V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Re-accredited with 'A' Grade (3rd Cycle) by NAAC
VIRUDHUNAGAR - 626 001

OUTCOME BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM REGULATIONS AND SYLLABUS
(With effect from Academic Year 2023 - 2024)

V.V.Vanniaperumal College for Women, Virudhunagar, established in 1962, offers 13 UG Programmes (Aided), 14 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, Computer Applications and Computer Applications - Graphic Design
Commerce & Management	Commerce, Commerce (Computer Applications), Commerce (Professional Accounting), Business Administration

PG PROGRAMMES

Arts & Humanities	History, English, Tamil
Physical & Life Sciences	Mathematics, Physics, Chemistry, Zoology, Biochemistry, Home Science - Nutrition and Dietetics, 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. Discipline Specific Elective Courses (DSEC)
3. Elective Courses
4. Skill Enhancement Courses (SEC)
5. Non Major Elective Courses (NMEC)
6. Ability Enhancement Compulsory Courses (AECC)
7. Generic Elective Courses (GEC)
8. Self Study Courses
9. Extra Credit Courses (Self Study Courses) (Optional)

List of Non Major Elective Courses (NME)

(2023-2024 onwards)

UG PROGRAMMES

Name of the Course	Course Code	Semester	Department
Introduction to Tourism	23UHIN11	I	History(EM)
Indian Constitution	23UHIN21	II	History(EM)
சுற்றுலா ஓர் அறிமுகம்	23UHIN11	I	History (TM)
இந்திய அரசியலமைப்பு	23UHIN21	II	History(TM)
Popular Literature and Culture	23UENN11	I	English
English for Professions	23UENN21	II	
பேச்சுக்கலைத்திறன்	23UTAN11	I	Tamil
பயன்முறைத் தமிழ்	23UTAN21	II	
Practical Banking Basic Accounting Principles	23UCON11 23UCON22	I II	Commerce (Aided)
Financial Literacy-I Financial Literacy -II	23UCON12 23UCON21	I II	Commerce (SF)

Self-Employment and Startup Business Fundamentals of Marketing	23UCCN11 23UCCN21	I II	Commerce CA (SF)
Women Protection Laws	23UCPN11	I	Commerce (Professional Accounting)
Basic Labour Laws	23UCPN21	II	
Basics of Event Management	23UBAN11	I	Business Administration
Business Management	23UBAN21	II	
Quantitative Aptitude I	23UMTN11	I	Mathematics
Quantitative Aptitude II	23UMTN21	II	
Physics for Everyday life -I	23UPHN11	I	Physics
Physics for Everyday life -II	23UPHN21	II	
Food Chemistry	23UCHN11	I	Chemistry
Drugs and Natural Products	23UCHN21	II	
Ornamental fish farming and Management	23UZYN11	I	Zoology
Biocomposting for Entrepreneurship	23UZYN21	II	
Foundations of Baking and Confectionery	23UHSN11	I	Home Science – Nutrition and Dietetics
Basic Nutrition and Dietetics	23UHSN21	II	
Nutrition and Health	23UBCN11	I	Biochemistry
Life Style Diseases	23UBCN21	II	
Social and Preventive Medicine	23UMBN11	I	Microbiology
Nutrition & Health Hygiene	23UMBN21	II	
Herbal Medicine	23UBON11	I	Biotechnology
Organic farming and Health Management	23UBON21	II	
Basics of Fashion	23UCFN11	I	Costume Design And Fashion
Interior Designing	23UCFN21	II	
Office Automation	23UCSN11	I	Computer Science
Introduction to Internet and HTML 5	23UCSN21	II	
Office Automation	23UITN11	I	Information Technology
Introduction to HTML	23UITN21	II	
Introduction to HTML	23UCAN11	I	Computer Applications
Fundamentals of Computers	23UCAN21	II	
Introduction to HTML	23UGDN11	I	Computer Applications - Graphic Design
Fundamentals of Computers	23UGDN21	II	
Organic Farming	23UBYN11	I	Botany
Nursery and Landscaping	23UBYN12		
Mushroom Cultivation	23UBYN21	II	
Medicinal Botany	23UBYN22		
Cadet Corps for Career Development I	23UNCN11	I	National Cadet Corps
Cadet Corps for Career Development II	23UNCN21	II	

List of Ability Enhancement Compulsory Courses (AECC) &
Generic Elective Courses (GEC) Offered
ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)

1. Value Education
2. Environmental Studies

GENERIC ELECTIVE COURSES 1

1. Human Rights
2. Women Studies

GENERIC ELECTIVE COURSES2

1. Constitution of India
2. Modern Economics
3. Adolescent Psychology
4. Disaster Management

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 fulfill the Vision and Mission of the Department offering the Programme.

Vision of the Department of Computer Applications

To enrich the students to be technologically skilled, ethical responsibilities, technical and professional values and face the challenges of the ever changing world.

Mission of the Department of Computer Applications

- To impart the fundamental principles of computer science, and continue to develop their technical competencies.
- To train students for careers as socially responsible IT professionals, entrepreneurs and researchers
- To empower the student in rural communities with effective communication skills and high ethical values.

Programme Educational Objectives (PEOs)

PEOs are broad statements that describe the career and professional achievements that the Programme is preparing the graduates to achieve within the first few years after graduation. PEOs are framed for each Programme and should be consistent with the mission of the Institution.

Programme Educational Objectives (PEOs) of B.C.A. Programme

The students will be able to

PEO1: Effectively utilizing their knowledge of computing principles and mathematical theory to develop sustainable solutions to current and future computing problems.

PEO2: employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur.

