

B.C.A

LOCF SYLLABUS – 2024-2025

CHOICE BASED CREDIT

SYSTEM

The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a ‘cafeteria’ type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning. Our College have has moved to CBCS and implemented the grading system.

OUTCOME-BASED EDUCATION (OBE)

LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)

The fundamental premise underlying the learning outcomes-based approach to curriculum planning and development is that higher education qualifications are awarded on the basis of demonstrated achievement of outcomes (expressed in terms of knowledge, understanding, skills, attitudes and values) and academic standards expected of graduates of a programme of study. Learning outcomes specify what graduates completing a particular programme of study are expected to know, understand and be able to do at the end of their programme of study. The expected learning outcomes are used as reference points that would help formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes which in turn will help in curriculum planning and development, and in the design, delivery and review of academic programmes. They provide general guidance for articulating the essential learnings associated with programmes of study and courses within a programme, maintain national standards and international comparability of learning outcomes and academic standards to ensure global competitiveness, and to facilitate student/graduate mobility and provide higher education institutions an important point of reference for designing teaching-learning strategies, assessing student learning levels, and periodic review of programmes and academic standards.

Some important aspects of the Outcome Based Education

Course: is defined as a theory, practical or theory cum practical subject studied in a semester.

Course Outcomes (COs): are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally three or more course outcomes may be specified for each course based on its weightage.

Programme: is defined as the specialization or discipline of a Degree.

Programme Outcomes (POs): Programme outcomes are narrower statements that describe what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes.

Programme Specific Outcomes (PSOs): PSOs are what the students should be able to do at the time of graduation with reference to a specific discipline.

Some important terminologies repeatedly used in LOCF.

Core Courses (CC) A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course. These are the courses which provide basic understanding of their main discipline. In order to maintain a requisite standard certain core courses must be included in an academic program. This helps in providing a universal recognition to the said academic program.

Discipline Specific Elective Courses (DSE) Elective course maybe offered by the main discipline/subject of study is referred to as Discipline Specific Elective (DSE). These courses offer the flexibility of selection of options from a pool of courses. These are considered specialized or advanced to that particular programme and provide extensive exposure in the area chosen; these are also more applied in nature.

Generic Elective Courses An elective course chosen generally from an **unrelated discipline/subject**, with an intention to seek exposure is called a Generic Elective. Generic Elective courses are designed for the students of **other disciplines**. Thus, as per the CBCS policy, the students pursuing particular disciplines would have to opt Generic Elective courses offered by other disciplines, as per the basket of courses offered by the college. The scope of the Generic Elective (GE) Courses is positively related to the diversity of disciplines in which programmes are being offered by the college.

Ability Enhancement Compulsory Courses (AECC)

“AECC” are the courses based up on the content that leads to Knowledge enhancement especially in Communicative English and other soft skills.

Skill Enhancement Courses (SECs) These courses focus on developing skills or proficiencies in the student, and aim at providing hands-on training. Skill enhancement courses can be opted by the students of any other discipline, but are highly suitable for students pursuing their academic programme. These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.

Field Study/ Industrial Visit / Case Study: It has to be completed during the fifth semester of the degree programme. Credit for this course will be entered in the fifth semester's marks statement.

Internship: Students must complete internship during summer holidays after the fourth semester. They have to submit a report of internship training with the necessary documents and have to appear for a viva-voce examination during fifth semester. Credit for internship will be entered in the fifth semester's mark statement.

Extra Credit Courses: In order to facilitate the students, gaining knowledge/skills by attending online courses MOOC, credits are awarded as extra credits, the extra credit are at three semesters after verifying the course completion certificates. According to the guidelines of UGC, the students are encouraged to avail this option of enriching their knowledge by enrolling themselves in the Massive Open Online Courses (MOOC) provided by various portals such as SWAYAM, NPTEL etc.

Undergraduate Programme:

Programme Pattern: The Under Graduate degree programme consists of **FIVE** vital components. They are as follows:

Part-I: Languages (Tamil/Hindi/French/Sanskrit)

Part-II : General English

Part-III: Core Course (Theory, Practical's, Generic Elective courses, Discipline Specific Elective courses, Compulsory and Optional Allied courses, Project)

Part-IV: Non Major Elective, Foundation Course, Ability Enhancement Compulsory Course, Value Education, Environmental studies, Skill Enhancement Courses/ Soft Skills, Internship / field visit / industrial visit/ Case Study), Professional Competency Course

Part-V

Extension activity, Gender studies

EXAMINATION

Continuous Internal Assessment (CIA):

UG - Distribution of CIA Marks

Passing Minimum: 40 %

Assignments-3=30%

Tests-3(Best2outof3) = 50%Seminar=10 %

Attendance=10%

Question Paper Pattern

Part A:

Part A1 (10X1=10marks)

One word question/Fill in/True or False /Multiple Choice Questions

Two Questions from Each unit

Part A2 (5X2=10marks)

Match the following/Short Answers one question from each unit

Total Marks-20

Part B: (5X5=25marks)

Paragraph Answers

Either/ or type, One Questions from each unit

Part C: (10X3=30)

Essay Type Answers

Answer 3 out of 5

Questions **Part A:** K1 Level

Part B: K2, K3 and K4 Level

Part C: K5 and K6 Level

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S. No.	Level	Parameter	Description
1	K1	Knowledge/Remembering	It is the ability to remember the previously learned
2	K2	Comprehension/ Understanding	The learner explain side as or concepts
3	K3	Application/Applying	The learner uses information in a new way
4	K4	Analysis/Analyzing	The learner distinguishes among different parts
5	K5	Evaluation/Evaluating	The learner justifies a stand or decision
6	K6	Synthesis/Creating	The learner creates a new production point of View

WEIGHTAGE of K-LEVELS IN QUESTION PAPER

(Cognitive Level) K-LEVELS →	Lower Order Thinking			Higher Order Thinking			Total
	K1	K2	K3	K4	K5	K6	
ENDSEMESTER EXAMINATIONS(ESE)	20	25			30		75
Continuous Internal Assessment (CIA)	20	25			30		75

QUESTION PATTERN FOR SEMESTER EXAMINATION/Continuous Internal Assessment

PART	MARKS
PART–AI. (No choice, One Mark) TWO questions from each unit (10x1=10)	20
II. (No choice, Two Mark) ONE question from each unit (5x2=10)	
PART–B (Either/or type,5-Marks) ONE questions from each unit (5x5=25)	25
PART–C (3 out of 5)(10Marks) ONE question from each unit (3x10=30)	30
Total	75

BLUE PRINT OF QUESTION PAPER FOR SEMESTER EXAMINATION							
DURATION: 3.00 Hours.				MaxMark:100			
K-LEVELS	K1	K2	K3	K4	K5	K6	Total Marks
PART							
PART–A (One Mark, No choice) (10x1=10)	10						10
(2-Marks,No choice) (10x2=20)	10						10
PART–B (5-Marks)(Either/or type)(5x5=25)		5	10	10			25
PART -C (10 Marks)(3 out of 5) (3x10=30) Courses having only K5,K6 levels, K5 level- 3 Questions, K6 level- 2 Questions (One K6 level question is compulsory)					20	10	30
Total	20	05	10	10	20	10	75

EVALUATION

GRADING SYSTEM

Once the marks of the CIA and the end-semester examination for each of the courses are available, they will be added and converted as final mark. The marks thus obtained will then be graded as per the scheme provided in Table-1.

Grade Point Average (GPA) will be calculated from the first semester onwards for all semester. From the second semester onwards, the total performance with in a semester and the continuous performance starting from the first semester are indicated by semester Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA) , respectively. These two are calculated by the following formulae:

$\text{GPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$	$\text{WAM(Weighted Average Marks)} = \frac{\sum_{i=1}^n C_i M_i}{\sum_{i=1}^n C_i}$
Where, C_i is the Credit earned for the Course i G_i is the Grade Point obtained by the student for the Course i M_i is the marks obtained for the course i and N is the number of Courses Passed in hat semester.	

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

CLASSIFICATION OF FINAL RESULTS:

1. For each of the first three parts, there shall be separate classification on the basis of CGPA, as indicated in Table-2.
2. For the purpose of declaring a candidate to have qualified for the Degree of Bachelor of Arts / Science / Commerce / Management as Outstanding / Excellent / Very Good / Good / Above Average/Average, the marks and the corresponding CGPA earned by the candidate in Part-III alone will be the criterion, provided the candidate has secured the prescribed passing minimum in the all the Five parts of the Programme.
3. Grade in Part –IV and Part-V shall be shown separately and it shall not be taken into account for classification.
4. A Pass in PART- V will be mandatory although the marks will not count for the calculation of the CGPA.
5. Absence from an examination shall not be taken an attempt.

Table-1: Grading of the Courses-UG

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above and below90	9	A+
70 and above and below80	8	A
60 and above and below70	7	B+
50 and above and below60	6	B
40 and above and below50	5	C
Below 40	0	RA

Table-2: Grading of the Courses-PG

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above and below90	9	A+
70 and above and below80	8	A
60 and above and below70	7	B+
50 and above and below60	6	B
Below50	0	RA

Table-3: Final Result

CGPA	Corresponding Grade	Classification of Final Result
9.00 and above	O	Outstanding
8.00 to 8.99	A+	Excellent
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average
4.00 to 4.99	C	Average
Below 4.00	RA	Re-appearance

Vision

To empower the women students by providing excellent of aware engineering skills to meet the global needs of IT industry

Mission

1. Providing quality education in computer science and its applications by updated knowledge through technology transfer
2. Enhancing professional skills to satisfy the needs of the Software industries and Technical skills of the individual towards competitive world.

PROGRAMME OUTCOMES FOR B.C.A. DEGREE PROGRAMMES

PO No.	Programme Outcomes <i>(Upon completion of the B.C.A. Degree Programme, the Undergraduate will be able to)</i>
PO-1	Disciplinary knowledge: Demonstrate comprehensive knowledge and understanding of one or more disciplines that form a part of an under graduate program of study in Bachelor Of Computer Applications.
PO-2	Critical thinking, Problem Solving and Reflective thinking: think critically about the issues and identify, critically analyze and solve problems from the disciplines of concern using appropriate tools and techniques and the knowledge, skills and attitudes acquired and extrapolate the same to real life situations; show critical sensibility to life experiences, With self-awareness and reflexivity of both self and society.
PO-3	Analytical & Scientific Reasoning: evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and address opposing viewpoints; critically evaluate ideas, evidence, and Experiences from an open minded and reasoned perspective.
PO-4	Research-related Skills: develop a sense of capability for relevant / appropriate inquiry and asking questions ,synthesize, articulate and report results and to recognize and predict cause and effect relationships, define problems, formulate and establish hypothesis, analyze and interpret and draw conclusions from data, execute and report the results of an experiment or investigation.
PO-5	Digital literacy and Effective Communication: use ICT in a variety of learning situations and speak, read, write and listen clearly in person and through electronic media in English and in one or more Indian languages, and make meaning of the world by connecting people, ideas, books, media and technology; efficiently communicate thoughts and ideas in a clear and concise manner.
PO-6	Individual and Team Work: effectively accomplish tasks individually as well as work effectively and respectfully as member or leader with diverse teams, facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the Interests of or a common cause and work efficiently as a member of a team.
PO-7	Multi-cultural Competence and Social Interaction: understand the values and beliefs of multiple cultures, global perspectives, engage and interact respectfully with diverse groups and elicit views of others, mediate disagreements and help reach conclusions in Group settings.
PO-8	Awareness of Ethical issues, Human values and Gender Issues: embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work and understand the value of relationship between self and the community and aware of the various issues concerning Women and society.
PO-9	Awareness of Environment and Sustainability: understand the impacts of technology and business practices in societal and environmental contexts, and sustainable Development.
PO-10	Self-directed and Lifelong learning: acquire knowledge and skills, including learning "how to learn", that are necessary for participating in learning activities throughout life and to engage in independent and life-long learning in the broadest context of socio-Technological changes.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO No.	Program Specific Outcomes (<u>B.C.A., DEGREE</u>)
PSO1	Think in a critical and logical based manner
PSO2	Familiarize the students with suitable software tools of computer science and industrial applications to handle issues and solve problems in mathematics or statistics and real time application Related sciences.
PSO3	Know when there is a need for information, to be able to Identify, locate, evaluate, and effectively use that information for the issue or problem at hand.
PSO4	Understand, formulate, develop programming model with logical Approaches to a Address issues arising in social science, business and other contexts.
PSO5	Acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of Computer Science and Industrial statistics.

B.C.ASYLLABUS

Syllabus

2024-2025

Programme Code:3USBCA



**SENGAMALA THAYAR EDUCATIONAL TRUST
WOMEN'S COLLEGE (AUTONOMOUS)**

(Affiliated to Bharathidasan University, Tiruchirappalli)
(Accredited by NAAC) (An ISO 9001:2015 Certified Institution)

Sundarakkottai, Mannargudi-614016,

Thiruvarur(Dt.), Tamil Nadu, India.

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



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SUNDARAKKOTTAI, MANNARGUDI-614016,
TAMILNADU, INDIA.

BACHELOR OF COMPUTER APPLICATIONS COURSE STRUCTURE UNDER CBCS

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS-LOCF)

(For the candidates admitted in the academic year 2024 - 2025)

ELIGIBILITY: Those who have completed +2 examinations with Mathematics as one of the core subject

Semester	Part	Nature of the Course	Course Code	Title of the Course	Inst. Hou rs/ Week	L	T	P	O	Credit	E x am Ho urs	Marks		Total
												Int	Ext	
I	I	Language Course (LC)-I	U24LC101	Podhu Tamil I Tamil Elakkiya Varalaru-I	6	5	1	-	-	3	3	25	75	100
	II	English Language Course (ELC)-I	U24ELC101	General English-I	6	5	1	-	-	3	3	25	75	100
	III	Core Course(CC)-I	U24CA101	Python Programming	5	4	1	-	-	5	3	25	75	100
		Core Practical(CP)-I	U24CA102P	Python Programming Lab	4	-	1	3	-	4	3	25	75	100
		Allied Course(AC)–I	U24AMA101	Statistics	3	3	-	-	-	2	3	25	75	100
		Allied Course(AC)-II	U24AMA102	Numerical Analysis	2	2	-	-	-	-	-	-	-	-
	IV	Non Major Elective			2	2	-	-	-	2	3	25	75	100
		Foundation Course–FC	U24FCCA11	Fundamentals of Computers and Programming in C	2	2	-	-	-	2	3	25	75	100
Total					30	23	4	3	-	21	-	-	-	700
II	I	Language Course(LC)-II-Tamil	U24LC202	Podhu Tamil II Tamil Elakkiya Varalaru–II	6	5	1	-	-	3	3	25	75	100
	II	English Language Course(ELC)–II	U24ELC202	General English-II	6	5	1	-	-	3	3	25	75	100

III	III	Core Course(CC)–II	U24CA203	Object Oriented Programming Concepts Using C++	5	4	1	-	-	5	3	25	75	100
		Core Practical(CP)–II	U24CA204P	C++Programming Lab	4	1	-	3	-	4	3	25	75	100
		Allied Course(AC)–II	U24AMA102	Numerical Analysis	2	2	-	-	-	2	3	25	75	100
		Allied Course(AC)–III	U24AMA203	Operations Research	3	3	-	-	-	2	3	25	75	100
	IV	Non-Major Elective-II	U24NMECA22		2	2	-	-	-	2	3	25	75	100
		Skill Enhancement Course(SEC)-I	U24SECA21	Office Automation	2	2	-	-	-	2	3	25	75	100
Total					30	24	3	3	-	23	-	-	-	800
III	I	Language Course (LC)-III	U24LC303	Podhu Tamil III	6	5	1	-	-	3	3	25	75	100
		English Language Course(ELC)–III	U24ELC303	General English-III	6	5	1	-	-	3	3	25	75	100
	III	Core Course(CC)–III	U24CA305	Data Structures and Algorithms	4	3	1	-	-	4	3	25	75	100
		Core Practical(CP)–III	U24CA306P	Data Structures and Algorithms lab	4	1	-	3	-	4	3	25	75	100
		Allied Course(AC)–IV	U24ACOM301	Financial Accounting	2	2	-	-	-	2	3	25	75	100
		Allied Practical(AP)–I	U24ACOM302P	Accounting Package Lab	2	-	-	2	-	-	-	-	-	-
	IV	Skill Enhancement Course(SEC)-II	U24SECA32	Multimedia Systems	2	2	-	-	-	2	3	25	75	100
		Skill Enhancement Course(SEC)-III	U24SECA33	Web Designing	2	2	-	-	-	2	3	25	75	100
	V	Special Course	24UGSC	Health & Wellness	2	-	-	2	-	1	-	-	-	-
		Total				30	20	3	7	-	21	-	-	-
IV	I	Language Course(LC)- IV	U24LC404	Podhu Tamil IV	6	5	1	-	-	3	3	25	75	100
	II	English Language Course(ELC)–IV	U24ELC404	General English-IV	6	5	1	-	-	3	3	25	75	100
	III	Core Course(CC)–IV	U24CA407	Programming in Java	5	4	1	-	-	5	3	25	75	100

		Core Practical(CP)–IV	U24CA408P	Programming in Java Lab	4	1	-	3	-	4	3	25	75	100
		Allied Course(AC)–V	U24ACOM403	Cost and Management Accounting	3	3	-	-	-	2	3	25	75	100
		Allied Practical(AP)–I	U24ACOM302P	Accounting Package Lab	2	-	-	2	-	2	3	25	75	100
	IV	Skill Enhancement Course(SEC)-IV	U24SECA44	Problem Solving Techniques	2	2	-	-	-	2	3	25	75	100
		Skill Enhancement Course(SEC)-V	U24SECA45	Biometrics	2	2	-	-	-	2	3	25	75	100
		Total			30	22	3	5	-	23	-	-	-	800
V	III	Core Course(CC)–V	U24CA509	Operating Systems	5	4	1	-	-	5	3	25	75	100
		Core Course(CC)–VI	U24CA510	ASP.Net Programming	5	4	1	-	-	4	3	25	75	100
		Core Course(CC)–VII	U24CA511	Computer Networks	6	4	2	-	-	5	3	25	75	100
		Core Practical(CP)–V	U24CA512P	ASP.Net Programming Lab	4	-	2	2	-	4	3	25	75	100
		Elective Course(EC)–I	U24CAE51A/ U24CAE51B/ U24CAE51C	Software Engineering/Cyber Security/Big Data Analytics	4	4	-	-	-	3	3	25	75	100
		Elective Course(EC)–II	U24CAE52A/ U24CAE52B/ U24CAE52C	Software Project Management/ Natural Language Processing/IoT and Its Applications	4	4	-	-	-	3	3	25	75	100
	IV	Environmental Studies	24UGCES	Environmental Studies	2	2	-	-	-	2	3	25	75	100
		Internship/Industrial visit/Field visit	U24CAI51	Internship/Industrial visit/Field visit	-	-	-	-	-	2	-	-	-	-
Total					30	22	6	2	-	28	-	-	-	700
VI	III	Core Course-VIII	U24CA613	Bigdata Analytics using R P Programming	6	4	1	1	-	4	3	25	75	100
		Core Practical(CP)-VI	U24CA614P	R Programming Lab	6	-	1	5	-	4	3	25	75	100
		Core Project	U24CAPW	Project with Viva-Voce/Group Project	5	5	-	-	-	5	3	25	75	100
		Elective Course(EC)–III	U24CAE63A/ U24CAE63B/ U24CAE63C	Software Metrics /Machine Learning/Cloud Computing	4	3	1	-	-	3	3	25	75	100

		Elective Course(EC)– IV	U24CAE 64A/ U24CAE64B/ U24CAE64C	Agile Project Management/ Human Computer Interaction/ Grid Computing	4	3	1	-	-	3	3	25	75	100
	IV	Value Education	24UGVED	Value Education	2	2	-	-	-	2	3	25	75	100
		Professional Competency Skill	U24PCCA61	Mobile Application Development	2	2	-	-	-	2	3	25	75	100
	V	Gender Studies	24UGGS	Gender Studies	1	1	-	-	-	1	3	25	75	100
		Extension activity		Extension activity	-	-	-	-	-	1	-	-	-	-
Total					30	20	4	6	-	25	-	-	-	800
				Value Added Course(At least one per year)	-	-	-	-	-	3*2	-	-	-	-
				GRAND TOTAL	180	-	-	-	-	141	-	-	-	4500

Credit Distribution for UG PROGRAMME-BCA

S.No	Part	Subject	No. of Courses	Total Credits
1	I	Language Course	4	12
2	II	English Language Course	4	12
3	III	Core Course Theory	8	37
4		Core Practical	6	24
5		Core Project	1	05
6		Allied Course Theory	5	10
7		Allied Course Practical	1	02
8		Elective Course	4	12
9	IV	Non-Major Elective	2	04
10		Foundation Course	1	02
12		Skill Enhancement Course	5	10
13		Internship/Industrial Visit/Field Visit	1	02
14		Environmental Studies	1	02
15		Value Education	1	02
16		Professional Competency Course	1	02
17	V	Gender Studies	1	01
18		Extension Activity	1	01
19		Health& Wellness	1	01
Total			48	141

Note:

S.NO	PARTICULARS	CIA	ESE
1.	Theory	25	75
2.	Practical	25	75
3. Separate passing minimum is prescribed for Internal and External marks			

FOR THEORY

1. The passing minimum for CIA shall be 40% out of 25 marks [i.e.10 marks]
2. The passing minimum for ESE shall be 40% out of 75 marks [i.e.30 marks]

FOR PRACTICAL

1. The passing minimum for CIA shall be 40% out of 25 marks [i.e.10marks]
2. The passing minimum for ESE shall be 40% out of 75 marks [i.e.30 marks]

NON-MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Part	Course Code	Course	Course Title
I	IV	U24NMECA11	NME-I	Fundamentals of Computer and Applications
II		U24NMECA22	NME-II	Web Designing

SKILL ENHANCEMENT COURSE (SEC) OFFERED BY THE DEPARTMENT

Semester	Part	Course Code	Course	Course Title
II	IV	U24SECA21	SEC-I	Office Automation
III	IV	U24SECA32	SEC-II	Multimedia Systems
		U24SECA33	SEC-III	Web Designing
IV	IV	U24SECA44	SEC-IV	Problem Solving Techniques
		U24SECA45	SEC-V	Biometrics

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



SUNDARAKKOTTAI, MANNARGUDI- 614016.
(For the Candidates admitted in the academic year 2024 – 2025)
DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)

Semester: V-CC-V: Operating Systems

Ins. Hrs./Week: 5

Course Credit: 5

Course Code:U24CA509

UNIT-I

(15-Hours)

Introduction: Operating System, History (1990sto2000 and beyond), Distributed computing, Parallel computation. **Process concepts:** Definition of process, Process states-Life cycle of a process, Process management – Process state transitions, Process Control Block (PCB), Process operations , Suspend and Resume, Context Switching, Interrupts-Interrupt Processing, Interrupt Classes, Inter process Communication-Signals, Message Passing.

UNIT-II: Asynchronous concurrent processes

(15-Hours)

Asynchronous concurrent processes: Mutual Exclusion- Critical Section, Mutual Exclusion Primitives, Implementing Mutual Exclusion Primitives, Peterson's Algorithm, Software Solutions to the Mutual Exclusion Problem- n-thread Mutual Exclusion-Lamports Bakery Algorithm. Semaphores– Mutual Exclusion with Semaphores, Thread synchronization with Semaphores, Counting Semaphores, Implementing Semaphores. **Concurrent programming:** Monitors, Message passing.

UNIT-III: Deadlock

(15-Hours)

Dead lock and indefinite postponement: Resource concepts, Four necessary conditions for deadlock, Deadlock prevention, Deadlock avoidance and Dijkstra's Banker's algorithm, Deadlock detection, Deadlock recovery.

UNIT-IV: Job and Processor Scheduling

(15-Hours)

Job and Processor Scheduling: scheduling levels, scheduling objectives, Scheduling criteria, Preemptive vs Non-Preemptive Scheduling, Interval timer or Interrupting clock, priorities, Scheduling Algorithms - FIFO Scheduling, RR scheduling, Quantum size, SJF scheduling, SRT scheduling, HRN scheduling, multilevel feedback queues, Fair share scheduling.

UNIT-V: Real Memory organization

(15-Hours)

Real Memory organization and Management: Memory organization, Memory management, Memory hierarchy, Memory management strategies, contiguous vs non-contiguous memory allocation, single user contiguous memory allocation, fixed partition multi programming, variable partition multi programming, Memory swapping. **Virtual Memory organization:** virtual memory basic concepts, multilevel storage organization, block mapping, paging basic concepts, segmentation, paging / segmentation systems. **Virtual Memory Management:** Demand Paging, Page replacement strategies.

Total Lecture Hours: 75

COURSE OUTCOMES

On completion of this course, students will be able to

1. Define the fundamentals of OS and identify the concepts relevant to process, process life cycle, Scheduling Algorithms, Deadlock and Memory management.
2. know the critical analysis of process involving various algorithms, an exposure to threads and semaphores

3. Have a complete study about Deadlock and its impact over OS. Knowledge of handling Deadlock with respective algorithms and measures to retrieve from deadlock.
4. Have complete knowledge of Scheduling Algorithms and its types.
5. Understand memory organization and management.

TEXT BOOK(S)

1. H.M.Deitel, Operating Systems, Third Edition, Pearson Education Asia, 2011

REFERENCE BOOK(S)

1. William Stallings, Operating System: Internals and Design Principles, Seventh Edition, Prentice-Hall of India, 2012.
2. A.Silberschatz, and P.B. Galvin., Operating Systems Concepts, Ninth Edition, John Wiley & Sons (ASIA) Pte Ltd., 2012.
3. Andrew S.Tanenbaum, Herbert Bos, Modern Operating System”, 4th edition, Pearson, 2014.
4. Remzi H.Arpaci-Dusseau and Andrea C.Arpaci-Dusseau, Operating Systems: Three Easy Pieces, 1st edition, Arpaci-Dusseau Books, 2018.
5. Abraham Silberschatz, Peter B.Galvin, Greg Gagne, Operating System Concepts, 10th edition, Wiley 2018.

E-RESOURCES

1. <https://nptel.ac.in/courses/106/105/106105214>
2. <https://www.geeksforgeeks.org/operating-systems/>
3. https://www.tutorialspoint.com/operating_system/index.htm
4. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-828-operating-system-engineering-fall-2012/>
5. <https://github.com/search?q=operating+system+lab+programs>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	1	3						3	3	2		
CO2	3	3	3	2	3						3	3	3	1	
CO3	3	3	3	2	3	1					3	3	3	2	
CO4	3	3	2	2	3						3	3	2	1	
CO5	3	2	2	2	3						3	2	2	1	1

Strong-3 Medium-2 low-1



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

SUNDARAKKOTTAI, MANNARGUDI- 614016.

(For the Candidates admitted in the academic year 2024 – 2025)

**DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: V-CC-VI: ASP.Net Programming

Ins. Hrs./Week: 5

Course Credit: 4

Course Code:U24CA510

UNIT-I: Overview of .NET framework:

(15 Hours)

Overview of .NET framework: Common Language Runtime (CLR), Framework Class Library - C# Fundamentals: Primitive types and Variables – Operators –Conditional statements-Looping statements –Creating and using Objects –Arrays–String operations.

UNIT- II: Introduction to ASP.NET

(15 Hours)

Introduction to ASP.NET – IDE – Language supported Components-Working with Web Forms–Web form standard controls: Properties and its events–HTML controls – List Controls: Properties and its events.

UNIT-III: Rich Controls

(15 Hours)

Rich Controls: Properties and its events–validation controls: Properties and its events– File Stream classes -File Modes – File Share – Reading and Writing to files –Creating, Moving, Copying and Deleting files –File uploading.

UNIT- IV: ADO.NET

(15 Hours)

ADO.NET Overview – Database Connections – Commands –Data Reader – Data Adapter- Data Sets Data Controls and its Properties–Data Binding.

UNIT-V: Grid View control

(15 Hours)

Grid View control: Deleting, editing, Sorting and Paging .XML classes–Web form to manipulate XML files-Website Security-Authentication-Authorization– Creating a Web application.

Total Lecture Hours: 75

COURSE OUTCOMES

On completion of this course, students will be able to

1. Develop working knowledge of C# programming constructs and the .NET Framework.
2. To develop a software to solve real-world problems using ASP.NET.
3. To Work On Various Controls Files.
4. To create a web application using Microsoft ADO.NET.
5. To develop web applications using XML.

TEXT BOOK(S)

1. Svetlin Nakov, VeselinKolev& Co, Fundamentals of Computer Programming with C#, Faber publication, 2019.
2. Mathew, MacDonald, The Complete Reference ASP.NET, TataMcGraw-Hill, 2015.

REFERENCE BOOK(S)

1. Herbert Schildt, The Complete Reference C# .NET, TataMcGraw-Hill, 2017.
2. Kogent Learning Solutions, C# 2012 Programming Covers .NET4.5 Black Book, Dreamtechpres, 2013.
3. AnneBoehm,JoelMurach, Murach's C# 2015, Mike Murach& Associates Inc.2016.
4. DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill,2008.
5. Matthew MacDonald, Beginning ASP.NET 4in C#2010,APRESS,2010.

WEB RESOURCES

1. <https://www.geeksforgeeks.org/introduction-to-net-framework/>
2. <https://www.javatpoint.com/net-framework>
3. <https://learn.microsoft.com/en-us/dotnet/csharp/>
4. <https://www.w3schools.com/aspnet/>
5. <https://www.tutorialspoint.com/asp.net/index.htm>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 ₀	PSO ₁	PSO ₂	PSO ₃	PSO ₄	PSO ₅
CO1	3	2	2	1	3						3	3	2		
CO2	3	3	3	2	3	1					3	3	3	2	
CO3	3	2	2	1	3	.					3	2	2	1	
CO4	3	3	3	2	3	1					3	3	3	2	1
CO5	3	2	3	2	3	1					3	3	2	2	1

Strong-3 Medium-2 low-1



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

SUNDARAKKOTTAI, MANNARGUDI- 614016.

(For the Candidates admitted in the academic year 2024 – 2025)

**DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: V-CC-VII: Computer Networks

Ins. Hrs./Week: 6

Course Credit: 5

Course Code:U24CA511

UNIT-I: Introduction

15-Hours

Introduction–Network Hardware–Software–Reference Models–OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs- Physical Layer–Theoretical Basis for Data Communication–Guided Transmission Media.

UNIT-II: Data Link Layer

15-Hours

Wireless Transmission–Communication Satellites–Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues–Error Detection and Correction.

UNIT-III: Data Link Protocols

15-Hours

Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem–Multiple Access Protocols–Bluetooth.

UNIT-IV: Network Layer

15-Hours

Network Layer – Design Issues – Routing Algorithms – Congestion Control Algorithms –IP Protocol – IP Addresses – Internet Control Protocols.

UNIT-V: Transport Layer

15-Hours

Transport Layer – Services – Connection Management - Addressing, Establishing and Releasing a Connection – Simple Transport Protocol – Internet Transport Protocols (ITP)-Network Security: Cryptography.

Total Lecture Hours: 75

COURSE OUTCOMES

On completion of this course, students will

1. To understand the basics of Computer Network architecture, OSI and TCP/IP reference model.
2. To gain knowledge on Telephone systems using wireless network.
3. To understand the concept of MAC.
4. To analyze the characteristics of Routing and Congestion control algorithms.
5. To understand network security and define various protocols such as FTP, HTTP, Telnet, DNS.

TEXT BOOK(S)

1. A.S.Tanenbaum, –Computer Networks, 4th Edition, Prentice-Hall of India, 2008.

REFERENCE BOOK(S)

1. B.A. Forouzan, –Data Communications and Networking, Tata McGraw Hill, 4th Edition, 2017
2. F. Halsall, –Data Communications, Computer Networks and Open Systems, Pearson Education, 2008
3. D.Bertsekas and R. Gallager, –Data Networks, 2nd Edition, PHI, 2008.
4. Lamarca, –Communication Networks, Tata McGraw-Hill, 2002.
5. James F. Kurose, Keith W. Ross, Computer Networking: A Top-Down Approach, 8th edition, Pearson, 2024.

WEB RESOURCES

1. https://gaia.cs.umass.edu/kurose_ross/online_lectures.htm
2. https://www.tutorialspoint.com/data_communication_computer_network/index.html
3. <https://www.coursera.org/learn/data-communication-networks>
4. <https://iti.illinois.edu/credc/videos/introduction-data-communications-and-networking-utility-computing-and-control>
5. <https://arxiv.org/abs/cs/9809048>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	1	3						3	3	2		
CO2	3	2	2	1	3						3	2	2	1	
CO3	3	3	2	2	3						3	3	2	1	
CO4	3	3	3	2	3	1					3	3	3	2	
CO5	3	3	3	2	3	1					3	3	3	2	1

Strong-3 Medium-2 low-1

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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**SUNDARAKKOTTAI, MANNARGUDI- 614016.
(For the Candidates admitted in the academic year 2024 – 2025)
DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: V-CP-V: ASP.Net Programming Lab

Ins. Hrs./Week: 4

Course Credit: 4

Course Code:U24CA512P

LIST OF PROGRAMS

1. Create an exposure of Web applications and tools.
2. Implement the Html Controls.
3. Implement the Server Controls.
4. Web application using Web controls.
5. Web application using List controls.
6. Web Page design using Rich control. Validate user input using Validation controls. Working with File concepts.
7. Web application using Data Controls.
8. Data binding with Web Controls.
9. Data binding with Data Controls.
10. Database application to perform insert, update and delete operations.
11. Database application using Data Controls to perform insert, delete, edit, paging and sorting operation.
12. Implement the XML classes.
13. Implement Authentication–Authorization.
14. Ticket reservation using ASP.NET controls.
15. Online examination using ASP.NET controls.

Total Lab Hours: 60

COURSE OUTCOMES

On completion of this course, students will be able to

1. Develop working knowledge of C# programming constructs and the .NET Framework.
2. To develop a software to solve real-world problems using ASP.NET.
3. To Work On Various Controls Files.
4. To create a web application using Microsoft ADO.NET.
5. To develop web applications using XML.

TEXT BOOK(S)

1. SvetlinNakov, VeselinKolev& Co, Fundamentals of Computer Programming with C#, Faber publication, 2019.

2. Mathew, MacDonald, The Complete Reference ASP.NET, Tata McGraw-Hill, 2015.

REFERENCE BOOK(S)

1. Herbert Schildt, The Complete Reference C# .NET, TataMcGraw-Hill, 2017.
2. Kogent Learning Solutions, C# 2012 Programming Covers .NET4.5 Black Book, Dreamtechpres, 2013.
3. AnneBoehm,JoelMurach, Murach's C# 2015, Mike Murach& Associates Inc.2016.
4. DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill,2008.
5. Matthew MacDonald, Beginning ASP.NET 4in C#2010,APRESS,2010.

WEB RESOURCES

1. https://gaia.cs.umass.edu/kurose_ross/online_lectures.htm
2. https://www.tutorialspoint.com/data_communication_computer_network/index.html
3. <https://www.coursera.org/learn/data-communication-networks>
4. <https://iti.illinois.edu/credc/videos/introduction-data-communications-and-networking-utility-computing-and-control>
5. <https://arxiv.org/abs/cs/9809048>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 ₀	PSO ₁	PSO ₂	PSO ₃	PSO ₄	PSO ₅
CO1	3	2	2	1	3						3	3	2		
CO2	3	3	3	2	3	1					3	3	3	2	
CO3	3	2	2	1	3						3	2	2	1	
CO4	3	3	3	2	3	1					3	3	3	2	1
CO5	3	2	3	2	3	1					3	3	2	2	1

Strong-3

Medium-2

low-1



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

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(For the Candidates admitted in the academic year 2024 – 2025)

**DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: V-EC-I: Software Engineering

Ins. Hrs./Week: 4

Course Credit: 3

Course Code:U24CAE51A

UNIT-I: Introduction

12-Hours

Introduction: The software engineering discipline, Programs vs Software products, Why study Software Engineering, Emergence of Software Engineering, Notable changes in software development practices, Computer systems engineering. Software Life Cycle Models: Why use a life cycle model, Classical waterfall model, iterative waterfall model, prototyping model, evolutionary model, spiral model, comparison of different life cycle models.

UNIT-II: Requirements Analysis

12-Hours

Requirements Analysis and Specification: Requirements gathering and analysis, Software Requirements Specification (SRS) Software Design: Good software design, cohesion and coupling, neat arrangement, software design approaches, object-oriented vs function-oriented design.

UNIT-III: Function Oriented Software Design

12-Hours

Function Oriented Software Design: Overview of SA/SD methodology, structured analysis, data flow diagrams (DFD's), structured design, detailed design. User-Interface design: Characteristics of a good interface; basic concepts; types of user interfaces; component based GUI development, a user interface methodology

UNIT-IV: Coding and Testing

12-Hours

Coding and Testing: Coding; code review; testing; testing in the large vs testing in the small; unit testing; black-box testing; white-box testing; debugging; program analysis tools; integration testing; system testing; some general issues associated with testing. Software Reliability and Quality Management: Software reliability; statistical testing; software quality; software equality management system; SEI capability maturity model; personal software process.

UNIT-V: Computer Aided Software Engineering:

12-Hours

Computer Aided Software Engineering: CASE and its scope; CASE environment; CASE support in software life cycle; other characteristics of CASE tools; towards second generation CASE tool; architecture of a CASE environment. Software Maintenance: Characteristic of software maintenance; software reverse engineering; software maintenance process models; estimation of maintenance cost.

Total Lecture Hours: 60

COURSE OUTCOMES

On completion of this course, students will be able to

1. Gain basic knowledge of analysis and design of systems.

2. Ability to apply software engineering principles and techniques.
3. Model a reliable and cost-effective software system.
4. Ability to design an effective model of the system.
5. Perform Testing at various levels and produce an efficient system.

TEXT BOOK(S)

1. Rajib Mall, Fundamentals of Software Engineering, Fifth Edition, Prentice-Hall of India, 2018

REFERENCE BOOK(S)

1. Richard Fairley, Software Engineering Concepts, Tata McGraw - Hill publishing company Ltd, Edition 1997.
2. Roger S. Pressman, Software Engineering, Seventh Edition, McGraw-Hill.
3. James A. Senn, Analysis & Design of Information Systems, Second Edition, McGraw-Hill International Editions.
4. Ian Sommerville, Software Engineering, 10th edition, Pearson Publication, 2015.
5. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Fundamentals of Software engineering, 2nd edition, Pearson, 2002.

WEB RESOURCES

1. <https://www.coursera.org/specializations/software-engineering>
2. <https://www.geeksforgeeks.org/software-engineering/>
3. https://www.tutorialspoint.com/software_engineering/index.htm
4. <https://ieeexplore.ieee.org/Xplore/home.jsp>
5. <https://insights.sei.cmu.edu/library/>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	3						3	2	2		
CO2	3	3	3	2	3	1					3	3	3	2	
CO3	3	3	3	2	3	1					3	3	3	2	1
CO4	3	3	2	2	3						3	3	2	2	
CO5	3	3	3	3	3	1					3	3	3	2	1

Strong-3 Medium-2 low-1

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



**SUNDARAKKOTTAI, MANNARGUDI- 614016.
(For the Candidates admitted in the academic year 2024 – 2025)
DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: V-EC-I: Cyber Security

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24CAE51B

UNIT-I: Introduction

12-Hours

Introduction to cybercrime: Classification of cybercrimes – reasons for commission of cybercrime – malware and its type – kinds of cybercrime – authentication – encryption – digital signatures – antivirus – firewall – steganography – computer forensics – why should we report cybercrime – introduction counter cyber security initiatives in India – generating secure password – using password manager-enabling two-step verification – security computer using free antivirus.

UNIT-II: Tips for buying online

12-Hours

Tips for buying online: Clearing cache for browsers – wireless LAN-major issues with WLAN-safe browsing guidelines for social networking sites – email security tips – introduction-smart phone security guidelines – purses, wallets, smart phones – platforms, setup and installation-communicating securely with a smart phone.

UNIT – III: Cyber investigation roles

12-Hours

Cyber investigation roles: Introduction – role as a cybercrime investigator – the role of law enforcement officers – the role of the prosecuting attorney – incident response: introduction-post mortem versus live forensics – computer analysis for the hacker defender program-network analysis – legal issues of intercepting Wi-Fi transmission – Wi-Fi technology – Wi-Fi RF-scanning RF – eavesdropping on Wi-Fi – fourth amendment expectation of privacy in WLAN.

UNIT – IV: Seizure of digital information

12-Hours

Seizure of digital information: introduction – defining digital evidence – digital evidence seizure methodology – factors limiting the wholesale seizure of hardware – other options for seizing digital evidence – common threads within digital evidence seizure – determining the most appropriate seizure method– conducting cyber investigations–demystifying computer/cybercrime – IP addresses – the explosion of networking – interpersonal communication.

UNIT – V: Digital forensics and analyzing data

12-Hours

Digital forensics and analyzing data: introduction – the evolution of computer forensics–phases of digital forensics-collection – examination-analysis – reporting – Cybercrime prevention: Introduction – crime targeted at a government agency.

Total Lecture Hours: 60

COURSE OUTCOMES

On completion of this course, students will be able to

1. Understand, describe, analyze and examine the basics of Cyber security concepts and its implementation in India.
2. Comprehend and demonstrate the security tips in browsers, WLAN, social networks, Email security and Smart phone. Apply the investigations in post mortem and Forensics.
3. Understand, apply and evaluate the various investigation roles and WiFi protecting mechanisms.

- Understand, illustrate and evaluate the method of seize the digital information and evidences forensics data and evaluate the forensics reports.
- Comprehend, apply and appraise the methods digital forensics with cybercrime prevention techniques

TEXT BOOK(S):

- Dr.JeetendraPande, “Introduction to Cyber Security” Published by Uttarakhand Open University, 2017.(Chapter: 1.2-6.4,9.3-12.2)
- Anthony reyes, Kevin o’shea, Jim steele, Jon R. Hansen, Captain Benjamin R. Jean Thomas Ralph, “Cyber-crime investigations” - bridging the gaps between security professionals, law enforcement, and prosecutors, 2007.(Chapter: 4, 5, 6, 7, 8, 9,10)

REFERENCE BOOK(S):

- Sebastian Klipper, “Cyber Security” EinEinblickfurWirtschaftswissenschaftlerFachmedien Wiesbaden,2015
- John G.Voller Black and Veatch, “Cyber Security” Published by John Wiley & Sons, Inc., Hoboken, New Jersey Published simultaneously in Canada ©2014.
- P.W.Singer, Allan Friedman, Cyber Security and Cyberwar: What Everyone Needs to know, Updated edition, Oxford University Press, 2022.
- William Stallings, Lawrie brown,Computer Security: Principles and Practice, 5th edition, Pearson Publication, 2023.
- William Stallings, Network security Essentials: Applications and Standards, 7th edition, Pearson Publication, 2023.

WEB RESOURCES

- https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwlu-sP_vP-
- <https://www.sans.org/security-resources/>
- <https://www.cyberdegrees.org/resources/the-big-list/>
- <https://onlinedegrees.sandiego.edu/top-cyber-security-blogs-websites/>
- <https://www.estrellamountain.edu/institutes/networking-technologies-institute/cybersecurity-resources>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	3	2					3	2	2		
CO2	3	3	3	2	3	2					3	3	3	2	
CO3	3	3	3	2	3	2					3	3	3	2	1
CO4	3	3	2	3	3	2					3	3	3	2	1
CO5	3	3	3	3	3	2					3	3	3	2	1

Strong-3 Medium-2 low-1

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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**SUNDARAKKOTTAI, MANNARGUDI- 614016.
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DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: V-EC-I: Big Data Analytics

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24CAE51C

UNIT-I: Introduction

12-Hours

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 - Map Reduce and YARN - Map Reduce Programming Model.

UNIT-II: Advanced Analytical Theory and Methods

12-Hours

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.

UNIT-III: Association Rules

12-Hours

Association Rules – Overview – A priori 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.

UNIT-IV: Streams Concepts

12-Hours

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.

UNIT-V:NoSQL Databases

12-Hours

NoSQL Databases : Schema-less Models: Increasing Flexibility for Data Manipulation-Key Value Stores-Document Stores - Tabular Stores - Object Data Stores - Graph Databases Hive – Sharding - H base - Analyzing big data with twitter - Big data for E-Commerce Big data for blogs - Review of Basic Data Analytic Methods using R.

Total Lecture Hours: 60

COURSE OUTCOMES

On completion of this course, students will be able to

1. Work with big data tools and its analysis techniques.
2. Analyze data by utilizing clustering and classification algorithms.
3. Learn and apply different mining algorithms and recommendation systems for large volumes of data.
4. Perform analytics on data streams.
5. Learn NoSQL databases and management.

TEXT BOOK(S)

1. AnandRajaramanand Jeffrey David Ullman,–Mining of Massive Datasets, Cambridge University Press,2012.

REFERENCE BOOK(S)

1. DavidLoshin,–Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques,NoSQL,andGraph,MorganKaufmann/ElsevierPublishers,2013.
2. EMC Education Services, – Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley publishers,2015.
3. Nathan Marz, Jams warrenBig data: Principles and Best Practices of Scalable Real-Time Data Systems, 1st edition, Manning Publications, 2015.
4. David Loshin, Big Data Analytics: from Strategic Planning to enterprise Integration with Tools, Techniques, NoSQL, and Graph, 1st edition, Morgan Kanfman, 2013.
5. Thomas Erl (et.al), Big Data: Concepts, Technology and Architecture, 1st Edition, Prentice Hall, 2016.

WEB RESOURCES

1. <https://www.simplilearn.com>
2. https://www.sas.com/en_us/insights/analytics/big-data-analytics.html
3. <https://cloud.google.com/architecture/big-data-analytics>
4. <https://www.simplilearn.com>
5. https://www.sas.com/en_us/insights/analytics/big-data-analytics.html

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	3						3	3	2		
CO2	3	3	3	2	3						3	3	3	2	
CO3	3	3	3	2	3	1					3	3	3	2	1
CO4	3	2	3	2	3	1					3	3	2	2	
CO5	3	2	2	2	3	1					3	3	2	1	1

Strong-3 Medium-2 low-1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016.

(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF COMPUTER APPLICATIONS

BACHELOR OF COMPUTER APPLICATIONS (BCA)



Semester: V-EC-II: Software Project Management

Ins. Hrs./Week: 4

Course Credit: 3

Course Code:U24CAE52A

UNIT-I: Introduction

12-Hours

Introduction to Competencies - Product Development Techniques -Management Skills - Product Development Life Cycle – Software Development Process and models – The SEICMM-International Organization for Standardization.

UNIT-II: Managing Domain Processes

12-Hours

Managing Domain Processes - Project Selection Models – Project Portfolio Management- Financial Processes- Selecting a Project Team - Goal and Scope of the Software Project -Project Planning - Creating the Work Breakdown Structure - Approaches to Building a WBS-Project Milestones – Work Packages – Building a WBS for Software.

UNIT-III: Tasks and Activities

12-Hours

Tasks and Activities - Software Size and Reuse Estimating – The SEICMM – Problems and Risks – Cost Estimation - Effort Measures - COCOMO: A Regression Model – COCOMO II - SLIM: A Mathematical Model – Organizational Planning – Project Roles and Skills Needed.

UNIT-IV: Project Management Resources Activities

12-Hours

Project Management Resource Activities - Organizational Form and Structure - Software Development Dependencies - Brainstorming -Scheduling Fundamentals – PERT and CPM - Leveling Resource Assignments-Map the Schedule to a Real Calendar- Critical Chain Scheduling.

UNIT-V: Quality

12-Hours

Quality: Requirements – The SEI CMM - Guidelines - Challenges –Quality Function Deployment – Building the Software Quality Assurance - Plan - Software Configuration Management: Principles - Requirements-Planning and Organizing-Tools-Benefits-Legal Issues in Software – Case Study.

Total Lecture Hours: 60

COURSE OUTCOMES

On completion of this course, students will be able to

1. Understand the principles and concepts of project management.
2. Knowledge gained to train software project managers.
3. Apply software project management methodologies.
4. Able to create comprehensive project plans.
5. Evaluate and mitigate risks associated with software development process.

TEXT BOOK(S)

1. Robert T.Futrell, Donald F.Shafer, LindaI.Safer, – Quality Software Project Management Pearson Education Asia2002.

REFERENCE BOOK(S)

1. PankajJalote, – Software Project Management in Practice, Addison Wesley 2002.
2. Hughes, – Software Project Management, Tata McGraw Hill 2004, 3rdEdition.
3. Bob Hughes, Mike Cotterell, Rajib Mall, software Project Management, 6th edition, McGraw-Hill Education, 2017.
4. Walker Royce, software Project Management, 1st edition Addison-Wesley 1998.
5. Gopalaswamy Ramesh, Managing software Projects, 1st Edition, McGraw-Hill Education, 2001.

WEB RESOURCES

1. NPTEL & MOOC courses titled Software ProjectManagement.
2. www.smartworld.com/notes/software-project-management
3. <https://www.geeksforgeeks.org/what-is-a-resource-in-project-management/>
4. <https://www.projectmanager.com/software/resource-planning>
5. <https://www.atlassian.com/project-management>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	2	1			2		2	2	1		
CO2	3	3	2	1	2	2			3		2	2	2	1	
CO3	3	3	3	2	3	2			2		3	3	2	2	
CO4	3	3	3	2	3	2			3		3	3	3	2	1
CO5	3	3	3	3	3	2			3		3	3	3	3	1

Strong-3 Medium-2 low-1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016.

(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF COMPUTER APPLICATIONS

BACHELOR OF COMPUTER APPLICATIONS (BCA)



Semester: V-EC-II: Natural Language Processing

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24CAE52B

UNIT-I: Introduction

12-Hours

Introduction : Natural Language Processing tasks in syntax, semantics, and pragmatics – Issue-Applications – The role of machine learning –Probability Basics –Information theory – Collocations - N-gram Language Models – Estimating parameters and smoothing – Evaluating language models.

UNIT-II: Word level and Syntactic Analysis

12-Hours

Word level and Syntactic Analysis: Word Level Analysis: Regular Expressions - Finite-State Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word classes – Part – of Speech Tagging. Syntactic Analysis: Context – free Grammar-Constituency – Parsing – Probabilistic Parsing.

UNIT-III: Semantic analysis and Discourse Processing

12-Hours

Semantic analysis and Discourse Processing: Semantic Analysis: Meaning Representation-Lexical Semantics – