Practical	24UITC31I	5	3	3	40	60	100
5		Elective Course -3	Numerical Methods	24UITA31	4	4	3	25	75	100
6	**Part IV**	SEC – 3	Enterprise Resource Planning	24UITS31	1	1	2	100	-	100
7		SEC – 4	Software Testing	24UITS32	2	2	2	25	75	100
8			Environmental Studies		1	-	-	-	-	-
				Total	**30**	**21**				**700**

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Semester IV

Sl. No	Component		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1.	**Part I**		Tamil / Hindi	24UTAG41/ 24UHDG41	6	3	3	25	75	100
2.	**Part II**		English	24UENG41	6	3	3	25	75	100
3.	**Part III**	Core Course 7	.Net Programming	24UITC41	5	5	3	25	75	100
4.		Core Course – 8 Practical-IV	.Net Programming Practical	24UITC41P	4	3	3	40	60	100
5.		Elective Course 4	Statistical Methods and its Application	24UITA41	4	4	3	25	75	100
6.	**Part IV**	SEC – 5	Problem Solving Techniques	24UITS41	2	2	2	25	75	100
7.		SEC – 6	Web Designing	24UITS42	2	2	2	25	75	100
8.			Environmental Studies	24UGES41	1	2	2	100	-	100
	TOTAL				**30**	**24**				**800**

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Semester V

Sl. No	Component		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1.	Part III	Core Course 9	Python Programming	24UITC51	6	6	3	25	75	100
2.		Core Course – 10	Operating Systems	24UITC52	6	6	3	25	75	100
3.		Core Course – 11 Practical-V	Python Programming Practical	24UITC51P	5	3	3	40	60	100
4.		Core Course-12 Project	Project	24UITC53PR	1	1	-	100	-	100
5.		Discipline Specific Elective Course 1 (DSEC 1)	Big Data Analytics/ Cryptography	24UITE51/ 24UITE52	5	4	3	25	75	100
6.		Discipline Specific Elective Course 2 Practical (DSEC 2)	Big Data Analytics using R Practical / Cryptography Practical	24UITE53P/ 24UITE54P	5	3	3	40	60	100
7.	Part IV		Value Education	24UGVE51	2	2	2	100	-	100
8.		Self-Study Course	Practice for Competitive Examination -Online	24UGCE51	-	1	-	100	-	100
9.		Internship/ Industrial Training	Internship	24UITI51	-	1	-	100	-	100
				TOTAL	**30**	**27**				**900**

Extra Credit Course (Self Study Course)	Data Structures	24UITO51	-	2	3	100	-	100

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Semester VI

Sl. No.	Component		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1.	Part III	Core Course 13	Data Mining	24UITC61	6	5	3	25	75	100
2.		Core Course – 14	Data Communication and Networking	24UITC62	6	5	3	25	75	100
3.		Core Course – 15 Practical-VI	PHP Scripting Practical	24UITC61P	6	3	3	40	60	100
4.		Discipline Specific Elective Course 3 (DSEC 3)	Artificial Intelligence/ Fuzzy Logic	24UITE61/ 24UITE62	5	4	3	25	75	100
5.		Discipline Specific Elective Course 4 Practical (DSEC 4)	Machine Learning using AI Practical / Fuzzy Logic Practical	24UITE63P/ 24UITE64P	5	3	3	40	60	100
6.	Part IV	Self-Study Course	Discipline Specific Quiz - Online	24UITQ61	-	1	-	100	-	100
7.		SEC – 7	Biometrics	24UITS61	2	2	3	25	75	100
8.	Part V		Extension Activities		-	1	-	100	-	100
				TOTAL	**30**	**24**				**800**

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B.SC. INFORMATION TECHNOLOGY
(2024 - 2025 onwards)

Semester I	**PROGRAMMING IN C**	Hours/Week: 5	
Core Course - 1		Credits: 5	
Course Code **24UITC11**		Internal 25	External 75

COURSE OUTCOMES

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

CO1 : outline the fundamental concepts of C programming languages, and its features to enhance the students learning. [K1]

CO2 : demonstrate the programming methodology to develop an application. [K2]

CO3 : illustrate the programming constructs for problem solving to solve real world problems in easier manner.[K2]

CO4 : construct the data representation, control structures, functions and concepts based on the problem requirement to improve their programming skills. [K3]

CO5 : develop the program performance by fixing the errors to develop their real time projects in the field of Information Technology. [K3]

UNIT I

Overview of C: History of C- Importance of C- Basic Structure of C Programs-Executing a C Program- Constants, Variables and Data types - Operators and Expressions - Managing Input and Output Operations.

Self-Study: History of C (15 Hours)

UNIT II

Decision Making and Branching: Decision Making and Looping - Arrays – Character Arrays and Strings. (15 Hours)

UNIT III

User Defined Functions: Elements of User Defined Functions- Definition of Functions- Return Values and their Types- Function Call- Function Declaration- Categories of Functions- Nesting of Functions-Recursion**.** (15 Hours)

UNIT IV

Structures and Unions: Introduction- Defining a Structure- Declaring Structure Variables Accessing Structure Members- Structure Initialization- Arrays of Structures- Arrays within Structures- Unions- Size of Structures. (15 Hours)

UNIT V

File Management in C: Introduction-Defining and opening a file-Closing a file-Input/Output Operations on files-Error handling during I/O Operations-Random Access to files-Command line arguments. (15 Hours)

TEXT BOOKS

E. Balaguruswamy, (2010), ―Programming in ANSI C, 8th Edition, Tata McGraw Hill Publications

REFERENCE BOOKS

1. Ashok Kamthane, (2009), ―Programming with ANSI & Turbo C‖, Pearson Education
2. Byron Gottfried, (2010), ―Programming with C‖, Schaums Outline Series, Tata McGraw Hill Publications.

Course Code 24UITC11	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	-	3	1	2	3	2	3	-
CO2	3	2	1	2	2	1	3	2	2	-
CO3	3	2	2	1	2	1	2	2	-	-
CO4	3	3	3	3	3	2	2	3	3	-
CO5	2	3	2	2	3	2	2	3	3	-

Strong (3) Medium (2) 1ow (1)

Dr.A.Bharathi Lakshmi
Heads of the Departments

Mrs.G.Chandraprabha
Course Designer

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B.SC. INFORMATION TECHNOLOGY
(2024 - 2025 onwards)

Semester I	**C PROGRAMMING PRACTICAL**	Hours/Week: 5	
Core Course -2 Practical - I		Credits: 3	
Course Code **24UITC11P**		Internal 40	External 60

COURSE OUTCOMES

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

CO1 : demonstrate the understanding of syntax and semantics of C programs. [K2]

CO2 : outline the problem and solve using C programming techniques. [K2]

CO3 : develop suitable programming constructs for problem solving. [K3]

CO4 : construct various concepts of C language to solve the problem in an efficient way. [K3]

CO5 : develop the C program for a given problem and debugging for its correctness. [K3]

EXERCISES:

1. Programs using Input/ Output functions
2. Programs on conditional structures
3. Command Line Arguments
4. Programs using Arrays
5. String Manipulations
6. Programs using Functions
7. Recursive Functions
8. Programs using Pointers
9. Files
10. Programs using Structures & Unions

Course Code 24UITC11P	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO3	PSO4	PSO 5.a.	PSO 5. b.	PSO6	PSO7
CO1	1	1	3	3	3	3	3	2	2	-
CO2	3	3	3	3	3	3	2	3	2	-
CO3	2	2	3	3	3	2	2	2	1	-
CO4	2	2	3	3	2	3	2	2	2	-
CO5	1	1	3	3	2	3	1	2	2	-

Strong (3) Medium (2) Low (1)

Dr.A.Bharathi Lakshmi
Heads of the Department

Dr.D.Shunmuga Kumari
Course Designer

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B.SC. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester I	**DIGITAL LOGIC FUNDAMENTALS**	Hours/Week: 4	
Elective Course - 1		Credits: 4	
Course Code **24UITA11**		Internal 25	External 75

COURSE OUTCOMES

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

CO 1 : recall number system over Boolean data and outline the arithmetic and combinational circuits using counters and registers in digital logic system. [K1]

CO 2 : classify various structure of number systems, counters and registers articulating in logic gates, digital circuit designing representations. [K2]

CO 3 : illustrate the concept of coding system, minimization techniques, Flip flops, registers, counters, gates and how to prevent various hazards and timing problems in a digital design. [K2]

CO 4 : implement Boolean Algebra, Logic gates, combinational and sequential circuits, counters and registers to design the circuits effectively. [K3]

CO 5 : build the concepts of Number Systems, Boolean Algebra, Minimization Techniques, Logic Gates, Flip Flops, Registers and Counters to discover solutions for specific real time problems in the field of Information Technology. [K3]

UNIT I

Number Systems and Codes: Introduction - Number system - Floating Point Representation of Numbers - Arithmetic Operation - 1's and 2's Complements - 9's Complement - 10's Complement-Binary Coded Decimal (BCD) - Codes. (15 Hours)

UNIT II

Boolean Algebra and Minimization Techniques: Introduction - Development of Boolean Algebra - Boolean Logic Operations - Basic Laws of Boolean Algebra - Demorgan's Theorems - Sum of Products and Product of Sums - Karnaugh Map.

(15 Hours)

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UNIT III

Logic Gates: Introduction - Positive and Negative Logic Designation - Logic Gates.

Arithmetic Circuits: Introduction - Procedure for the Design of Combinational Circuits - Half-Adder - Full-Adder - K-Map Simplification - Half- Subtractor- Full-Subtractor. (10 Hours)

UNIT IV

Combinational Circuits: Introduction - Multiplexers (Data Selectors) – Basic Four-input Multiplexer – IC74151-8 to 1 multiplexer – IC74150-16 to 1 Multiplexer - De-multiplexers (Data Distributors) – 1-to-4 DE multiplexer – 1-to-8 DE multiplexer - Decoders – Basic Binary decoder – 3-to-8 Decoder - Encoders – Octal to Binary Encoder – Decimal – BCD Encoder - Parity Generators/Checkers.

Flip-Flops: Introduction – Latches - Flip-Flops - S-R Flip-Flop - D Flip-Flop - J-K Flip-Flop -T Flip-Flop. (10 Hours)

UNIT V

Counters: Introduction - Asynchronous (Ripple or Serial) Counter - Ripple Counter with Decoded Outputs - Asynchronous Down Counter - Up-Down Counter.

Registers: Introduction - Shift Registers – Serial-in-Serial-out Shift Register - Serial-in-Parallel-out Shift Register - Parallel-in-Serial-out Shift Register - Parallel-in-Parallel-out Shift Register. (10 Hours)

TEXT BOOK

S.Salivahanan&S.Arivazhagan (2009), *Digital Circuits and Design*, Third Edition, Vikas Publishing House Pvt. Ltd.

REFERENCE BOOKS

1. Tocci R.J Widmer. N. S, *Digital Systems: Principles and Applications*, Eighth edition, Pearson Education Pvt., Ltd.
2. Albert Paul Malvino& Donald P.Leach, GoutamSaha (2011), *Digital Principles and Applications*, Seventh Edition, Tata McGraw-Hill, New Delhi.
3. Floyd, *Digital Fundamentals*, 8/e, Pearson Education.

WEB RESOURCES:

https://digitalprinciples.org/principles/

Course Code 24UITA11	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO3	PSO4	PSO 5.a.	PSO 5. b.	PSO6	PSO7
CO1	3	3	-	3	2	-	2	2	-	-
CO2	3	3	1	3	3	1	-	3	-	-
CO3	3	2	2	3	2	1	2	2	-	-
CO4	3	2	2	3	3	3	2	2	-	-
CO5	3	3	2	3	3	3	2	2	-	-

Strong (3) Medium (2) Low (1)

Dr.A.Bharathi Lakshmi
Head of the Department

Dr.D.ShunmugaKumari
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Quality Education with Wisdom and Values

B.SC. INFORMATION TECHNOLOGY
(2024 - 2025 onwards)

Semester I	**FUNDAMENTALS OF COMPUTERS**	Hours/Week: 2	
SEC -1 (Foundation Course)		Credits: 2	
Course Code **24UITF11**		Internal 25	External 75

COURSE OUTCOMES:
On completion of the course, the students will be able to

CO1 : outline the Computer fundamentals and various problem solving concepts in Computers. [K1]

CO2 : describe the basic computer organization, software, computer languages, software development life cycle and the need of structured programming in solving a computer problem. [K1]

CO3 : extend the types of computer languages, software, computer problems and examine how to set up expressions and equations to solve the problem. [K2]

CO4 : demonstrate the most appropriate programming languages, constructs and features to solve the problems in diversified domains. [K2]

CO5 : experiment the design of modules and functions in structuring the solution and various Organizing tools in problem solving. [K2]

UNIT I

Introduction: Characteristics of Computers - Evolution of Computers.

Basic Computer Organization: I/O Unit - Storage Unit - Arithmetic Logic Unit - Control Unit – Central Processing Unit. (6 Hours)

UNIT II

Computer Software: Types of Software - System Architecture.

Computer Languages: Machine Language - Assembly Language - High Level Language – Object Oriented Languages. (6 Hours)

UNIT III

Problem Solving Concepts: Problem Solving in Everyday life - Types of Problems - Problem solving with computers - Difficulties with Problem Solving.

Problem solving concepts for the computer: Constant Variables - Data Types - Functions - Operators - Expressions and Equations. (6 Hours)

UNIT IV

Organizing the Solution: Analyzing the problem - Algorithm - Flowchart - Pseudo code.

Programming Structure: Structuring a solution - Modules and their function - Local and Global variables. (6 Hours)

Self-Study: Data Types

UNIT V

Programming Structure: Parameters - Return values - Sequential Logic Structure - Problem solving with Decision - Problem Solving with Loops. (6 Hours)

TEXT BOOKS

1. Pradeep K.Sinha and Priti Sinha, (2004) ―Computer Fundamentals‖, Sixth Edition, BPB Publications.
2. Maureen Sprankle and Jim Hubbard, (2009) ―Problem Solving and Programming Concept, Ninth Edition, Prentice Hall.

REFERENCE BOOKS

1. R.G. Dromey, (2007), ―How to Solve it by Computer‖, Prentice Hall International Series in Computer Science.
2. C. S. V. Murthy, (2009), ―Fundamentals of Computers‖, Third Edition, Himalaya Publishing House

Course Code 24UITF11	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO3	PSO4	PSO 5.a.	PSO 5. b.	PSO6	PSO7
CO1	3	3	-	3	2	-	2	-	-	-
CO2	3	3	1	3	3	2	-	-	-	-
CO3	3	2	2	3	2	2	2	-	-	-
CO4	3	2	2	3	3	3	2	-	-	-
CO5	3	3	2	3	3	3	2	-	-	-

Strong (3) Medium (2) Low (1)

Dr.A.Bharathi Lakshmi
Head of the Department

Dr.D.Shunmuga Kumari
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B.SC. INFORMATION TECHNOLOGY
(2024 - 2025 onwards)

Semester II	**JAVA PROGRAMMING**	Hours/Week: 5	
Core Course -3		Credits: 5	
Course Code **24UITC21**		Internal 25	External 75

COURSE OUTCOMES

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

CO1 : outline the basic terminologies of OOP, programming language techniques and Internet programming concepts. [K1]

CO2 : interpret the problems using basic constructs, mechanisms, techniques and technologies of Java. [K2]

CO3 : demonstrate the behaviour of simple programs involving different techniques such as Inheritance, Packages, Interfaces, Exception Handling and Thread mechanisms. [K2]

CO4 : construct various problem-solving strategies involved in Java to develop a high-level application. [K3]

CO5 : develop Java programs to implement operator precedence, conditional operators, Inheritance, Interfaces, package, synchronization, user defined exceptions and applet for developing web pages to execute projects efficiently. [K3]

UNIT I

Fundamentals of Object- Oriented Programming: Introduction – Object Oriented Paradigm – Concepts of Object – Oriented Programming – Benefits of OOP.

Evolution: Java History- Java Features - Differs from C and C++.

Overview of Java Language: Java Program- Structure – Tokens – Java Statements – Java Virtual Machine – Command Line Arguments. (15 Hours)

UNIT II

Constants, Variables and Data Types – Operators and Expressions – Decision making and Branching – Looping – Arrays - Strings – Collection Interfaces and classes. (15 Hours)

UNIT III

Classes objects and methods: Introduction – Defining a class – Method Declaration – Constructors - Method Overloading – Static Members – Nesting of methods – Inheritance – Overriding – Final variables and methods – Abstract methods and classes. (15 Hours)

UNIT IV

Multiple Inheritance: Defining Interfaces – Extending Interfaces – Implementing Interfaces.

Packages: Creating Packages – Accessing Packages – Using a Package – Managing Errors and Exceptions - Multithreaded Programming. (15 Hours)

UNIT V

Applet Programming: Introduction – How Applet Differ from Applications – Preparing to Write Applets – Building Applet Code – Applet Life Cycle – Creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML file – Running the Applet – More About Applet Tag – Passing Parameters to Applets – Aligning the Display – More About HTML Tags – Displaying Numerical Values – Getting Input from the User.

Graphics Programming: Introduction– The Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing Polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts. (15 Hours)

TEXT BOOKS

E Balagurusamy(2010), “Programming with Java”, Tata McGraw Hill Edition India Private Ltd, 4th Edition

REFERENCE BOOKS

1. P.Naughton and H.Schildt (1999), “Java 2 The Complete Reference”, TMH, 3rd Edition
2. Jaison Hunder & William Crawford (2002),”Java Servlet Programming”, O'Reilly
3. Jim Keogh (2002), “J2EE: The Complete Reference”, Tata McGraw Hill Edition.

Course Code 24UITC21	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5.a	PSO 5.b	PSO 6	PSO 7
CO 1	3	1	2	2	2	3	3	2	1	1
CO 2	3	2	2	2	2	3	2	3	1	1
CO 3	3	2	2	2	3	3	2	3	1	1
CO 4	3	2	2	3	3	3	3	2	1	1
CO 5	2	2	3	2	3	3	3	2	1	1

Strong (3) Medium (2) Low (1)

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Mrs.G.Chandraprabha
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B.SC. INFORMATION TECHNOLOGY
(2024 - 2025 onwards)

Semester II	**JAVA PROGRAMMING & DATA STRUCTURES PRACTICAL**	Hours/Week: 5	
Core Course-4 Practical II		Credits: 3	
Course Code **24UITC21P**		Internal 40	External 60

COURSE OUTCOMES

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

CO1 : explain the way of solving the simple problems. [K2]

CO2 : demonstrate the appropriate software development environment to write, compile and execute object-oriented Java programs. [K2]

CO3 : apply the necessary mechanisms of Java needed to solve real-world problems.[K3]

CO4 : identify the defects and validate a Java program with different inputs. [K3]

CO5 : design, develop and compile Core Java that utilize OOP and data structure concepts. [K3]

Exercises

1. Basic Programs
2. Programs using Arrays
3. Programs using Strings
4. Programs to implement Classes and Objects
5. Programs to implement Interfaces
6. Programs to implement Inheritance
7. Programs to implement Packages
8. Demonstrate the Exception Handling mechanism
9. Programs to implement Threads
10. Programs to implement Linked List
11. Programs to implement Stacks
12. Programs to implement Queue
13. Sorting Procedures
14. Searching techniques

Course Code 24UITC21P	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5.a	PSO 5.b	PSO 6	PSO 7
CO 1	3	1	2	2	2	3	3	2	1	1
CO 2	3	2	2	2	2	3	2	3	1	1
CO 3	3	2	2	2	3	3	2	3	1	1
CO 4	3	2	2	3	3	3	3	2	1	1
CO 5	2	2	3	2	3	3	3	2	1	1

Strong (3) Medium (2) Low (1)

Dr.(Mrs).A.Bharathi Lakshmi
Head of the Department

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B.Sc. Information Technology
(2024 - 2025 onwards)

Semester II	**RESOURCE MANAGEMENT TECHNIQUES**	Hours/Week:4	
Elective Course 2		Credits: 4	
Course Code **24UITA21**		Internal 25	External 75

COURSE OUTCOMES
On completion of the course the students will be able to

CO1: define the basic concepts of operations research, linear programming problem, assignment problem and transportation problem.[K1]
CO2: discuss models, phases, characteristics of operations research, and mathematical formulation in linear programming problem, dual, assignment problem and transportation problem.[K2]
CO3: explain various methods of linear programming problem, assignment problem and transportation problem. [K2]
CO4: solve the problems in linear programming problem, assignment problem and transportation problem. [K3]
CO5: apply the algorithms for problems in linear programming problem, assignment problem and transportation problem. [K3]

UNIT I

Development of OR –Definition of OR – Modeling in OR – General methods for solving OR models – Main Characteristics and phases of OR study – Tools Techniques and methods– Scientific methods in OR – Scope of OR . (12 Hours)

UNIT II

Linear programming problems-Mathematical formulation of L.P.P- Slack and surplus variables–Graphical solution of L.P.P, Standard form of L.P.P., Matrix form of L.P.P – Simplex Method (Without Computational Procedure) (12 Hours)

UNIT III

Artificial variables techniques, Two phase method, Duality in linear programming (Conversion only) Dual Simplex method (Theorems without proof)

(12 Hours)

UNIT IV

Mathematical formulation of assignment problem – Methods for solving the assignment problem (12 Hours)

UNIT V

Mathematical formulation of transportation problem – Optimal solution of T.P – Methods for obtaining initial feasible solution–degeneracy in T.P– Unbalanced T.P

(12 Hours)

TEXT BOOK

Sharma, S.D. (Sixteenth Revised Edition 2009).*Operations Research*, Kedar Nath Ramnath & co.

REFERENCE BOOKS

1. P.K. Gupta, Man Mohan, Kantiswarup, *Operations Research*, Sultan Chand Publications.
2. Shankara Iyer, P.(2008).*Operations Research*,TataMc GrawHill.
3. Sharma, S.C.(2006). Introductory *Operation Research*, Discovery Publishing House.

Web Resources

Web resources from NDL Library, E-content from open-source libraries

Course Code 24UITA21	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	1	1	1	2
CO2	3	1	3	3	3	1	2
CO3	3	3	3	3	2	1	1
CO4	3	1	3	3	2	3	1
CO5	3	3	3	3	3	3	1

Strong (3) Medium (2) Low (1)

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B.SC. INFORMATION TECHNOLOGY
(2024 - 2025 onwards)

Semester II	**MULTIMEDIA PRACTICAL**	Hours/Week: 2	
SEC – 2 Practical I		Credits: 2	
Course Code **24UITS21P**		Internal 40	External 60

COURSE OUTCOMES
On completion of the course, the students will be able to

CO1 **:** illustrate the Adobe Photoshop tools to write the basic text and image effects. [K2]

CO2 **:** develop basic animation effects and use the drawing and painting tools in Photoshop and canva to write the various effects. [K2]

CO3 **:** explore the edited photoshop image and canva file. [K3]

CO4 **:** complete the animation to design cards, Banner and packaging design using Canva. [K3]

CO5 **:** develop the ability to edit photos and create their own 2D short animation film to meet the emerging demand and contemporary challenges [K3]

LAB EXERCISES:

PHOTOSHOP

1. Picture within a Text
2. Cloning and Transformations
3. Making Silhouette Images
4. Candle flame Animation
5. Blur effect
6. Pencil Drawing
7 Red Eye Removal
8. Heart Beat Animation
9. Sunset using Layer mask
10. Apple in a Palm using Layer mask
11. Editing a Photo.
12. Selecting a person from a photo.

13. Creating 3D Photo Cube.
14. Dripping Blood Animation
15. Giving Shadow Effect for the image and text.
16. Creating Glassy Characters.
17. Enhancing an Old Image to a Color Image. (Healing Brush Tool)

CANVA

18. Designing a Banner in Canva
19. Designing a Brochure in Canva
20. Designing a Pamphlet in Canva
21. Designing a Hotel menu card in Canva
22. Designing a Invitation in Canva
23. Create a Product packaging design in Canva
24. Designing a certificate using Canva
25. Designing a flyer using Canva

Course Code 24UITS21P	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1.a	**PSO 1.b**	**PSO 2.a**	**PSO 2.b**	**PSO 3**	**PSO 4**	**PSO 5.a**	**PSO 5.b**	**PSO 6**	**PSO 7**
CO 1	3	2	2	3	3	2	3	2	1	-
CO 2	3	1	2	3	3	3	2	3	1	-
CO 3	3	3	3	3	2	2	3	2	1	-
CO 4	2	3	3	2	2	3	2	3	1	-
CO 5	3	3	3	2	2	3	2	3	1	-

Strong (3) Medium (2) Low (1)

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B.Sc. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester III	**RELATIONAL DATABASE MANAGEMENT SYSTEM**	Hours/Week: 5	
Core Course 5		Credits: 5	
Course Code **24UITC31**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: learn the fundamental elements of DBMS to enhance their knowledge. [K1]

CO2: understand the architecture of the database and the languages used to maintain DBMS to apply the software aspects of computer systems. [K2]

CO3: illustrate the concept of database requirements and determine the entities involved in the system and their relationship to one another to find solutions for specific domain problems. [K2]

CO4: implement a relational database using a relational database package and manipulate a database using SQL for applying current technical concepts and practices. [K3]

CO5: apply the quality and ease of use of data modeling and diagramming tools in real world based on their carrier. [K3]

UNIT I

Introduction to Databases: Introduction – Characteristics of the Database Approach – Actors on the Scene – Workers behind the scene – Advantages of using DBMS Approach. **Overview of database and Architectures**: Data Models, Schemas, and Instances – Three-schema Architecture and Data Independence – Database languages & Interfaces – Database System Environment– Centralized & Client Server Architecture for DBMS - Classification of DBMS. (15 Hours)

UNIT II

Basic Relational Model: Relational Model Concepts – Relational Model Constraints and Relational Database Schemas – Update Operations, Tractions, Dealing with Constraint Violations.

The Relational Algebra and relational Calculus: Unary Relational Operations**:** SELECT and PROJECT – Relational Algebra Operations from Set Theory – Binary Relational Operations: JOIN and DIVISION – Examples of Queries in Relational Algebra. (15 Hours)

UNIT III

Data Modeling using the ER Model: Using High-Level Conceptual Data Models for Database Design – An example DB application – Entity Types, Entity Sets, Attributes, and Keys – Relationship Types, Relationship sets, Roles, and Structural Constraints – Weak entity types

Relational Database Design using ER and EER-to-Relational Mapping: Relational Database Design using ER- Relational Mapping – Mapping EER Model Constructs to Relations

(15Hours)

UNIT IV

Functional Dependencies and Normalization for Relational Database: Functional Dependencies – Definition of Functional Dependency – Normal Forms based on Primary Keys – Normalization of Relations – First Normal Form – Second Normal Form – Third Normal Form – BCNF- Fourth Normal Form- Fifth Normal Form. (15 Hours)

UNIT V

SQL-99:Schema Definition, Basic Constraints and Queries: The Relational Database Standard: Data definition, Constraints, and schema changes in SQL – Basic Queries in SQL – More complex SQL Queries – Insert, delete and update statements in SQL – Views in SQL.

(15 Hours)

TEXT BOOKS

1. Ramez Elmasri, Shamkant B. Navathe (2014), ―*Database Systems*, Sixth edition, Pearson Education, New Delhi.
2. Ivan Bayross (2003 Reprint*), SQL, PL/SQL-The Programming Language of Oracle*, Second Revised Edition, BPB Publications, New Delhi.
3. Abraham Silberschatz, Henry F. KorthS.Sudarshan (2013), *Database System Concepts*, 6th Edition, Tata McGraw Hill International Edition.

REFERENCE BOOKS

1. Alexis Leon, Mathews Leon (2006). *Essentials of Database Management Systems,* Vijay Nicole Imprints Pvt. Ltd.
2. Date, C.J. (2002). *An Introduction to Database Systems,* 7th Edition. Pearson Education Pvt. Ltd.
3. Raghu Ramakrishnan and Johannes Gehrke, *Database Management Systems,* 2nd Edition. Tata McGraw- Hill.

24UITC31	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	**PSO 1. b.**	**PSO 2. a.**	**PSO 2. b.**	**PSO 3**	**PSO 4**	**PSO 5.a.**	**PSO 5. b.**	**PSO 6**	**PSO 7**
CO 1	3	2	1	3	2	1	2	3	3	1
CO 2	3	3	1	2	2	1	3	2	1	1
CO 3	3	3	1	1	3	2	3	3	3	1
CO 4	3	3	2	3	3	2	2	3	2	1
CO 5	3	3	1	3	3	2	3	2	2	1

Strong (3) Medium (2) 1ow (1)

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B.SC. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester III	**RDBMS PRACTICAL**	Hours/Week: 5	
Core Course – 6 Practical III		Credits: 3	
Course Code **24UITC31P**		Internal 40	External 60

COURSE OUTCOMES:

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

CO1: Illustrate the transaction processing system to acquire the knowledge of database concepts. [K2]

CO2: determine the DDL, DML and DCL commands and relational database schemas to develop the PL/SQL programs to solve the real time (online) transaction processing system. [K2]

CO3: demonstrate a basic programmatic interface to a database and to use the basic functions of one such interface to enhance their skills to find the solutions for real time problems. [K3]

CO4: practice and record the commands and database packages that are used to create, populate, maintain, and query a database to deliver a data report in easily understandable format. [K3]

CO5: construct the query using SQL, solutions to a broad range of query, data update problems and derive an information model expressed in the forms to enhance their lifelong learning. [K3]

Exercises

Write simple Queries for the following:

SQL:

1. DDL Commands
2. DML Commands
3. DCL Commands
4. SQL Built-in functions
5. Using Sub Queries

PL/SQL:

6. Simple programs using PL/SQL
7. Procedures
8. User-defined functions
9. Exception Handling
10. Triggers

Course Code 24UITC31P	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1. a.	**PSO 1. b.**	**PSO 2. a.**	**PSO 2. b.**	**PO3**	**PSO4**	**PSO 5.a.**	**PSO 5. b.**	**PSO 6**	**PSO 7**
CO1	3	3	-	3	3	3	3	2	3	-
CO2	3	2	2	2	3	3	3	3	2	-
CO3	3	2	3	2	3	2	3	3	-	-
CO4	3	3	3	3	3	2	3	3	3	-
CO5	2	3	2	3	3	3	3	3	3	-

Strong (3) Medium (2) 1ow (1)

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B.SC. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester III	**NUMERICAL METHODS**	Hours/Week: 4	
Allied Course		Credits: 4	
Course Code **24UITA31**		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: Recall the fundamental concepts of algebraic, transcendental and simultaneous equations. [K1]

CO2: Derive the solutions of equations by various iterative methods. [K2]

CO3: Find the missing data by using interpolation and inverse interpolation methods.[K2]

CO4: Perform numerical differentiation and integration to find the derivatives and integral value numerically.[K3]

CO5: Apply Taylor series method, Picard's method, Euler's and Runge-kutta methods to obtain the solution of the initial value problems. [K3]

UNIT I

Algebraic and Transcendental Equations:

Introduction - Errors in numerical computation-Iteration method-Bisection method-Regula-Falsi method-Newton-Raphson method-Horner's method. (12 hours)

UNIT II

Simultaneous Equations:

Introduction-Simultaneous equations-Back substitution-Gauss Elimination method-Gauss-Jordan Elimination method-Calculation of Inverse of a matrix- Crout's method-Iterative methods-Gauss-Jacobi Iteration method- Gauss Seidal Iteration method-Newton Raphson's method for simultaneous equations. (12 hours)

UNIT III

Interpolation

Introduction - Newton's interpolation Formula - Central difference Interpolation Formulae-Gauss Forward Interpolation Formula, Gauss Backward Interpolation Formula, Lagrange's Interpolation Formula - Divided Differences-Newton's Divided Difference Formula-Inverse Interpolation. (12 hours)

UNIT IV

Numerical Differentiation and Integration:

Introduction - Derivatives using Newton's forward difference Formula - Derivatives using Newton's backward difference Formula.

Numerical Integration: Newton-cotes quadrature -Trapezoidal Rule-Simpson's one third rule-Simpson's 3/8th rule. (12 hours)

UNIT V

Numerical Solution of Ordinary Differential Equations:

Introduction-Taylor series method-Picard's method-Euler's method-Runge-kutta method of second, third, fourth order- Predictor & corrector methods-Milne's method. (12 hours)

TEXT BOOK

Arumugam. S, Thangapandi lssac.A, Somasundaram.A, *Numerical Methods*, Second Edition, Scitech Publications. Reprint, December 2013.

Unit	Chapter	Section
I	3	3.0 - 3.6
II	4	4.0 - 4.8, 4.10
III	7	7.0 - 7.2((i), (ii) and related problems), 7.3, 7.4,7.5, 7.6
IV	8	8.0 - 8.2,8.5 (excluding Weddles rule, Booles rule, Romberg's method and related problems)
V	10	10.0 - 10.2, 10.3(excluding modified Euler's method & its related problems), 10.4 - 10.6

REFERENCE BOOK

1. Mathews J.H. Numerical Method for Maths, Science and Engineering: PHI, New Delhi, 2001.

2. P.Kandasamy, K.Thilagavathy, K.Gunavathy, Numerical Methods (2016), S.Chand &

Company Ltd., New Delhi-55.

3. P.Duraipandian and Dr.S.Udayabaskaran, Allied Mathematics Volume I (2014), S.Chand & Company Ltd., New Delhi-55.

SELF STUDY

Modified Euler's method

WEB RESOURCES

https://27x37.files.wordpress.com/2011/05/mcgraw-hill-numerical-methods-using-matlab.pdf

Course Code 24UITA31	PO1	PO2	PO3	PO4	PO5	PO 6	PO7
CO1	3	2	1	3	1	1	-
CO2	3	2	1	3	2	1	-
CO3	3	1	1	3	2	1	-
CO4	3	2	1	3	2	1	-
CO5	2	2	1	3	2	1	-

Strong (3) Medium(2) Low(1)

Dr.M.C. Maheswari
Head of the Department

Dr.M.Uma Maheswari
Course Designer

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

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B.SC. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester III	**ENTERPRISE RESOURCE PLANNING**	Hours/Week: 1
SEC 3		Credits: 1
Course Code **24UITS31**		Internal 100

COURSE OUTCOMES:

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

CO1 : understand the basic concepts, Evolution and Benefits of ERP. [K1]

CO2 : know the need and Role of ERP in logical and Physical Integration. [K1]

CO3 : identify the important business functions provided by typical business software such as enterprise resource planning and customer relationship management. [K2]

CO4 : train the students to develop the basic understanding of how ERP enriches the business organizations in achieving a multidimensional growth. [K2]

CO5 : apply the technological competitive and make them ready to self-upgrade with the higher technical skills. [K3]

UNIT I

ERP Introduction: Benefits, Origin, Evolution and Structure: Conceptual Model of ERP, the Evolution of ERP, the Structure of ERP. (3 Hours)

UNIT II

Components and needs of ERP, ERP Vendors: Benefits & Limitations of ERP Packages. (3 Hours)

UNIT III

Need to focus on Enterprise Integration/ERP: Information mapping; Role of common shared Enterprise database; System Integration. (3 Hours)

UNIT IV

Logical vs. Physical System Integration, Benefits & limitations of System Integration, ERP's Role in Logical and Physical Integration. Business Process Reengineering. (3 Hours)

UNIT V

Data ware Housing, Data Mining, Online Analytic Processing (OLAP), Product Life Cycle Management (PLM), LAP, Supply chain Management. (3 Hours)

TEXT BOOK

Alexis Leon, *Enterprise Resource Planning*, Tata McGraw Hill.

REFERENCE BOOKS

1. Diversified by Alexis Leon, *Enterprise Resource Planning*, TMH.
2. Ravi Shankar & S. Jaiswal, *Enterprise Resource Planning*, Galgotia**.**

Course Code 24UITS31	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PO3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	-	3	2	3	3	2	1	1
CO2	3	2	2	2	2	3	3	2	1	1
CO3	2	2	3	2	2	2	3	2	1	1
CO4	3	2	3	3	2	2	2	3	1	1
CO5	2	3	2	1	2	3	2	2	1	1

Strong (3) Medium (2) Low (1)

Dr. A.Bharathi Lakshmi
Head of the Department

Mrs.G.Chandraprabha
Course Designer

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B.Sc. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester III	**SOFTWARE TESTING**	Hours/Week: 2	
SEC 4		Credits: 2	
Course Code **24UITS32**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: understand the different testing techniques and learn test case designing methods. [K1]

CO2: learn and identify the needs of software test automation, and define and develop a test tool to support test automation. [K1]

CO3: explain the various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods. [K2]

CO4: expose the knowledge of contemporary issues in software testing, such as component-based software testing problems. [K2]

CO5: identify the software testing methods and modern software testing tools for their testing projects. [K3]

UNIT I

Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style. (6 Hours)

UNIT II

Flow / Graphs and Path Testing – Achievable paths – Path instrumentation Application Transaction Flow Testing Techniques. (6 Hours)

UNIT III

Data Flow Testing Strategies - Domain Testing: Domains and Paths – Domains and Interface Testing. (6 Hours)

UNIT IV

Linguistic – Metrics – Structural Metric – Path Products and Path Expressions. Syntax Testing – Formats – Test Cases (6 Hours)

UNIT V

Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing. (6 Hours)

TEXT BOOKS

1. Beizer.B(2003), *Software Testing Techniques*, II Edn., Dream Tech India, New Delhi.
2. Prasad.K.V.K (2005), *Software Testing Tools*, Dream Tech. India, New Delhi.

REFERENCE BOOKS

1. I.Burnstein (2003), *Practical Software Testing*, Springer International Edn.
2. E. Kit (1995), *Software Testing in the Real World: Improving the Process*, Pearson Education, Delhi.
3. R. Rajani, and P.P.Oak (2004), *SoftwareTesting*, Tata McGrawHill, New Delhi.

WEB RESOURCES

1. https://www.javatpoint.com/software-testing-tutorial
2. https://www.guru99.com/software-testing.html

Course Code 24UITS32	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1. a.	**PSO 1. b.**	**PSO 2. a.**	**PSO 2. b.**	**PSO 3**	**PSO 4**	**PSO 5.a.**	**PSO 5. b.**	**PSO 6**	**PSO 7**
CO1	3	3	-	3	3	3	3	2	3	1
CO2	3	2	2	2	3	3	3	3	2	1
CO3	3	2	3	2	3	2	3	3	1	1
CO4	3	3	3	3	3	2	3	3	2	1
CO5	3	3	2	3	3	2	3	3	2	1

Strong (3) Medium (2) Low (1)

Dr. A. Bharathi Lakshmi
Head of the Department

Mrs. K. Kasthuri
Course Designer

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B.SC. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester IV	.**NET PROGRAMMING**	Hours/Week: 5	
Core Course – 7		Credits: 5	
Course Code **24UITC41**		Internal 25	External 75

COURSE OUTCOMES:

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

CO1: describe .NET framework, visual studio, web forms and controls, data access, data binding, XML concepts, Master page creation and Site Map. [K1]

CO2: discuss .NET code behind web form, web controls and data controls, ADO Data access, Master page and Site Map. [K2]

CO3: identify the controls to be used in C#.NET, ASP.NET and ADO.NET connection with SQL. [K2]

CO4: discover the C#.NET controls, interaction between ASP.NET and XML, SQL statements to create and manipulate the database. [K3]

CO5: predict the appropriate validation controls, SQL statements and XML data file to build dynamic web applications. [K3]

UNIT I

The Creation of C#: C# Relates to the .Net Framework - Common Language Runtime - Managed vs unmanaged code.

An Overview of C#: Object-Oriented Programming - First Simple Program-Handling Syntax errors - Using code blocks-semicolon, positioning and Indentation-The C# Keywords-Identifiers-The .Net Framework Class Library-Data Types, Literals and Variables- Operators. (15 Hours)

UNIT II

Program Control Statements: If Statement- switch Statement-For Loop- While loop do-while loop- foreach loop-using break to exit a loop-using continue- goto- **Introducing Classes and objects**: Class Fundamentals- objects creation-Methods-constructors-Garbage Collection and Destructors-Exception Handling. (15 Hours)

UNIT III

Arrays and Strings: Arrays-Multidimensional Arrays-Jagged Arrays- for each loop Strings-Methods and classes: Method overloading- Main Method-Recursion-static Classes

(15 Hours)

UNIT IV

Developing ASP.NET Applications: Visual Studio: Creating Websites- The Anatomy of a Web Form.

Web Form Fundamentals: Converting HTML Page to an ASP.Net Page – Page Class – Web Controls.

State Management: View State - Transferring Information between Pages – Cookies – Session State – Application State. (15 Hours)

UNIT V

Validation Controls – AdRotator Control. **Working with Data: ADO.NET Fundamentals:**– Direct Data Access – Disconnected Data Access - Data Binding: Data Binding with ADO.NET –Data Source Controls - **The Data Controls:** The GridView – Formatting the GridView – Selecting GridView Row – Editing, Sorting and Paging the GridView-Generating Crystal Reports.

(15 Hours)

TEXT BOOKS

1. Herbert Schildt (2010), *C# 4.0 The Complete Reference*, Tata McGraw-Hill Pvt Ltd
2. Mathew MacDonald, (2010), *Beginning ASP.NET 4 in C# 2010*, Second Edition, Apress.

REFERENCE BOOKS

1. Greg Buczek (2002), *ASP.NET – Developer's guide,* Tata MaGraw Hill Publication
2. Jesse Liberty, (2002), P*rogramming C#, 3.0*, O'Reilly Press.
3. J.Sharp (2009), *Microsoft Visual C# 2008 Step by Step*, PHI Learning Private Ltd.
4. Christian Nagel et al., *Professional C# 2005 with .NET 3.0*, Wiley India, 2007

WEB RESOURCES:

1. https://www.javatpoint.com/software-testing-tutorial
2. https://www.guru99.com/software-testing.html

Course Code 24UITC41	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	-	3	2	2	3	2	3	-
CO2	3	2	2	2	2	2	3	3	2	-
CO3	3	2	3	2	2	2	2	3	-	-
CO4	3	3	3	3	3	2	3	3	3	-
CO5	2	3	2	3	3	3	3	3	3	-

Strong (3) Medium (2) 1ow (1)

Dr.A.Bharathi Lakshmi
Head of the Department

Dr.A.Bharathi Lakshmi
Course Designer

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B.SC. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester IV	.NET PROGRAMMING PRACTICAL	Hours/Week: 4	
Core Course – 8 Practical-IV		Credits: 3	
Course Code **24UITC41P**		Internal 40	External 60

COURSE OUTCOMES:

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

CO1: describe MS Visual Studio.NET IDE to Create applications. [K2]

CO2: design the applications using C#.NET controls, Object Oriented Programming concepts and special expressions. [K2]

CO3: discover and implement the functionality of the web application in accordance to the user Requirement. [K3]

CO4: predict and fix the errors in web application.[K3]

CO5: build a web application using C# and ASP.NET concepts to solve the problem. [K3]

Exercises

1. C# Basics
2. Looping Constructs
3. Arrays & Jagged Array
4. Strings
5. Windows Applications.
6. Classes and Objects
7. Method overloading
8. ADO.Net Programming
9. ASP.Net Programming

Course Code 24UITC41P	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1. a.	**PSO 1. b.**	**PSO 2. a.**	**PSO 2. b.**	**PSO 3**	**PSO 4**	**PSO 5.a.**	**PSO 5. b.**	**PSO 6**	**PSO 7**
CO1	3	3	-	3	3	3	3	2	3	1
CO2	3	3	3	3	3	3	3	3	2	1
CO3	3	2	3	3	3	2	3	3	-	1
CO4	3	3	3	3	3	2	3	3	3	1
CO5	2	3	3	3	3	3	3	3	3	1

Strong (3) Medium (2) 1ow (1)

Dr.A.Bharathi Lakshmi
Head of the Department

Dr.A.Bharathi Lakshmi
Course Designer

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(2024-2025 onwards)

Semester II	**STATISTICAL METHODS AND ITS APPLICATIONS**	Hours/Week: 4	
Allied Course		Credits: 4	
Course Code **24UITA41**		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: Define fundamental concepts of statistical data, data collection, methods of sampling, sample space and related events. [K1]

CO2: Understand the different Statistical measures of data to establish the relationship between the variables by using graphs and other correlation methods. [K2]

CO3: Compute the measures of central tendency, dispersion, skewness and kurtosis. [K2]

CO4: Perform correlation, regression analysis to show the association between variables and determine its statistical significance. [K3]

CO5: Apply appropriate statistical test to validate the hypothesis in real life situations. [K3]

UNIT I

Introduction to statistics – primary and secondary data – classification, tabulation and Diagrammatic Representation of statistical data – Bar-charts, Pie-diagrams' – Graphical Representation of data – Histograms, Frequency polygon, Ogives. (12 hours)

UNIT II

Introduction- Measures of dispersion – characteristics – coefficient of dispersion - Coefficient of variation – Moments – skewness and kurtosis – Pearson's coefficient of skewness - Bowley's coefficient of Skewness – Coefficient of skewness based upon moments. (12 hours)

UNIT III

Simple correlation – Karl Pearson's coefficient of correlation – correlation coefficient for A bivariate frequency distribution – Rank correlation – Regression – lines of regression – Properties of regression coefficient. (12 hours)

UNIT IV

Events and sets – sample space – concept of probability – addition and multiplications Theorem on probability – conditional probability and independence of events – Baye's Theorem – concept of random variable – Mathematical Expectation. (12 hours)

UNIT V

Concept of sampling distributions – standard error – Tests of significance based on t, Chi-square distribution, F-Test. (12 hours)

TEXT BOOKS

Gupta S.P, *Statistical Methods,* Sultan Chand and sons Publications, 45th Edition, Reprint 2019.

REFERENCE BOOKS

1. Arumugam.S, Thangapandi Issac.A, *Statistics,* New Gamma Publication house, 2002.
2. Kishor.S. Trivedi, *Probability and statistics with reliability queuing and Computer Science Applications*, Prentice Hall of India (P) Ltd., New Delhi - 1997.
3. Seymour Lipschutz, Marc Lars Lipson, *Discrete Mathematics*, Schaum's Outlines 3rd Edition., Tata McGraw Hill, Education Pvt. Ltd., New Delhi. 5th Reprint, 2012.

SELF STUDY

Application of F-Distribution

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WEB RESOURCES

Web resources from NDL Library, E-content from open-source libraries

Course Code 24UITA41	PO1	PO2	PO3	PO4	PO5	PO 6	PO7
CO1	3	2	1	3	1	1	-
CO2	3	2	1	3	2	1	-
CO3	3	1	1	3	2	1	-
CO4	3	1	1	3	2	1	-
CO5	2	2	1	2	2	1	-

Strong (3) Medium(2) Low(1)

Dr.M.C. Maheswari — **Head of the Department**

Dr.S.Kohila — **Course Designer**

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Semester IV	**PROBLEM SOLVING TECHNIQUES**	Hours/Week: 2	
SEC 5		Credits: 2	
Course Code **24UITS41**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: understand the systematic approach to the logic of problem, algorithm and Top Down approach and concept of Recursion. [K1]

CO2: able to understand the Sequence of Numbers and Series Fibonacci, Reversing, Base Conversion. [K1]

CO3: demonstrate the efficient approach to solve specific factoring-related problems and to do algebraic operations. [K2]

CO4: explain the efficient array-related techniques to solve specific problems and analyze the execution coverage of Arrays and its Logics [K2]

CO5: experiment the efficient methods to solve specific problems related to text processing and Pattern Searching based on recursion. [K3]

UNIT I

Introduction: Notion of algorithms and programs – Requirements for solving problems by computer.

The problem-solving aspect: Problem definition phase - Getting started on a problem - The use of specific examples - Similarities among problems, Working backwards from the

solution – General problem-solving strategies - Problem solving using top-down design – Implementation of algorithms – The concept of Recursion. (6 Hours)

UNIT II

Fundamental Algorithms: Exchanging the values of two variables – Counting - Summation of a set of numbers - Factorial computation - Sine function computation - Fibonacci Series generation - Reversing the digits of an integer. (6 Hours)

UNIT III

Factoring Methods: Finding the square root of a number – The smallest divisor of an integer – Greatest common divisor of two integers - Generating prime numbers – Computing the prime factors of an integer – Computing the nth Fibonacci number. (6 Hours)

UNIT IV

Array Techniques: Array order reversal – Array counting or histograming – Finding the maximum number in a set - Removal of duplicates from an ordered array - Partitioning an array – Finding the kth smallest element. (6 Hours)

UNIT V

Text Processing and Pattern Searching: Text line length adjustment – Left and right justification of text – Keyword searching in text – Text line editing – Linear pattern search. (6 Hours)

TEXT BOOK

R. G. Dromey, *How to Solve it by Computer*, Pearson India, 2007

REFERENCE BOOKS

1. George Polya, Jeremy Kilpatrick (2009), *The Stanford Mathematics Problem Book: With Hints and Solutions*, Kindle Edition 2013, Dover Publications.

2. Greg W. Scragg (1996), *Problem Solving with Computers*, First Edition, Jones & Bartlett.

WEB RESOURCES

1. https://www.studytonight.com/

2. https://www.w3schools.com/

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Course Code 24UITS41	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1. a.	**PSO 1. b.**	**PSO 2. a.**	**PSO 2. b.**	**PSO 3**	**PSO 4**	**PSO 5.a.**	**PSO 5. b.**	**PSO 6**	**PSO 7**
CO1	3	3	-	3	3	3	3	2	3	1
CO2	3	2	2	2	3	3	3	3	3	1
CO3	3	2	3	2	3	2	3	3	1	1
CO4	3	3	3	3	3	2	3	3	3	1
CO5	3	2	3	2	2	3	2	2	2	1

Strong (3) Medium (2) Low (1)

Dr. A. Bharathi Lakshmi
Head of the Department

Mrs. K. Kasthuri
Course Designer

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

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B.SC. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester IV	**WEB DESIGNING**	Hours/Week: 2	
SEC 6		Credits: 2	
Course Code 24UITS42		Internal 25	External 75

COURSE OUTCOME

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

CO1: list out the basic tags used in HTML and the importance of Document object model (DCOM). [K1]

CO2: relate the tags, forms and Java script to design and publish a web pages. [K1]

CO3: outline the mechanisms to optimize page styles and layout with Cascading Style Sheets (CSS).[K2]

CO4: illustrate the dynamic web applications by using XML, DHTML and Java script concepts. [K2]

CO5: identify the objects in Java script and validating a form to develop and publish Interactive web pages. [K3]

UNIT I

HTML: HTML – Introduction – Structure of HTML Document-Switching between your Editor and Browser-Header or Head Section-Body Section-Heading tags –paragraph formatting tags -Font setting Tag – Lists – Tables. (6 Hours)

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UNIT II

Images: Using the ALT ATTRIBUTE-Using the Align Attribute in Inline Graphics-Setting the Height and Width of Inline Image-Creating Image Links Including an Image in a Link-Controlling the Border Around an Image Link.

Forms: Application Areas for Forms-Creating a Form-Input Elements-Adding a Check Box-Adding a Radio Button-Adding a Password Field-Multiple Line Text Input-Pull Down Menus-Adding Submit and Reset Buttons-Attributes to Form Tag.

Frames: Defining Frameset-Nested Frame-Creating Linked Frames. (6 Hours)

UNIT III

Cascaded Style Sheet (CSS): Introduction **–** Style Sheet-Style Rule-Including Style Information Inline-Inline Styles-Embedding Style Sheet-Grouping Style Sheet-Selectors-Cascading Style Sheet.

XML (Extensible Markup Language): Introduction – History – XML – XML Basics – XML Markup(XML Schema). (6 Hours)

UNIT IV

JavaScript and AJAX: Introduction – JavaScript – Add a JavaScript into an HTML Page **–** Variables – Conditional Statements – operators in JavaScript – JavaScript Popup Boxes – JavaScript Functions – JavaScript Loops. (6 Hours)

UNIT V

JavaScript And AJAX: Events – JavaScript-Catching Errors – Insert Special Characters – Object Oriented Programming – The HTML DOM – Browser Detection – JavaScript Form Validataion. (6 Hours)

TEXT BOOKS

1. Pankaj Sharma (2011), *Web Technology*, SkKataria & Sons, Bangalore.
2. Mike Mcgrath (2006), *Java Script*, First Edition, Dream Tech Press.
3. Achyut S Godbole & AtulKahate (2002), *Web Technologies*, Second Edition, Tata McGraw Hill.

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REFERENCE BOOKS

1. Laura Lemay, RafeColburn , Jennifer Kyrnin (2016), "*Mastering HTML, CSS & Javascript Web Publishing*, BPB Publications.
2. DT Editorial Services (Author) (2016), *HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)*, Second Edition, Dreamtech Publications .

WEB RESOURCES

1. NPTEL & MOOC courses titled Web Design and Development.
2. https://www.geeksforgeeks.org

Course Code 24UITS42	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5.a	PSO 5.b	PSO 6	PSO 7
CO 1	3	3	2	2	2	3	3	2	1	1
CO 2	3	2	2	2	2	3	2	3	1	1
CO 3	3	2	2	2	2	3	2	3	1	1
CO 4	3	2	2	3	3	3	3	2	1	1
CO 5	2	3	3	2	3	3	3	2	1	1

Strong (3) Medium (2) Low (1)

Dr.A.Bharathi Lakshmi
Head of the Department

Dr.A.Bharathi Lakshmi
Course Designer

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B.SC. INFORMATION TECHNOLOGY

(2024 – 2025 onwards)

Semester V	**PYTHON PROGRAMMING**	Hours/Week: 6	
Core Course 9		Credits: 6	
Course Code **24UITC51**		Internal 25	External 75

COURSE OUTCOMES

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

CO1 : learn the fundamental elements of concepts in python language. [K1]

CO2 : interpret different looping and conditional statements in python language. [K2]

CO3 : demonstrate the various data types and identify the usage of control statements, loops, functions and Modules in python for processing the data [K2]

CO4 : apply and solve problems using basic constructs and techniques of python. [K3]

CO5 : develop the approaches used in the development of interactive application. [K3]

UNIT I

Basics of Python Programming: History of Python-Features of Python-Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types-Output Statements – Input Statements-Comments – Indentation- Operators-Expressions-Type conversions.

Python Arrays: Defining and Processing Arrays – Array methods. (15 Hours)

UNIT II

Control Statements: Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops.

Jump Statements: break, continue and pass statements. (15 Hours)

UNIT III

Functions: Function Definition – Function Call – Variable Scope and its Lifetime- Return Statement.

Function Arguments: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion.

Python Strings: String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison.

Modules: import statement- The Python module – dir() function – Modules and Namespace – Defining our own modules. (20 Hours)

UNIT IV

Lists: Creating a list -Access values in List-Updating values in Lists-Nested lists -Basic list operations-List Methods.

Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples.

Dictionaries: Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries. (20 Hours)

UNIT V

Python File Handling: Types of files in Python - Opening and Closing files-Reading and Writing files: write() and writelines() methods- append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files. (20 Hours)

TEXT BOOKS

1. Reema Thareja (2017), *Python Programming using problem solving approach*, First Edition, Oxford University Press.
2. Dr. R. Nageswara Rao (2017), *Core Python Programming*, First Edition, Dreamtech Publishers.

.

REFERENCE BOOKS

1. Vamsi Kurama, *Python Programming: A Modern Approach*, Pearson Education.
2. Mark Lutz, *Learning Python*, Orielly.

WEB RESOURCES

1. https://www.programiz.com/python-programming
2. https://www.guru99.com/python-tutorials.html

Course Code 24UITC51	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO 1	3	2	1	3	2	1	2	3	3	1
CO 2	3	3	1	2	2	1	3	2	1	1
CO 3	3	3	1	1	3	3	3	3	3	1
CO 4	3	3	2	3	3	3	2	3	2	1
CO 5	3	3	1	3	3	3	3	2	2	1

Strong (3) Medium (2) Low (1)

Dr. A.Bharathi Lakshmi
Head of the Department

Dr.D.ShunmugaKumari
Course Designer

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

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VIRUDHUNAGAR

Quality Education with Wisdom and Values

B.SC. INFORMATION TECHNOLOGY

(2024-2025 onwards)

Semester V	**OPERATING SYSTEMS**	Hours/Week: 6	
Core Course 10		Credits: 6	
Course Code **24UITC52**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: reminisce the structure of operating system, files, services and techniques used for scheduling CPU helps in synchronizing the process and memory. [K1]

CO2: illustrate the components of a system, main principles and techniques used to implement processes and deadlock as well as the different algorithms for process scheduling and paging of memory to solve the technical memory management errors. [K2]

CO3: outline the main problems related to scheduling and the different process synchronization and also deadlock mechanisms, as well as describe the different approaches of memory management and paging replacement algorithms to resolve page faults. [K2]

CO4: apply the knowledge of process management, synchronization, deadlock to solve basic problems in allocating memory and resource. [K3]

CO5: organize the basic system design process to schedule the process and CPU as well as the requirement for process coordination and avoid the deadlock to enhance the system capacitance. [K3]

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UNIT I

Introduction: Definition of Operating System.**OS Structures:** OS Services - System Calls. **Process Management:** Process Concept - Process Scheduling - Operation on Processes - Operations on Processes - Inter-process Communication. (15 Hours)

UNIT II

CPU Scheduling: Basic Concepts - Scheduling Criteria - Scheduling Algorithms.

Process Synchronization: The Critical Section Problem - Semaphores - Classical Problems of Synchronization. (20 Hours)

UNIT III

Deadlocks: System Model - Deadlock characterization – Methods for Handling Deadlocks Deadlock Prevention - Deadlock avoidance- Deadlock Detection - Recovery from Deadlock. (20 Hours)

UNIT IV

Storage management: Memory management - Swapping – Contiguous Memory allocation. Paging – Segmentation –Segmentation with Paging.**Virtual memory:** Demand paging - Page replacement – Thrashing. Mass-Storage Structure: Disk Structure- Disk scheduling. (20 Hours)

UNIT V

File-System Interface: File Concept-File Attributes-File Operations.

Access Methods: Sequential Access – Direct Access –Directory Structure: Single-Level Directory- Two –Level Directory-Tree-Structured Directories. (15 Hours)

TEXT BOOKS

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2012), *Operating System Concepts*, 9th edition, Wiley Student Edition.
2. B.Mohamed Ibrahim (2005), *Linux Practical Approach*, Firewall Media.

REFERENCE BOOKS

1. Milan Milenkovic (2003), *Operating System Concepts and Design*, McGraw Hill.

2. Andrew S. Tanenbaum, (2001), *Modern Operating Systems*, 2nd Edition, Prentice Hall of India. J.Sharp (2009), *Microsoft Visual C# 2008 Step by Step*, PHI Learning Private Ltd.
3. Deital and Deital (1990), *Introduction to Operating System*, Pearson Education.

WEB RESOURCES

1. http://www.tutorialspoint.com/operating_system/
2. http://www.reallylinux.com/docs/files.shtml
3. http://www.tutorialspoint.com/operating_system/os_linux.htm

Course Code 24UITC52	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	-	3	2	2	3	2	3	-
CO2	3	2	2	2	2	2	3	3	2	-
CO3	3	2	3	2	2	2	2	3	-	-
CO4	3	3	3	3	3	2	3	3	3	-
CO5	2	3	2	3	3	3	3	3	3	-

Strong (3) Medium (2) 1ow (1)

Dr.A.Bharathi Lakshmi
Head of the Department

Dr.A.Bharathi Lakshmi
Course Designer

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B.SC. INFORMATION TECHNOLOGY

(2024-2025 onwards)

Semester V	**PYTHON PROGRAMMING PRACTICAL**	Hours/Week: 5	
Core Course 11 Practical V		Credits: 3	
Course Code **24UITC51P**		Internal 40	External 60

COURSE OUTCOMES:

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

CO1 : outline the significance of control statements, loops and functions in creating Simple programs. [K2]

CO2 : demonstrate the core data structures available in python to store, process and sort the data. [K2]

CO3 : develop the real time applications using python programming language. [K3]

CO4 : apply the real time problem using suitable python concepts. [K3]

CO5 : organize the complex problems using appropriate concepts in python. [K3]

Lab Exercises

1. Program using variables, constants, I/O statements in Python.
2. Program using Operators in Python.
3. Program using Conditional Statements.
4. Program using Loops.
5. Program using Jump Statements.
6. Program using Functions.

7. Program using Recursion.
8. Program using Arrays.
9. Program using Strings.
10. Program using Modules.
11. Program using Lists.
12. Program using Tuples.
13. Program using Dictionaries.
14. Program for File Handling.

Course Code 24UITC51P	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1.a	**PSO 1.b**	**PSO 2.a**	**PSO 2.b**	**PSO 3**	**PSO 4**	**PSO 5.a**	**PSO 5.b**	**PSO 6**	**PSO 7**
CO1	3	2	3	3	3	3	2	3	1	1
CO2	3	3	3	3	3	3	3	2	1	1
CO3	2	2	3	3	3	3	3	2	2	1
CO4	2	2	3	2	2	3	2	1	3	1
CO5	1	2	3	3	2	3	1	2	2	1

Strong (3) Medium (2) Low (1)

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B.SC. INFORMATION TECHNOLOGY

(2024-2025 onwards)

Semester V	**PROJECT**	Hours/Week: 1
Core Course 12 Project		Credits: 1
Course Code **24UITC53PR**		Internal 100

COURSE OUTCOMES

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

CO1: demonstrate fundamental concepts and methods to identify and solve technical problems.[K2]

CO2: identify the ability to look into industrial problem and implement a secure and reliable information system. [K3]

CO3: construct the characteristics of various stages of projects to provide technology based conclusion. [K3]

CO4: organize team management to complete the project on time and work effectively as a member or a leader of a team. [K3]

CO5: evaluate the software models to present technical report for Lifelong learning. [K4]

Students are expected to select a project in the field of Information Technology and related interdisciplinary fields. Projects can be done individually or in a group of two students. Minimum pages for project report should be 20 pages. Two typed copies of the report on the completed project will be submitted to the Controller of Examination through the Head of the department in the month of November during V semester. Evaluation will be done internally.

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Project work & Report - 60 marks

Presentation & Viva-voce - 40 marks

Course Code 24UITC53PR	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1. a.	**PSO 1. b.**	**PSO 2. a.**	**PSO 2. b.**	**PSO 3**	**PSO 4**	**PSO 5.a.**	**PSO 5. b.**	**PSO 6**	**PSO 7**
CO1	3	3	3	3	2	2	3	2	3	1
CO2	3	2	2	2	2	2	3	3	3	1
CO3	3	2	3	2	2	2	2	3	3	1
CO4	3	3	3	3	3	2	3	3	2	1
CO5	2	3	2	3	3	3	3	3	2	1

Strong (3) Medium (2) Low (1)

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Mrs. K. Kasthuri
Course Designer

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B.SC. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester V	**BIG DATA ANALYTICS**	Hours/Week: 5	
DSEC 1		Credits: 4	
Course Code **24UITE51**		Internal 25	External 75

COURSE OUTCOME

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

CO1: list the characteristics of big data, algorithms and methods used for clustering to acquire the basic knowledge of big data computing.[K1]

CO2: Demonstrate specialist knowledge of how a range of data sources , analytical methods and streams are used to manipulate data stores across multiple domains.[K2]

CO3: Summarize the strengths and limitations of a range of data analytics approaches that helps in applying real time data analytics projects. [K2]

CO4: identify the use of decision tree algorithms, stream data models and Hbase tools to manipulate data and perform statistical analysis.[K3]

CO5: Apply contemporary data analytics research techniques to investigate social, policy, scientific and organisational problems through software to carry out societal IT projects. [K3]

UNIT I

Evolution of Big data — Best Practices for Big data Analytics — Big data characteristics — Validating — The Promotion of the Value of Big Data — Big Data Use Cases- Characteristics of Big Data Applications — Perception and Quantification of Value -Understanding Big Data

Storage — A General Overview of High-Performance Architecture — HDFS — MapReduce and YARN — Map Reduce Programming Model (15 Hours)

UNIT II

Advanced Analytical Theory and Methods: Overview of Clustering — K-means — Use Cases — Overview of the Method — Determining the Number of Clusters — Diagnostics — Reasons to Choose and Cautions .- Classification: Decision Trees — Overview of a Decision Tree — The General Algorithm — Decision Tree Algorithms — Evaluating a Decision Tree — Decision Trees in R — Naïve Bayes — Bayes? Theorem — Naïve Bayes Classifier. (15 Hours)

UNIT III

Advanced Analytical Theory and Methods: Association Rules — Overview — Apriori Algorithm — Evaluation of Candidate Rules — Applications of Association Rules — Finding Association& finding similarity — Recommendation System: Collaborative Recommendation- Content Based Recommendation — Knowledge Based Recommendation- Hybrid Recommendation Approaches. (15 Hours)

UNIT IV

Introduction to Streams Concepts — Stream Data Model and Architecture — Stream Computing, Sampling Data in a Stream — Filtering Streams — Counting Distinct Elements in a Stream — Estimating moments — Counting oneness in a Window — Decaying Window — Real time Analytics Platform(RTAP) applications — Case Studies — Real Time Sentiment Analysis, Stock Market Predictions. Using Graph Analytics for Big Data: Graph Analytics (15 Hours)

UNIT V

NoSQL Databases : Schema-less Models?: Increasing Flexibility for Data Manipulation- Key Value Stores- Document Stores — Tabular Stores — Object Data Stores — Graph Databases Hive — Sharding —Hbase — Analyzing big data with twitter — Big data for E-Commerce Big data for blogs — Review of Basic Data Analytic Methods using R. (15 Hours)

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TEXT BOOK

Anand Rajaraman and Jeffrey David Ullman (2012), *Mining of Massive Datasets*, Cambridge University Press.

REFERENCE BOOKS

1. David Loshin (2013), *Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph*, Morgan Kaufmann/El sevier Publishers.
2. EMC Education Services (2015), *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*, Wiley publishers.

WEB RESOURCES

1. https://www.simplilearn.com
2. https://www.sas.com/en_us/insights/analytics/big-data-analytics.html

Course Code 24UITE51	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	1	3	2	2	3	2	1	1
CO2	3	2	2	2	2	2	3	3	1	1
CO3	3	2	3	2	2	2	2	3	1	1
CO4	3	3	3	3	3	2	3	3	1	1
CO5	2	3	2	3	3	3	3	3	1	1

Strong (3) Medium (2) Low (1)

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Mrs.G.Chandraprabha
Course Designer

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B.SC. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester V	**CRYPTOGRAPHY**	Hours/Week: 5	
DSEC 1		Credits: 4	
Course Code **24UITE52**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: Understand various Security practices and System security standards. [K1]

CO2: grasp the various Authentication schemes to simulate different applications. [K2]

CO3: Implement the different cryptographic operations of public key a cryptography [K2]

CO4: Apply the different cryptographic operations of symmetric cryptographic algorithms. [K3]

CO5: Apply the vulnerabilities in any computing system and hence be able to design a security solution.. [K3]

UNIT I

Introduction: The OSI security Architecture – Security Attacks – Security Mechanisms – Security Services – A model for network Security. (15 Hours)

UNIT II

Classical Encryption Techniques: Symmetric cipher model – Substitution Techniques: Caesar Cipher – Monoalphabetic cipher – Play fair cipher – Poly Alphabetic Cipher – Transposition techniques – Stenography (15 Hours)

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UNIT III

Block Cipher and DES: Block Cipher Principles – DES – The Strength of DES –RSA: The RSA algorithm. (15 Hours)

UNIT IV

Network Security Practices: IP Security overview - IP Security architecture – Authentication Header.

Web Security: SecureSocket Layer and Transport Layer Security – Secure Electronic Transaction. (15 Hours)

UNIT V

Intruders – Malicious software – Firewalls. (15 Hours)

TEXT BOOKS

William Stallings, *Cryptography and Network Security Principles and Practices*, Pearson Publishers.

REFERENCE BOOKS

1. Behrouz A. Foruzan (2007), *Cryptography and Network Security*, Tata McGraw-Hill.
2. Atul Kahate (2003), *Cryptography and Network Security*, Second Edition, TMH.
3. M.V. Arun Kumar (2011), *Network Security*, First Edition, USP.

WEB RESOURCES

1. https://www.tutorialspoint.com/cryptography/
2. https://gpgtools.tenderapp.com/kb/how-to/introduction-to-cryptography

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Course Code 24UITE52	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	2	3	2	2	3	2	1	1
CO2	3	2	3	2	2	3	3	3	1	1
CO3	3	2	2	2	2	2	2	3	1	1
CO4	3	3	2	3	3	3	2	3	1	1
CO5	2	3	2	3	3	3	3	3	1	1

Strong (3) Medium (2) 1ow (1)

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B.Sc. INFORMATION TECHNOLOGY

(2024-2025 onwards)

Semester V	**BIG DATA ANALYTICS USING R PRACTICAL**	Hours/Week: 5	
DSEC 2 Practical		Credits: 3	
Course Code **24UITE53P**		Internal 40	External 60

COURSE OUTCOME

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

CO1: demonstrate the R language syntax including control statements, loops and functions to write programs for a wide variety of real world problems in mathematics and research field. [K2]

CO2: illustrate the control structures like looping and conditional statements in R to store, process and sort the data in easier manner. [K2]

CO3: make use of the concepts of arrays and vectors in R to implement sorting and searching problems to enhance their knowledge . [K3]

CO4: interpret the capabilities of R data expression for data verification and Recursion procedure for building performance efficient R programs.[K3]

CO5: identify the different packages in R language to manipulate the large set of data that will improve their lifelong learning.[K3]

Exercises

1. R Program to Add Two Vectors
2. Find Sum, Mean and Product of Vector in R Programming
3. R Program to Generate Random Number from Standard Distributions

4. R Program to Find Minimum and Maximum of n numbers
5. R Program to Sort a Vector
6. R Program to Find the Factorial of a Number
7. R Program to print Multiplication Table
8. R Program to Check Prime Number
9. R Program to check Armstrong Number
10. R Program to Print the Fibonacci Sequence
11. R Program to Check for Leap Year
12. Check if a Number is Odd or Even in R Programming
13. R Program to Check if a Number is Positive, Negative or Zero
14. R Program to Find the Sum of Natural Numbers
15. R program to Find the Factorial of a Number Using Recursion
16. R Program to Find the Factors of a Number using function
17. Fibonacci Sequence Using Recursion in R
18. R Program to Find H.C.F. or G.C.D.
19. R Program to Make a Simple Calculator
20. Sum of Natural Numbers Using Recursion
21. Data Manipulation with dplyr package
22. Data Manipulation with data.table package
23. Study and implementation of Data Visualization with ggplot2
24. Study and implementation data transpose operations in R.

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Course Code 24UITE53P	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	1	3	2	2	3	2	2	1
CO2	3	2	2	2	2	2	3	3	2	1
CO3	3	2	3	2	2	2	2	3	2	1
CO4	3	3	3	3	3	2	3	3	2	1
CO5	2	3	2	3	3	3	3	3	2	1

Strong (3) Medium (2) Low (1)

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Semester V	**CRYPTOGRAPHY PRACTICAL**	Hours/Week: 5	
DSEC 2-Practical		Credits: 3	
Course Code		Internal	External
24UITE54P		40	60

COURSE OUTCOMES

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

CO1: understand the basic cryptographic operations such as XOR, AND, and bitwise manipulation for text encoding. [K2]

CO2: write programs and understand their real world applications in securing data. [K2]

CO3: implement well-known encryption algorithms. [K3]

CO4: enter and execute the programs for common symmetric and asymmetric encryption techniques. [K3]

CO5: use skills to design and deploy cryptographic algorithms in applications where confidentiality and data integrity are essential. [K3]

Exercises

1. Write a C program that contains a string (char pointer) with a value \Hello World'. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a string (char pointer) with a value \Hello World'. The program should AND or and XOR each character in this string with 127 and display the result.

3. Write a C/Java Programs to implement Caesar Cipher technique.
4. Write a C/Java Programs to implement Substitution Cipher technique.
5. Write a C/Java Programs to implement the Play fair Cipher.
6. Write a C/Java Programs to implement the Hill Cipher.
7. Write a C/Java program to implement Rail fence Cipher technique
8. Write a C/Java Programs to implement the DES algorithm.

Course Code 24UITE54P	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1. a.	**PSO 1. b.**	**PSO 2. a.**	**PSO 2. b.**	**PSO 3**	**PSO 4**	**PSO 5.a.**	**PSO 5. b.**	**PSO 6**	**PSO 7**
CO 1	3	3	3	3	3	3	3	2	3	-
CO 2	3	3	3	3	3	3	2	3	2	-
CO 3	2	2	3	3	3	2	2	2	3	-
CO 4	2	2	3	3	2	3	2	2	2	-
CO 5	1	1	3	2	2	2	1	3	2	-

9. Write a C/Java program to implement RSA algorithm.
10. Write a C/Java program to implement Blowfish algorithm.

Strong (3) Medium (2) Low (1)

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Semester V	**INTERNSHIP**	Hours/Week: -
Internship/Industrial Training		Credits: 1
Course Code **24UITI51**		Internal 100

COURSE OUTCOMES

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

CO1: observe, analyze, and understand organizational processes, systems, and cultures, and identify areas for further improvement. [K2]

CO2: identify the theoretical concepts learned in the classroom to Industry based problems. [K3]

CO3: apply professional skills, including team communication and work, and time management, and adhere to organizational norms and etiquette. [K3]

CO4: develop industry ready graduates and lifelong learning. [K3]

CO5: analyse problem-solving and critical thinking skills by identifying and addressing organizational challenges and problems. [K4]

Guidelines/ Regulations

- Each student must go for Internship training in a reputed Industry / Company / Organization/ Educational Institution.
- Students should produce the completion certificate after the completion of Internship period.
- A report of 10-15 pages must be submitted by each student after the completion of the Internship period.

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- Internal Viva-voce examination will be conducted.
- Students with diverse disabilities must complete a 10 day internship programme at their preferred places.

Course Code 24UITI51	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1. a.	**PSO 1. b.**	**PSO 2. a.**	**PSO 2. b.**	**PSO 3**	**PSO 4**	**PSO 5.a.**	**PSO 5. b.**	**PSO 6**	**PSO 7**
CO1	3	3	3	3	2	2	3	2	3	1
CO2	3	2	2	2	2	2	3	3	3	1
CO3	3	2	3	2	2	2	2	3	3	1
CO4	3	3	3	3	3	2	3	3	2	1
CO5	2	3	2	3	3	3	3	3	2	1

Strong (3) Medium (2) Low (1)

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Semester V	**DATA STRUCTURES**	**Hours/Week: -**
Extra Credit		**Credits: 2**
Course Code **24UITO51**		**Internal** **100**

COURSE OUTCOMES

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

CO1: understand the basic concepts of structured programs to develop the applications based on linear data structures such as stack, queue, linked list for better utilization of system resources.

CO2: explain the different types of linked list stack and queue.

CO3: implement the different types of linked list in data structures to build an intelligent system by using information theory calculations.

CO4: explore the knowledge in programming to implement data structures in their higher studies to lead a project team effectively.

CO5: identify and apply appropriate data structures for real-world problems.

UNIT I

Introduction and Overview: Definitions – Concept of Data Structures – Overview of Data Structures – Implementation of Data Structures.

UNIT II

Arrays: Definition- Terminology – One-Dimensional Array- Multi Dimensional Arrays– Pointer Array.

UNIT III

Linked Lists: Definition – Single Linked List – Circular Linked List- Double Linked Lists.

UNIT IV

Stacks: Definition – Representation of a Stack – Operations on Stack.

UNIT V

Queues: Definition – Representation of Queues – Various Queue Structures – Circular Queue – Deque.

TEXT BOOK

1. Debasis Samantha (2009), *Classic Data Structures*, Second Edition, PHI Learning Private Limited.

REFERENCE BOOKS

1. Sartajsahni (2000), *Data structures and applications in C++,* McGraw Hill.

2. Chitra, Rajan (2005), *Data Structures,* First edition, Vijay Nicole publishers.

3. James A.Storer (2002), *An Introduction to Data Structures and Algorithms,* Springer Science Business Media, LLC.

Course Code 24UITO51	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	1	2	2	2	3	2	1	1
CO2	3	2	2	2	2	2	3	3	2	1
CO3	3	2	3	2	2	2	2	3	2	1
CO4	3	3	3	1	3	2	3	3	2	1
CO5	2	3	2	1	3	3	3	3	2	1

Strong (3) Medium (2) Low (1)

Dr. A. Bharathi Lakshmi
Head of the Department

Mrs. K. Kasthuri
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B.SC. INFORMATION TECHNOLOGY

(2024-2025 onwards)

Semester VI	**DATA MINING**	Hours/Week: 6	
Core Course 13		Credits: 5	
Course Code **24UITC61**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: relate the real time datasets for data analysis. [K1]

CO2: demonstrate data-mining techniques based on the different applications. [K2]

CO3: explain appropriate data models for data mining techniques to solve real world problems. [K2]

CO4: apply suitable preprocessing for data mining task. [K3]

CO5: identify the performance evaluation of various data mining algorithms.[K3]

UNIT I

Introduction: Data Mining – Kinds of Data and Patterns to be Mined – Technologies used –Kinds of Applications are Targeted - Major Issues –Data objects and Attribute types – Basic statistical Descriptions of Data.

Data Preprocessing: Data Cleaning – Data Integration - Data Reduction - Data Transformation. (15 Hours)

UNIT II

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods: Frequent Itemset Mining Methods: Apriori Algorithm-Generating Association Rules

from Frequent Itemsets-Improving the efficiency of Apriori-A Pattern –Growth Approach for mining Frequent Itemsets-Pattern Evaluation Methods. (20 Hours)

UNIT III

Classification: Basic concepts – Logistic regression - Decision tree induction–Bayesian classification, Rule–based classification-Model Evaluation and selection. (20 Hours)

UNIT IV

Cluster Analysis: Introduction-Requirements for Cluster Analysis.

Partitioning Methods: The K-Means method.

Hierarchical Method: Agglomerative method.

Density based methods: DBSCAN

Evaluation of Clustering: Determining the Number of Clusters – Measuring Clustering Quality. (20 Hours)

UNIT V

Outlier Detection: Outliers and Outlier Analysis – Outlier Detection Methods.

Data Visualization: Pixel-oriented visualization – Geometric Projection visualization technique-Icon-based-Hierarchical visualization-Visualizing complex data and relations.

(15 Hours)

TEXT BOOK

Jiawei Han, Micheline Kamber, Jian Pei (2012), *Data Mining concepts and techniques*, 3rd Edition, Elsevier publication.

REFERENCE BOOKS

1. Ian H. Witten and Eibe Frank, (2005), *Data Mining: Practical Machine Learning Tools and Techniques,* Second Edition, Morgan Kaufmann.
2. Arun K Pujari (2008), *Data Mining Techniques*, University Press.
3. Daniel T. Larose , Chantal D. Larose (2015), *Data mining and Predictive analytics*, Second Edition, Wiley Publication.
4. G.K. Gupta (2011), *Introduction to Data mining with case studies*, 2nd Edition, PHI Private limited, New Delhi.

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WEB RESOURCES

1. http://csed.sggs.ac.in/csed/sites/default/files/WEKA%20Explorer%20Tutorial.pdf
2. https://www.cs.auckland.ac.nz/courses/compsci367s1c/tutorials/IntroductionToWeka.pdf

Course Code 24UITC61	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	-	3	2	2	3	2	3	-
CO2	3	2	2	2	2	2	3	3	2	-
CO3	3	2	3	2	2	2	2	3	-	-
CO4	3	3	3	3	3	2	3	3	3	-
CO5	2	3	2	3	3	3	3	3	3	-

Strong (3) Medium (2) 1ow (1)

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B.SC. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester VI	**DATA COMMUNICATION AND NETWORKING**	Hours/Week: 6	
Core Course 14		Credits: 5	
Course Code **24UITC62**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: Recall network types, components, problems, services, protocols and design issues of each layer in reference models to design reliable information communication system. [K1]

CO2: illustrate the types of transmission media, elementary protocols, routing algorithms, error control and flow control to solve technical problems in industry. [K2]

CO3: outline the functionalities of DNS, core knowledge of TCP, IP, collision free protocols& Email to build real time applications. [K2]

CO4: identify the characteristics of data unit, Multiple Access Protocols, Service Primitives, and IP addresses for additional security to meet security issues. [K3]

CO5: apply mode of transmission, network standards, Architecture and Services, communication protocol for better system performance. [K3]

UNIT I

Introduction: Data Communication – Networks: Distributed Processing-Network Criteria Physical Structures –Network Models-Categories of Network-Internetwork – The Internet – Protocols and Standards.

Network Models: Layers in the OSI Model - TCP/IP Protocol Suite. (15 Hours)

UNIT II

Data and Signals: Analog and Digital Data - Analog and Digital Signals – Performance.

Digital Transmission: Transmission Modes.

Bandwidth Utilization: Multiplexing and Spreading: Multiplexing: FDM – WDM - Synchronous TDM -Statistical TDM.

Transmission Media: Guided media - Unguided Media. (20 Hours)

UNIT III

Switching: Circuit Switched Networks - Datagram Networks-Virtual Circuit Network.

Error Detection and Correction: Introduction - Block Coding - Linear Block Codes - Cyclic Codes: Cyclic Redundancy Check - Checksum. (15 Hours)

UNIT IV

Data Link Control: Framing - Flow Control and Error Control - Noiseless Channel: Stop-and-wait Protocol.

Wired LANs: Standard Ethernet-GIGABIT Ethernet

Wireless LAN: Bluetooth

Connecting LANs, Backbone Networks and Virtual LANs: Connecting Devices: Passive Hubs-Repeaters-Active Hubs-Bridges-Two Layer Switches-Routers-Three layer Switches-Gateway. (20 Hours)

UNIT V

Network Layer: Internet Protocol: IPv4 –Ipv6-Transition from IPv4 to IPv6.

Network Layer: Delivery, Forwarding and Routing: Unicast Routing Protocols: Distance Vector Routing-Link state routing. (20 Hours)

TEXT BOOKS

1. Behrouz and Forouzan (2006), *Data Communication and Networking*, 4th Edition, TMH.
2. Ajit Pal (2014), *Data Communication and Computer Networks*, PHI.

.

REFERENCE BOOK

1. Jean Walrand (1998), *Communication Networks*, Second Edition, Tata McGraw Hill.

WEB RESOURCES

1. http://www.tutorialspoint.com/data_communication_computer_network/
2. http://www.slideshare.net/zafar_ayub/data-communication-and-network-11903853
3. http://www.freetechbooks.com/data-communication-and-networks-f31.html

Course Code 24UITC62	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	1	3	2	2	3	2	3	1
CO2	3	2	2	2	2	2	3	3	2	1
CO3	3	2	3	2	2	2	2	3	1	1
CO4	3	3	3	3	3	2	3	3	3	1
CO5	2	3	2	3	3	3	3	3	3	1

Strong (3) Medium (2) 1ow (1)

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(2024-2025 onwards)

Semester V	**PHP SCRIPTING PRACTICAL**	Hours/Week: 6	
Core Course 15 Practical VI		Credits: 3	
Course Code **24UITC61P**		Internal 40	External 60

COURSE OUTCOMES

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

CO1 : illustrate simple programs using PHP and jQuery. [K2]

CO2 : demonstrate the interface setup, styles & themes for the given application [K2]

CO3 : apply the problem and add necessary user interface components, multimedia components and web data source into the application [K3]

CO4 : construct the results by implementing the correct techniques on the web form. [K3]

CO5 : develop the results by implementing the correct techniques on the web form. [K3]

Lab Exercises

1. Control Structures
2. Working with Forms.
3. String Manipulations
4. Arrays
5. Functions
6. Sorting

7. Classes and Objects
8. Cookies and Sessions
9. Graphics
10. Working with single table
11. Working with multiple tables
12. Event Handling
13. Handling HTML Forms with jQuery

Course Code 24UITC61P	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1.a	**PSO 1.b**	**PSO 2.a**	**PSO 2.b**	**PSO 3**	**PSO 4**	**PSO 5.a**	**PSO 5.b**	**PSO 6**	**PSO 7**
CO1	3	2	3	3	3	3	2	3	1	1
CO2	3	3	3	3	3	3	3	2	1	1
CO3	2	2	3	3	3	3	3	2	2	1
CO4	2	2	3	2	2	3	2	1	3	1
CO5	1	2	3	3	2	3	1	2	2	1

Strong (3) Medium (2) Low (1)

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B.SC. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester VI	**ARTIFICIAL INTELLIGENCE**	Hours/Week: 5	
DSEC 3		Credits: 4	
Course Code **24UITE61**		Internal 25	External 75

COURSE OUTCOME:

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

CO1: list the agents ,search algorithms and learning methodology to acquire the knowledge of the basis of Artificial Intelligence.[K1]

CO2: summarize the evolution of AI, problem solving techniques and defining uncertainty helps to gain ability to familiarize the latest trends in technological development.[K2]

CO3: illustrate the AI concepts to made decision for both simple and complex real world problems. [K2]

CO4: apply the nature of agents along with searching problems , inference on Bayesian networks and learning techniques to enhance the practical knowledge of human computer interaction.[K3]

CO5: identify the key concepts used in AI such as rationality, problem solving techniques, temporal models, and reinforcement learning helps to carry out AI oriented IT projects. [K3]

UNIT I

Introduction: Introduction to AI – The History of AI. **Intelligent Agents:** Agents and Environments – Good behavior: The concept of Rationality-The Nature of Environments-The Structure of Agents. (15 Hours)

UNIT II

Solving Problems by Searching: Problem Solving Agents-Example Problems-Searching for Solutions- Depth first and Breadth first search, Heuristic search, Greedy Best first search, A* algorithm, **Adversial Search**: Games-Optimal Decisions in Games.

(15 Hours)

UNIT III

Quantifying Uncertainity: Basic Probability Notation – Inference using Full Joint Distributions-Bayes' rule and its use. **Probabilistic Reasoning :** The Semantics of Bayesian Networks- Representation of Conditional distributions-Exact Inference in Bayesian Networks- **Probabilistic Reasoning Over Time:** Inference in temporal models- hidden Markov model.

(15 Hours)

UNIT IV

Making Simple decisions: Combining beliefs and desires under Uncertainty- The basics of utility theory-utility functions. **Making Complex Decisions:** Value Iteration, Policy Iteration and Partially observable MDPs. (15 Hours)

UNIT V

Reinforcement Learning : Introduction-Passive reinforcement learning-Active reinforcement learning-Generalization in Reinforcement Learning-Policy Search-Applications of Reinforcement Learning. (15 Hours)

TEXT BOOKS

1. Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach*, 3rd Edition, Prentice Hall.
2. Elaine Rich and Kevin Knight, *Artificial Intelligence*, Tata McGraw Hill

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REFERENCE BOOKS

1. Trivedi, M.C., *A Classical Approach to Artifical Intelligence,* Khanna Publishing House, Delhi.
2. Saroj Kaushik (2011), *Artificial Intelligence,* Cengage Learning India.
3. David Poole and Alan Mackworth (2010), *Artificial Intelligence: Foundations for Computational Agents*, Cambridge University Press.

WEB RESOURCES

1. NPTEL & MOOC courses titled Artificial Intelligence and Expert Systems
2. https://nptel.ac.in/courses/106106140/
3. https://nptel.ac.in/courses/106106126/

Course Code 24UITE61	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	1	2	2	2	3	2	1	1
CO2	3	2	2	2	2	2	3	3	1	1
CO3	3	2	3	2	2	2	2	3	1	1
CO4	3	3	3	1	3	2	3	3	1	1
CO5	2	3	2	1	3	3	3	3	1	1

Strong (3) Medium (2) Low (1)

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B.Sc. INFORMATION TECHNOLOGY
(2024-2025 onwards)

Semester VI	**FUZZY LOGIC**	Hours/Week: 5	
DSEC 3		Credits: 4	
Course Code **24UITE62**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: understand the basics of Fuzzy sets, operation and properties. [K1]

CO2: explain the concept of Cartesian product and composition on Fuzzy relations and use the tolerance and Equivalence relations. [K2]

CO3: discuss the various fuzzification methods and features of membership Functions. [K2]

CO4: solve the problems based on Fuzzy Rule-Based System and defuzzification methods occurred in real time applications. [K3]

CO5: apply the concepts of Fuzzy Logic and Design in automotive applications. [K3]

UNIT I

Introduction: Fuzzy Logic- Fuzzy Sets- Fuzzy Set Operations, Properties of Fuzzy Sets, **Classical and Fuzzy Relations:** Introduction-Cartesian Product of Relation-Classical Relations-Cardinality of Crisp Relation. (15 Hours)

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UNIT II

Classical and Fuzzy Relations: Operations on Crisp Relation-Properties of Crisp Relations-Composition. **:** Cardinality of Fuzzy Relations-Operations on Fuzzy Relations-Properties of Fuzzy Relations-Fuzzy Cartesian product and Composition. **Tolerance and Equivalence Relations:** Crisp Relation. (15 Hours)

UNIT III

Membership Functions: Introduction, Features of Membership Function, Classification of Fuzzy Sets, Fuzzification, Membership Value Assignments, Intuition, Inference, Rank Ordering. (15 Hours)

UNIT IV

Defuzzification: Introduction, Lambda Cuts for Fuzzy Sets, Lambda Cuts for Fuzzy Relations, Defuzzification Methods. **Fuzzy Rule-Based System:** Introduction, Formation of Rules, Decomposition of Rules, Aggregation of Fuzzy Rules, Properties of Set of Rules.

(15 Hours)

UNIT V

Applications of Fuzzy Logic: Fuzzy Logic in Automotive Applications, Fuzzy Antilock Brake System-Antilock-Braking System and Vehicle Speed-Estimation Using Fuzzy Logic.

(15 Hours)

TEXT BOOK

S. N. Sivanandam, S. Sumathi and S. N. Deepa (2007), *Introduction to Fuzzy Logic using MATLAB*, Springer-Verlag Berlin Heidelberg.

REFERENCE BOOKS

1. Guanrong Chen and Trung Tat Pham, *Introduction to Fuzzy Sets, Fuzzy Logic and Fuzzy Control Systems.*
2. Timothy J Ross , *Fuzzy Logic with Engineering Applications*.

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WEB RESOURCES

1. https://www.javatpoint.com/fuzzy-logic
2. https://www.guru99.com/what-is-fuzzy-logic.html

Course Code 24UITE62	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1. a.	**PSO 1. b.**	**PSO 2. a.**	**PSO 2. b.**	**PSO 3**	**PSO 4**	**PSO 5.a.**	**PSO 5. b.**	**PSO 6**	**PSO 7**
CO1	3	3	1	3	2	2	3	2	2	1
CO2	3	2	2	2	2	2	3	3	2	1
CO3	3	2	3	2	2	2	2	3	2	1
CO4	3	3	3	3	3	2	3	3	1	1
CO5	2	3	2	3	3	3	3	3	2	1

Strong (3) Medium (2) Low (1)

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Semester: VI	**MACHINE LEARNING USING AI PRACTICAL**	Hours/Week: 5	
DSEC 4 Practical		Credits: 3	
Course Code		Internal	External
24UITE63P		40	60

COURSE OUTCOMES

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

CO1: classify the basic commands of mathematical principles from probability, linear algebra and optimization in statistical analysis which helps to pursue flexible career paths. [K2]

CO2: demonstrate the integrated collection of tools for knowledge of machine learning to make predictions in a scientific computing environment to produce effective designs and solutions for specific real-time problems. [K2]

CO3: identify the latest technologies and synthesize the workspace of current underlying mathematical relationships within and across machine learning algorithms and the paradigms of supervised and un-supervised learning to solve real-time projects skill. [K3]

CO4: apply the different types of graphs in an interactive manner and packages to execute the projects effectively with intelligent systems. [K3]

CO5: examine the statistical analysis method and advanced topics such as robotics machine learning, deep learning, pattern recognition, computer vision, cognitiv computing, human-computer interaction which constantly upgrade their skills. [K3]

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Exercises

1. Introduction of various python libraries used for machine learning.
2. Write a Program to implement Uninformed Search Technique: Breadth First Search
3. Write a Program to implement Uninformed Search Technique: Depth First Search
4. Write a Program to implement Informed Search Technique: A* Algorithm
5. Write a Program to implement Informed Search Technique: AO* Algorithm
6. Write a Program to implement Local Search Technique: Hill Climbing Algorithm
7. Write a Program to implement Game Playing Algorithms: Minimax and Alpha Beta Pruning
8. Program to Implement N Queens Problem using Python
9. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
10. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
11. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
12. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
13. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Calculate the accuracy, precision, and recall for your data set.
14. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set.
15. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering.

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Course Code 24UITE63P	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	**PSO 1. b.**	**PSO 2. a.**	**PSO 2. b.**	**PSO 3**	**PSO 4**	**PSO 5.a.**	**PSO 5. b.**	**PSO 6**	**PSO 7**
CO 1	3	2	1	3	2	1	2	3	2	1
CO 2	3	3	1	2	2	1	3	2	2	1
CO 3	3	3	1	1	3	2	3	3	2	1
CO 4	3	3	2	3	3	2	2	3	2	1
CO 5	3	3	1	3	3	2	3	2	2	1

Strong (3) Medium (2) Low (1)

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Semester V	**FUZZY LOGIC PRACTICAL**	Hours/Week: 5	
DSEC 4 Practical		Credits: 3	
Course Code **24UITE64P**		Internal 40	External 60

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

CO1: understand and apply fuzzy logic concepts, design and implement fuzzy systems, defuzzification, and membership functions. [K2]

CO2: design and implement fuzzy controllers for simple control systems and simulate fuzzy systems using appropriate tools and techniques. [K2]

CO3: interpret the concepts of fuzzy logic to solve real-world problems in areas such as control, decision-making, and pattern recognition. [K3]

CO4: discover the performance of fuzzy systems using simulation and experimentation, various fuzzification methods and features of membership Functions. [K3]

CO4: evaluate the effectiveness of fuzzy logic solutions and identify potential improvements. [K3]

Lab Exercises

1. Python program to implement union operations on fuzzy set.
2. Python program to implement intersection operations on fuzzy set.
3. Python program to implement Complement operations on fuzzy set.
4. Python program to implement difference operations on fuzzy set.

5. Python program to apply De-Morgan's law on fuzzy set.
6. Python program to implement Fuzzy Relations (Max-min Composition)
7. Python program to implement Fuzzy Relations (Max-product Composition).
8. Python program to implement Triangular membership function on fuzzy logic.
9. Python program to implement Trapezoidal membership function on fuzzy logic
10. Python program to implement Sigmoid function on fuzzy logic
11. Python program to implement Generalized bell function on fuzzy logic

Course Code 24UITE64P	**PO1**		**PO2**		**PO3**	**PO4**	**PO5**		**PO6**	**PO7**
	PSO 1. a.	**PSO 1. b.**	**PSO 2. a.**	**PSO 2. b.**	**PSO 3**	**PSO 4**	**PSO 5.a.**	**PSO 5. b.**	**PSO 6**	**PSO 7**
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CO3	3	2	3	2	2	2	2	3	2	1
CO4	3	3	3	3	3	2	3	3	2	1
CO5	2	3	2	3	3	3	3	3	2	1

Strong (3) Medium (2) Low (1)

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Semester VI	**BIOMETRICS**	Hours/Week: 2	
SEC 7		Credits: 2	
Course Code **24UITS61**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: understand the basic concepts and the functionality of the Biometrics, Face Biometrics, Types, Architecture and Applications. [K1]

CO2: understand the concepts of Retina and Iris Biometrics and Vein and Fingerprint Biometrics. [K1]

CO3: explain the Privacy Enhancement and Multimodal Biometrics. [K2]

CO4: compare the different analytical methods on Water marking and the security risks associated with biometric systems and how to mitigate them. [K2]

CO5: identify the practical challenges and limitations of using biometrics in real-world applications and identify the future scope of Biometrics. [K3]

UNIT I

Introduction: What is Biometrics – History - Types of biometric Traits - General architecture of biometric systems - Basic working of biometric matching- Biometric system error and performance measures - Design of biometric system - Applications of biometrics - Biometrics versus traditional authentication methods. **Face Biometrics:** Introduction - Background of Face Recognition - Design of Face Recognition System - Neural Network for Face

Recognition - Face Detection in Video Sequences - Challenges in Face Biometrics - Face Recognition Methods - Advantages and Disadvantages. (6 Hours)

UNIT II

Retina and Iris Biometrics: Introduction - Performance of Biometrics - Design of Retina Biometrics - Design of Iris Recognition System - Iris Segmentation Method - Determination of Iris Region - Determination of Iris Region - Applications of Iris Biometrics - Advantages and Disadvantages. **Vein and Fingerprint Biometrics:** Introduction - Biometrics Using Vein Pattern of Palm - Fingerprint Biometrics - Fingerprint Recognition System - Minutiae Extraction - Fingerprint Indexing - Experimental Results - Advantages and Disadvantages. (6 Hours)

UNIT III

Multimodal Biometrics: Introduction to Multimodal Biometrics- Basic Architecture of Multimodal Biometrics - Multimodal Biometrics Using Face and Ear - Characteristics and Advantages of Multimodal Biometrics - Characteristics and Advantages of Multimodal Biometrics. (6 Hours)

UNIT IV

Watermarking Techniques: Introduction - Data Hiding Methods - Basic Framework of Watermarking - Classification of Watermarking - Applications of Watermarking - Attacks on Watermarks - Performance Evaluation - Characteristics of Watermarks - General Watermarking Process - Image Watermarking Techniques - Watermarking Algorithm - Experimental Results - Effect of Attacks on Watermarking Techniques - Attacks on Spatial Domain Watermarking. (6 Hours)

UNIT V

Scope and Future: Scope and Future Market of Biometrics - Biometric Technologies - Applications of Biometrics - Biometrics and Information Technology Infrastructure - Role of Biometrics in Enterprise Security - Role of Biometrics in Border Security - Smart Card Technology and Biometrics - Radio Frequency Identification (RFID) Biometrics - DNA Biometrics - Comparative Study of Various Biometric Techniques. (6 Hours)

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TEXT BOOK

G.R Sinha and Sandeep B.Patil (2013), *Biometrics: Concepts and Applications*, Wiley.

REFERENCE BOOKS

1. Ruud M. Bolle , Sharath Pankanti, Nalinik.Ratha, Andrew W.Senior, Jonathan H. Connell (2009), *Guide to Biometrics*, Springer.
2. Anil k. Jain, Arun A. Ross, Karthik Nandakumar, *Introduction to Biometrics*.
3. Anil K. Jain, Patrick Flynn, ArunA.Ross, *Hand book of Biometrics*.

WEB RESOURCES

1. https://www.tutorialspoint.com/biometrics/index.htm
2. https://www.javatpoint.com/biometrics-tutorial

Course Code 24UITS61	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	3	3	1	3	2	2	3	2	2	1
CO2	3	2	2	2	2	2	1	3	2	1
CO3	3	2	3	2	2	2	2	3	2	1
CO4	3	3	3	2	3	2	1	3	2	1
CO5	2	3	2	3	2	2	1	1	2	1

Strong (3) Medium (2) Low (1)

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