PEO3: Shine as socially committed computer professionals having mutual respect, efficient programming skills and satisfy the needs of society.

Key Components of Mission Statement	Programme Educational Objectives		
	PEO1	**PEO2**	**PEO3**
continues development of technical competency	√	√	
train students for careers as IT professionals	√	√	
empower the student in rural communities	√		√

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.

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.

On completion of B.C.A. Programme, the students will be able to

PO1 - *Disciplinary Knowledge*

PSO 1.a: Apply the acquired knowledge in Computer Science and in interdisciplinary fields for successful career and higher studies.

PSO1.b: Make use of the technical knowledge in various technology field of computer science to identify the problem, analyze, design and develop the system as the solution to the problem.

PO2 – *Communication Skills*

PSO2: ability to express the computer knowledge by preparing documentation and communicate to the society with effective presentation.

PO3 – *Scientific Reasoning and Problem Solving*

PSO3.a: Apply theoretical foundations of computer applications with emphasis on strong practical training that enable them to solve real world problems related to sustainable environment.

PSO3.b: Analyze needed information and/or eliminate extraneous information towards solving contextual problems.

PO4 – *Critical Thinking and Analytical Reasoning*

PSO 4.a: Analyze, sketch and attain the innovative solutions to the problems related to Computer Industry.

PSO 4.b: Critically evaluate the software systems and find the optimum solution through research for the betterment of society.

PO5 – *Digital Literacy, Self - Directed and Lifelong Learning*

PSO5: Utilize modern computing tools, skills and techniques necessary for facing issues in finding software solutions in their career.

PO6 –*Co-operation/Team Work and Multi-Cultural Competence*

PSO6: Apply their leadership qualities, and cooperative spirit to achieve the project targets.

PO7 –*Moral and Ethical Awareness*

PSO 7: Solve and work with a professional context pertaining to ethics, cultural and cyber regulations

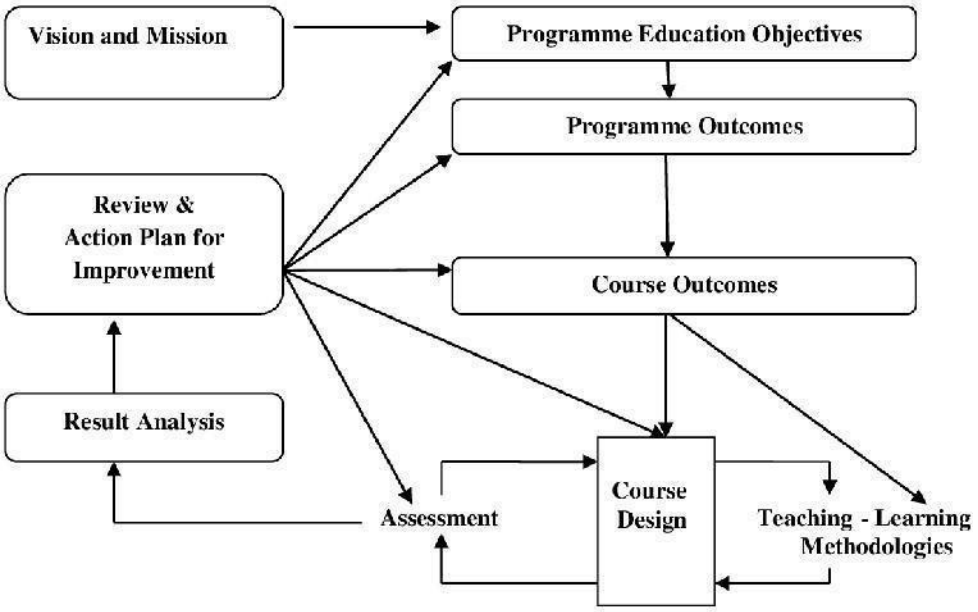
PO-PEO Mapping Matrix

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.

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	-	-	✓

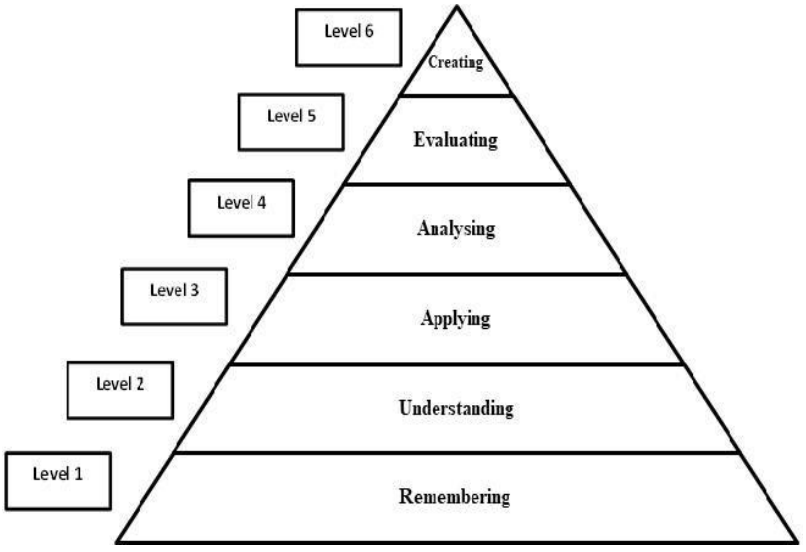
B.1.4 Course Outcomes (COs)

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.



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 1respectively.

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							

ELIGIBILITY FOR ADMISSION

The 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 Programme of study for a period of three academic years (six semesters).

MEDIUM OF INSTRUCTION

English

COURSES OFFERED

Part I	:	Tamil/Hindi/Alternate Course
Part II	:	English
Part III	:	Core Courses
	:	Elective Courses
	:	Elective Courses: Discipline Specific Elective Courses
	:	Self Study Course
Part IV	:	Skill Enhancement Courses (SEC)
	:	Field Project/Internship
	:	Non-Major Elective Courses (NMEC)
	:	Ability Enhancement Compulsory Courses (AECC)
	:	Generic Elective Courses (GEC)
	:	Self Study Course
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 and

B.2 EVALUATION SCHEME

B.2.1.PART II

Components	Internal Assessment Marks	Summative Examination Marks	Total Marks
Theory	15	75	100
Practical	5+5	-	

INTERNAL ASSESSMENT

Distribution of Marks

Mode of Evaluation		Marks
Periodic Test	:	15
Practical	:	5+5
Total	**:**	**25**

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

B.2.2.Part I & PART III - Core Courses, Discipline Specific Elective Courses & Elective Courses

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

INTERNAL ASSESSMENT

Distribution of Marks

Theory

Mode of Evaluation			Marks
Internal 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

Practical

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

Internal Test - Average of the best two will be considered

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 Internal 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	5	5	7	35
C	16 - 18	Internal Choice – Either… or Type	3	3	10	30
					Total	**75**

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

INTERNAL ASSESSMENT

Distribution of Marks

Theory

Mode of Evaluation			Marks
Internal Test		:	15
Assignment	K2 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**

Summative Examination

Mode of Evaluation		Marks
Summative Examination	:	50
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.2.6. Part V – Extension Activities

Assessment by Internal Examiner 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

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, Discipline Specific Elective Courses and Allied Courses.
  - Pass minimum for External Examination is 21 marks out of 60 marks for Skill Enhancement Courses and Non Major Elective Courses.
  - The aggregate minimum pass percentage is 40.
  - Pass minimum for External Practical Examination is 21 marks out of 60 marks.
  - Pass minimum for Ability Enhancement Compulsory Courses and Generic Elective Courses is 40 marks.
  - Pass minimum for Self Study Courses is 40 marks.

- Attendance
  - For UG, PG Programmes,

a) The students who have attended the classes for 76 days (85%) and above are permitted to appear for the Summative Examinations without any condition.

b) 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.

c) The students who have attended the classes for 59 days and less – upto 45 days (50% - 65%) can appear for the Summative Examinations only after getting special permission from the Principal.

d) 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.

These rules come into effect from 2020-2021 onwards.

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.

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	**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.

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	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 graduates and it gives the opinion of the graduates on attainment of Programme Outcomes
	Co-curricular/ Extra-curricular activities 15%	For participation in Co-curricular/Extra-curricular activities during the period of their study.

Programme Articulation Matrix (PAM)

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

Indirect Attainment of POs for all Courses

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

Attainments of POs for all Courses

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
Direct Attainment (Weightage							
Indirect Attainment (Weightage -							
Overall PO Attainment							

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

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

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 PROGRMME EDUCATIONALOBJECTIVES

The college has always been involving the key stakeholders 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 analyzed 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.C.A. Programme.

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BACHELOR OF COMPUTER APPLICATIONS (UG) (3026)
Outcome Based Education with Choice Based Credit System
Programme Structure - Allotment of Hours and Credits
For those who join in the Academic Year 2023-2024

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)	4 (4)	5(5)	29 (29)
Core Course	-	-	-	-	4 (4)	5(4)	9 (8)
Core Course	-	-	-	-	4 (4)	4(4)	8 (8)
Core Course Practical	5 (3)	5 (3)	5(3)	4(3)	5 (3)	5 (3)	29 (18)
Core Course Project	-	-	-	-	1 (1)	-	1 (1)
DSEC	-	-	-	-	4 (3)	5 (3)	9 (6)
DSEC Practical	-	-	-	-	4 (2)	4 (2)	8 (4)
Elective Course	4 (4)	4 (4)	4 (4)	4 (4)	-		16 (16)
Self Study Course	-	-		-	-	0 (1)	0 (1)
Part IV : Skill Enhancement Courses, Non Major Elective Courses, Ability Enhancement Compulsory Courses, Generic Elective Courses, & Self Study Course							
SEC	2(2)	-	1 (1)	-	-	-	3 (3)
SEC	-	2 (2)	2 (2)	2 (2)	2 (2)	2 (2)	10(10)
Non Major Elective	2(2)	2(2)	-	-	-	-	4 (4)
AECC 1 (Value Education)	-	-	-	-	2 (2)	-	2 (2)
AECC 2 (Environmental Studies)	-	-	-	2 (2)	-	-	2 (2)
GEC 1	-	-	1 (1)	-	-	-	1 (1)
GEC 2	-	-	-	1 (1)	-	-	1 (1)
Self Study Course	-	-	-	-	0 (1)		0 (1)
Part V – Extension Activities	-	-	-	0 (1)	-	-	0 (1)
Total	**30 (22)**	**30 (22)**	**30 (22)**	**30 (24)**	**30 (26)**	**30 (24)**	**180 (140)**
Extra Credit Course (Self Study Course)					0 (2)	-	0 (2)

DSEC: Discipline Specific Elective Course
AECC: Ability Enhancement Compulsory Course
SEC: Skill Enhancement Course
GEC: Generic Elective Course

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BACHELOR OF COMPUTER APPLICATIONS
Programme Code – 3026
PROGRAMME CONTENT
SEMESTER I

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part I**		Tamil / Hindi	23UTAG11/ 23UHDG11	6	3	3	25	75	100
2	**Part II**		English	23UENG11	6	3	3	25	75	100
3	**Part III**	Core Course-1	Python Programming	23UCAC11	5	5	3	25	75	100
4		Core Course - 2 Practical 1	Python Programming Practical	23UCAC11P	5	3	3	40	60	100
5		Elective Course	Discrete Mathematics - I	23UCAA11	4	4	3	25	75	100
6	**Part IV**	NME- 1	Introduction to HTML	23UCAN11	2	2	3	25	75	100
7		SEC -1 Foundation Course	Programming in C	23UCAF11	2	2	3	25	75	100
				Total	**30**	**22**				**700**

BACHELOR OF COMPUTER APPLICATIONS - SEMESTER II

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part I**		Tamil / Hindi	23UTAG21/ 23UHDG21	6	3	3	25	75	100
2	**Part II**		English	23UENG21	6	3	3	25	75	100
3	**Part III**	Core Course - 3	Programming in C++	23UCAC21	5	5	3	25	75	100
4		Core Course - 4 Practical II	Programming in C++ Practical	23UCAC21P	5	3	3	40	60	100
5		Elective Course	Resource Management Techniques	23UCAA21	4	4	3	25	75	100
6	**Part IV**	NME -2	Fundamentals of Computers	23UCAN21	2	2	3	25	75	100
7		SEC -2	Photoshop Practical	23UCAS21P	2	2	3	40	60	100
Total					**30**	**22**				**700**

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B.C.A.
(2023-24 onwards)

Semester I	**Python Programming**	Hours/Week: 5	
Core Course -1		Credits: 5	
Course Code **23UCAC11**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learners will be able to

CO1 : outline the basics of Python, control statements, functions, strings, Python Data structures and files. [K1]

CO2 : paraphrase about Python basics, conditional, looping statements and functions. [K2]

CO3 : relate the concepts of strings, modules, List, tuples and dictionary, reading, writing and other file handling operations. [K2]

CO4 : apply Python basics, selection, looping statements, functions and Modules. [K3]

CO5 : make use of Python data structures like List, Tuple, Set, Dictionary and files concepts. [K3]

UNIT I

Basics of Python Programming: Features of Python – History of Python – The Future of Python – Literal Constants – Variables and Identifiers – Data Types – Input Operation – Comments – Reserved Words – Indentation – Operators and Expressions – Expressions in Python – Operations on Strings – Other Data Types – Type Conversion.

(15 Hours)

UNIT II

Decision Control Statements: Introduction to Decision Control Statements – Selection/Conditional Branching statements – Basic Loop Structures/Iterative Statements – Nested Loops – The break Statement – The continue Statement – The pass Statement – The else Statement used with Loops. **(15 Hours)**

UNIT III

Functions and Modules: Introduction – Function Declaration and Definition – Function

Call – Variable Scope and its Lifetime – The return Statement – More on Defining Functions – Lambda Functions or Anonymous Functions – Documentation Strings – Good Programming Practices – Recursive Functions – Modules – Packages in Python – Standard Library modules – Globals(), Locals() and Reload() – Function Redefinition. **(15 Hours)**

UNIT IV

Python Strings Revisited: Concatenating, Appending and Multiplying Strings – Strings are Immutable – String Formatting Operator – Built-in String Methods and Functions – Slice Operation – ord() and chr() Functions – in and not in operators – Comparing Strings – Iterating String – The String Module. **File Handling:** File Path – Types of files in Python - Opening and Closing files – Reading and Writing files – File Positions – Renaming and deleting files – Directory Methods.

(15 Hours)

UNIT V

Data Structures: Lists: Creating a list – Access values in List – Updating values in Lists – Nested lists – Basic list operations – List Methods. **Tuples:** Creating Tuple – Utility of Tuples – Accessing values in a Tuple – Deleting Elements in Tuple – Basic Tuple Operations – Tuple Assignment – Tuples for Returning Multiple values – Nested Tuples – Sets – **Dictionaries:** Creating a Dictionary – Accessing values – Adding and Modifying an Item in a Dictionary – Modifying an Entry – Deleting Items – Sorting Items in a Dictionary – Looping over a Dictionary – Nested Dictionaries – Built-in Dictionary Functions and Methods – Difference between a List and a Dictionary – String Formatting with Dictionaries – List vs Tuple vs Dictionary vs Set.

(15 Hours)

TEXT BOOK:

Reema Thareja.”Python Programming using problem solving approach”, First Edition 2017, Oxford University Press.

Unit	Chapter	Section
I	3	3.1 – 3.16
II	4	4.1 – 4.8
III	5	5.1 – 5.15
IV	6, 7	6.1 – 6.10, 7.1 – 7.8
V	8	8.2.1 – 8.2.6, 8.4.1 – 8.3.9, 8.5, 8.6

REFERENCE BOOKS

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

3. Adam Stewarts, “Python Programming”, Online.
4. Fabio Nelli, “Python Data Analytics”, APress.
5. Kenneth A. Lambert, “Fundamentals of Python – First Programs”, CENGAGE Publication.

WEB RESOURCES

1. https://www.guru99.com/python-tutorials.html
2. https://www.w3schools.com/python/python_intro.asp
3. https://www.geeksforgeeks.org/python-programming-language/
4. https://en.wikipedia.org/wiki/Python_(programming_language)
5. https://www.programiz.com/python-programming

Course Code **23UCAC11**	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	3	3	3	2	2	-	-	1	1	-
CO2	3	3	3	3	3	1	1	2	1	-
CO3	3	3	3	2	2	2	2	2	1	-
CO4	3	3	3	3	3	2	2	2	1	1
CO5	3	3	3	3	3	2	2	3	1	1

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B.C.A.

(2023-24 onwards)

Semester I	**Python Programming Practical**	**Hours/Week: 5**	
Core Course – 2 Practical I		**Credits: 3**	
Course Code 23UCAC11P		**Internal 40**	**External 60**

COURSE OUTCOMES

On successful completion of the course, the learners will be able to

CO1 : outline the basic concepts of needed for the given problem. [K2]

CO2 : write programs using selection/looping statements, functions, strings, files and Python Data Structures. [K2]

CO3 : key-in the programs and test the programs with required input and get expected outputs with neat formatting and prepare the record work. [K3]

CO4 : explain the programs implemented using Python and deduce the answers for any queries raised. [K3]

CO5 : apply the necessary modifications and justify the desired result. [K3]

List of Programs

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 23UCAC11P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	3	3	3	2	2	-	-	1	2	-
CO2	3	3	3	3	3	1	1	2	2	-
CO3	3	3	3	2	2	2	2	2	2	2
CO4	3	3	3	3	3	2	2	2	2	2
CO5	3	3	3	3	3	2	2	3	2	2

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B.C.A.
(2023-24 onwards)

Semester I	**DISCRETE MATHEMATICS - I**	Hours/Week: 4	
Elective Course		Credits: 4	
Course Code 23UCAA11		Internal 25	External 75

Course Outcomes

On completion of the course the students will be able to

CO1 : define the basic concepts in propositional logic, relations, counting, graph theory and matrices [K1]

CO2 : understand the mathematical concepts in logic, relations, permutation and combinations, graphs and matrices.[K2]

CO3 : explain the concepts in predicates and quantifiers, partial orderings, recurrence relations, graphs and matrices. [K2]

CO4 : solve problems in discrete mathematics. [K3]

CO5 : apply the knowledge gained in discrete mathematics to other fields. [K3]

UNIT I

The Foundations: Logic and Proofs: Propositional logic – Applications of Propositional logic – Propositional equivalences – (Exclude Propositional satisfiability, Applications of satisfiability, Solving satisfiability problems, and its related problems) – Predicates and Quantifiers

(12 Hours)

UNIT II

Relations: Relations and their properties – Representing relations –Partial orderings (Theorems statement only; Exclude lexicographic order - Exclude Lattices and Topological sorting)

(12 Hours)

UNIT III

Counting: The basic of counting - The pigeonhole principle (Exclude Generalized Pigeonhole principle, Some Elegant Applications of the Pigeonhole Principle) – Permutation and

Combinations – Applications of recurrence relations (Exclude Algorithms and Recurrence Relations) – Solving linear recurrence relations (Exclude Linear Non homogeneous recurrence Relations with constant coefficients). (All theorems and Results statement only)

(12 Hours)

UNIT IV

Graphs: Graphs and Graphs models, (Excluding Biological networks; Tournaments; all its related examples and problems) – Graph terminology and special types of graphs(Thorems statement only, Exclude Some Applications of Special Types of Graphs, New Graphs from Old) – Representing graphs and Graph isomorphism – Connectivity–paths – connectedness in undirected graphs(Exclude How connected is a graph?, Connectedness in Directed Graphs) – paths and isomorphism – counting paths between vertices – shortest path problems.

(12 Hours)

UNIT V

Matrices: Introduction – operations – inverse – Rank of a matrix, solution of simultaneous linear equations – Eigen values and Eigen Vectors. (12 Hours)

TEXT BOOKS

1. Kenneth.H.Rosen, Discrete Mathematics and its applications, Seventh Edition, McGraw Hill Publishing Company, 2012.

2. M.Venkataraman, N.Sridharan and N.Chandrasekaran, ,Discrete Mathematics, The National Publishing Company, 2009

Unit	Chapter	Section
Text Book 1		
I	1	1.1,1.2,1.3,1.4
II	9	9.1, 9.3, 9.6
III	6	6.1, 6.2, 6.3
	8	8.1, 8.2
IV	10	10.1, 10.2, 10.3, 10.4, 10.6
Text Book 2		
V	6	6.1, 6.2, 6.3, 6.4, 6.5, 6.7

REFERENCE BOOKS

1. S.Arumugam and A. ThangapandiIsaac,Modern Algebra , Scitech publications 2005.

2. S.Arumugam and S.Ramachandran, Invitation to Graph Theory, Scitech Publications,2005, Chennai.

3. Tremblay and Manohar,Discrete Mathematical Structures with applications to Computer Science -, McGraw Hill,1997.

Web Resources

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

Course Code 23UCAA11	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	1	-	1	-
CO2	3	1	3	3	3	1	-
CO3	3	3	3	3	2	1	-
CO4	3	1	3	3	2	3	1
CO5	3	3	3	3	3	3	1

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B.C.A.
(2023-24 onwards)

Semester I	**Introduction to HTML**	Hours/Week: 2	
NME -1		Credits: 2	
Course Code **23UCAN11**		Internal 25	External 75

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

CO1 : know the basics of internet and web browsers.[K1]

CO2 : know the basic concept in HTML and concept of resources in HTML. [K1]

CO3 : recognize the concept of list and its types. .[K2]

CO4 : create tables and to understand the attributes of table. .[K2]

CO5 : design frames and forms with its attributes. .[K3]

UNIT I
Introduction to the Internet: Computer in Business – Networking – Internet – E- Mail – Resource Sharing –World Wide Web – Internet Browsers: Internet Explorer – Netscape Navigator.

(6 Hours)

UNIT II
Introduction to HTML: Designing a Home Page – History of HTML – HTML Generations – HTML documents – Anchor tag – Hyper Links – Sample HTML Documents – Paragraph – Tab Settings – Images and Pictures – Embedding PNG format images. **(6 Hours)**

UNIT III
Ordered and Unordered Lists: Lists – Unordered lists – Headings in a List – Ordered Lists – Nested Lists. **(6 Hours)**

UNIT IV

Table Handling: Tables – Table creation in HTML – Width of the Table and Cells – Cells Spanning and Multiple Rows/Columns – Coloring Cells – Column Specifications – Some Sample Tables.

(6 Hours)

UNIT V

Frames: Frameset Definition – Frame Definition – Nested Framesets. Forms: Action Attribute – Method Attribute – enctype Attribute – Dropdown Lists.

(6 Hours)

TEXT BOOK

Xavier,C., (2009). World Wide Web Design with HTML, Tata McGraw Hill Publishing Company, 21st Reprint.

REFERENCE BOOKS:

1. "Mastering HTML5 and CSS3 Made Easy", Teach U Comp Inc., 2014.
2. Thomas Michaud, "Foundations of Web Design: Introduction to HTML & CSS".

WEB RESOURCES:

1. https://www.teachucomp.com/samples/html/5/manuals/Mastering-HTML5-CSS3.pdf
2. https://www.w3schools.com/html/default.asp

Course Code (23UCAN11)	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	1	-	-	-	-	-
CO2	1	1	-	-	-	-	-
CO3	2	2	-	-	-	-	-
CO4	1	1	-	-	-	-	-
CO5	1	1	-	-	-	-	-

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B.C.A.

(2023 – 2024 onwards)

Semester I	**Programming in C**	Hours/Week: 2	
SEC -1 Foundation Course		Credits: 2	
Course Code **23UCAF11**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learners will be able to

CO1 : remember the program structure of C with its syntax and semantics. [K1]

CO2 : outline basics of computers, structure of C, constants, variables, data types, operators, expression, and control statement. [K1]

CO3 : identify the concept of top-down modular programming, collection of similar data, group of logically related data, array, pointers. [K2]

CO4 : understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, and pointers). [K2]

CO5 : associate the theory of computer basics, elements of C, operations, flow of execution, user defined and derived data types. [K2]

UNIT I

Overview of C: Importance of C, sample C program, C program structure, executing C program. Constants, Variables, and Data Types: Character set, C tokens, keywords and identifiers, constants, variables, data types, declaration of variables, Assigning values to variables---Assignment statement, declaring a variable as constant, as volatile. Operators and Expression.

(6 Hours)

UNIT II

Decision Making and Branching: Decision making with If, simple IF, IF ELSE, nested IF ELSE , ELSE IF ladder, switch, GOTO statement. .

Decision Making and Looping: While, Do-While, For, Jumps in loops.

(6 Hours)

UNIT III

Arrays: Declaration and accessing of one & two-dimensional arrays, initializing two-dimensional arrays, multidimensional arrays. **(6 Hours)**

UNIT IV

Functions: The form of C functions, Return values and types, calling a function, categories of functions, Nested functions, Recursion, functions with arrays, call by value, call by reference, storage classes-character arrays and string functions. **(6 Hours)**

UNIT V

Pointers: definition, declaring and initializing pointers, accessing a variable through address and through pointer, pointer expressions, pointer increments and scale factor, pointers and arrays, pointers and functions, pointers and structures. **(6 Hours)**

TEXTBOOK:

E. Balagurusamy, *Programming in ANSI C*, Fifth Edition, Tata McGraw-Hill, 2010.

REFERENCE BOOKS:

1. Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.
2. Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998.
3. YashavantKanetkar, Let Us C, Eighteenth Edition, BPB Publications, 2021.

WEB RESOURCES

1. https://codeforwin.org/
2. https://www.geeksforgeeks.org/c-programming-language/
3. http://en.cppreference.com/w/c\
4. http://learn-c.org/
5. https://www.cprogramming.com/

Course Code 23UCAF11	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	2	-	2	-	-	-	-	-	-	-
CO2	3	3	2	-	2	-	-	-	-	-
CO3	-	3	1	2	2	1	-	2	-	-
CO4	3	-	1	3	3	1	1	2	-	-
CO5	2	2	1	-	-	-	-	2	-	-

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B.C.A.

(2023 – 2024 onwards)

Semester II	**Programming in C++**	Hours/Week: 5	
Core Course -3		Credits: 5	
Course Code **23UCAC21**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learns should be able to

CO1: outline the procedural and object oriented paradigm with concepts of classes, token, data types, functions, control statement, overloading and objects. [K1]

CO2: describe about classes and object, expressions and controls structures, functions, friend functions, constructor and destructor, operator overloading and inheritance. [K2]

CO3: paraphrase about pointer, pointer class, this pointer, polymorphism, virtual functions and files stream classes.[K2]

CO4: apply the concepts of object-oriented programming, types of inheritance, pointer concepts and operator overloading [K3]

CO5: illustrate pointers, managing console I/O operators, manipulating strings, strings function and their attributes.[K3]

UNIT I

Principles of Object-Oriented Programming: Basic Concepts of Object Oriented Programming - Benefits of OOP. **Beginning with C++:** What is C++ - Applications of C++ - A Simple C++ Program –More C++ statements - Structure of a C++ program. **Tokens, Data types:** Introduction – Tokens – Keywords – Identifiers and Constants – Basic Data Types – User-Defined Data Types – Storage Classes - Derived Data Types – Symbolic Constants. (12 Hours)

UNIT II

Expressions and Control Structures: Type Compatibility – Declaration of Variables – Dynamic Initialization of Variables – Reference Variables – Operators in C++ - Scope Resolution Operator – Type Cast Operator – Expressions and their Types -

Control Structures. **Functions in C++:** Introduction – The main function – Function Prototyping – Call by Reference - Return by Reference - Inline Functions – Default Arguments- Function Overloading - Math Library Functions. **Classes and Objects:** Specifying a Class – Defining Member Functions– C++ Program with Class - Making an Outside Function Inline – Nesting of Member Functions – Private Member Functions – Arrays with in a Class – Memory Allocation for Objects- Arrays of Objects– Friendly Functions.

(15 Hours)

UNIT III

Constructors and Destructors: Introduction – Constructors - Parameterized Constructors – Constructors with Default Arguments – Copy Constructor – Dynamic Constructors - Destructors. **Operator Overloading:** Introduction - Defining Operator Overloading - Overloading unary operators - Overloading Binary Operators – Overloading Binary Operators using Friends – Rules for Overloading Operators.

(18 Hours)

UNIT IV

Inheritance: Extending Classes: Introduction - Defining derived classes – Single Inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance - Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes. **Pointers, Virtual Functions and Polymorphism:** Pointers – Pointer to Objects – this Pointer – Polymorphism –Virtual Functions. (15 Hours)

UNIT V

Managing Console I/O Operations: Introduction – C++ Streams - C++ Stream Classes – Unformatted I/O operation – Formatted Console I/O Operations - Managing Output with Manipulators. **Manipulating Strings:** Introduction – Creating (string) Objects – Manipulating String Objects – Relational Operations – String Characteristics – Accessing Characters in Strings – Comparing and Swapping. (15 Hours)

TEXT BOOK

E.Balagurusamy,*(*2018).*Object-Oriented Programming with C++*,7th Edition, India: McGraw Hill Education Private Ltd.

UNIT	CHAPTER	SECTION
I	1	1.5, 1.6
	2	2.1 to 2.4, 2.6
	3	3.1 to 3.9
II	3	3.10 to 3.15, 3.19, 3.20, 3.25
	4	4.1 to 4.7, 4.10, 4.12
	5	5.3 to 5.10,5.13, 5.15
III	6	6.1 to 6.3, 6.5, 6.7, 6.8 6.11
	7	7.1 to7.5,7.8
IV	8	8.1 to 8.9
	9	9.2 to 9.5, 9.7
V	10	10.1 to 10.6
	15	15.1 to 15.7

REFERENCE BOOKS

1. K.R.Venugopal, RajkumarBuyya, *(*2017). *Mastering C++,2nd Edition,* India: McGraw Hill Education Private Limited.

3. Pohl,I, *(*2004). *Object Oriented Programming using C+,* Second Edition, NewDelhi: Pearson Education.

3. Budd,*T., (*2008). *An Introduction to OOP*, Third Edition, New Delhi: PearsonEducation.

Course Code **23UCAC21**	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	**3**	**3**	**3**	**3**	**1**	**2**	-	-	**1**	
CO2	**2**	**3**	**2**	**3**	**2**	**2**	**1**	-	-	
CO3	**3**	**3**	**2**	**3**	**1**	**1**	-	**1**	-	
CO4	**2**	**3**	**2**	**3**	**1**	**1**	**2**	**2**	**1**	
CO5	**2**	**2**	**2**	**1**	**1**	**1**	**2**	**3**	**2**	

J.Porkodi
Head of the Department

V.G. Jyothi Mani
Course Designer

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
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VIRUDHUNAGAR - 626 001

B.C.A.

(2023-24 onwards)

Semester II	**Programming in C++ Practical**	Hours/Week: 5	
Core Course 4		Credits: 3	
Course Code **23UCAC21P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course, the learns should be able to

CO1 : Outline the basic concepts of object oriented, classes, functions and objects.[K2]

CO2 : write the program output for the function with pointer, modes of files and string attributes.[K2]

CO3 : explain the programming concepts in type casting, inheritance, operator overloading and polymorphism.[K3]

CO4 : Present output effectively and prepare the record with the neat output.[K3]

CO5 : Apply the programming concepts in type casting, inheritance, operator overloading and polymorphism.[K3]

Write a C++ program

1. To demonstrate returning objects from classes
2. To demonstrate passing objects as function arguments
3. To swap two numbers without using intermediate variable
4. To check if a number is prime or not, using objects
5. To find larger of two numbers using inline function
6. To calculate simple interest using function using rate of interest as default argument
7. To perform Area of different shape calculation using Function overloading(Minimum three functions)

8. To perform String manipulation (three different types) using function overloading
9. To find minimum of two numbers between two class objects using friend function
10. To perform Bank Transaction using Constructor and destructor.
11. To overload unary minus operator to change sign of given 3elements
12. To overload Binary plus operator to add two complex numbers.
13. To create telephone directory using single inheritance
14. To prepare a student's mark sheet using multiple inheritance
15. To prepare pay slip of an employee using hierarchical inheritance
16. To create bank account using multilevel inheritance
17. To prepare EB bill for a customer using hybrid inheritance
18. To format the output using system defined manipulators
19. To sort array of generic data.
20. To perform transform the matrix.
21. To find the biggest number using nesting member function.
22. To find the mean value using friend function.

Course Code 23UCAC21P	PO1	PO2		PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	3	3	3	3	1	2	-	-	1	-
CO2	2	3	2	3	2	2	1	-	-	-
CO3	3	3	2	3	1	1	-	1	-	1
CO4	2	3	2	3	1	1	2	2	1	1
CO5	2	2	2	1	1	1	2	3	2	1

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B.C.A.
(2023– 2024 onwards)

Semester II	**Resource Management Techniques**	Hours/Week:4	
Elective Course		Credits: 4	
Course Code **23UCAA21**		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

(12Hours)

Sharma, S.D.(1997).Operations Research, KedarNathRamnath& co.

UnitI: Chapter1:Sections1.1 to1.11

UnitII:Chapter1:Sections1.1to1.6,Chapter3:3.1to3.4

UnitIII:Chapter3:Sections3.5to3.8,Chapter5:Sections5.1to5.8

Chapter6:Sections6.1to6.3

UnitIV:Chapter9:Sections9.1to9.7

UnitV:Chapter10:Sections10.1to10.12

REFERENCE BOOKS

1. P.K. Gupta, Man Mohan, Kantiswarup, *Operations Research*, Sultan Chand Publications.

2. ShankaraIyer,P.(2008).*Operations Research*, TataMcGrawHill.

3. Sharma, S.C.(2006). Introductory *Operation Research*, Discovery Publishing House.

Course Code 23UCAA21	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

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B.C.A.
(2023-24 onwards)

Semester II	**Fundamentals of Computers**	Hours/Week: 2	
NME- 2		Credits: 2	
Course Code **23UCAN21**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learners will be able to

CO1 : outline the basics of computer, purpose of input/output devices, various input technologies and progress of computer languages from machine level to high level. [K1]

CO2 : recognize the evaluation of arithmetic operations by the processor, the registers involved in arithmetic operations and about the evolution and classification of computers. [K1]

CO3 : classify different kinds of input/output technologies, machine, assembly, high level languages and computers. [K2]

CO4 : : interpret problem solving using computers through the concepts of algorithms, computer model, its characteristics and computer generation & classification. [K2]

CO5 : acquire the knowledge of computer basics, input/output devices, calculating arithmetic operations using computers, programming languages, generation and classification of computers. [K3]

UNIT I

Computer Basics: Algorithms – Simple Model of a Computer – Characteristics of Computers – Problem Solving Using Computers. (6 Hours)

UNIT II

Input / Output Units: Traditional Computer Input/Output Units – Other Input Technologies (MICR, OMR, Optical Character Recognizer, Bar code) – Computer Output Devices (Printers, Inkjet Printers, Laser Printers, Dot Matrix Printers, Line Printers, Plotters). (6 Hours)

UNIT III

Binary Arithmetic: Binary Addition – Binary Subtraction – Signed Numbers – Two's Complement Representation of Numbers – Addition/Subtraction of Numbers in 2's Complement Notation – Binary Multiplication – Binary Division. (6 Hours)

UNIT IV

Programming Languages: Why Programming Language? – Assembly Language – Higher Level Programming Languages – Compiling a High Level Language Programs. (6 Hours)

UNIT V

Computer generation and classification: First Generation of Computers - Second Generation –Third generation – Fourth generation –Fifth generation – Classification of Computers – Distributed Computer System – Parallel Computers. (6 Hours)

TEXT BOOK

Rajaraman, V. &NeeharikaAdabala, (2015).Fundamentals of Computers, PHI,6th Edition.

UNIT	CHAPTER	SECTION
I	1	1.1 – 1.4
II	3	3 3.1, 3.2 (3.2.3, 3.2.4, 3.2.6, 3.2.7), 3.3 (3.3.3 – 3.3.8)
III	6	6.1 – 6.7
	9	9.1 – 9.4
V	12	12.1 – 12.5, 12.7 - 12.9

REFERENCE BOOKS

1. Anna Treby, Cassell, (1998). An Introduction to Information Technology.

2. Peter Zorkoczy& Pitman, (1990). : An Introduction to Information Technology, 3rd Edition.

3. Alexis Leon & Mathews Leon, (2009). Fundamentals of Information Technology, 2nd Edition.Vikas Publishing House Pvt. Ltd.

Course Code 23UCAN21	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	1	1	-	-	-	-	-
CO2	1	1	-	-	-	-	-
CO3	2	2	-	-	-	-	-
CO4	1	1	-	-	-	-	-
CO5	1	1	-	-	-	-	-

Mrs. J. Porkodi
Head of the Department

Mrs. R.Nancy Beaulah
Course Designer

B.C.A
(2023 – 2024 onwards)

Semester II	**Photoshop Practical**	Hours/Week: 2	
SEC- 2		Credits: 2	
Course Code **23UCAS21P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course, the learners will be able to

CO1 : examine the given design problem, identify the basic tools and features in Photoshop. [K2]

CO2 : design Photoshop document implementing the required tools and elements to get a good photo effect. [K2]

CO3 : execute the steps to produce required output. [K3]

CO4 : present output effectively and prepare the record. [K3]

CO5 : explain the necessity of tools used, deduce the changes to be incorporated over the developed application using the acquired knowledge. [K3]

Create the following programs

1. Use of basic Photoshop tools and techniques
2. Changing the background
3. Filters in Photoshop
4. Create rainbow, rain effects
5. Create 3D Photo cube
6. Animate the flame of a candle
7. Product advertisement
8. Cube creation
9. CD Logo creation
10. Glowing Effect
11. Animation
12. Image within text

13. Photo effect

14. Glossy text effect

15. Hair coloring effect

Course Code **23UCAS21P**	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	2	3	1	-	-	-	-	-	-	-
CO2	3	2	2	2	2	-	-	-	1	-
CO3	-	3	-	2	3	-	1	2	-	1
CO4	3	3	1	2	-	1	1	2	-	1
CO5	2	2	1	-	-	-	-	3	-	-

Mrs. J. Porkodi
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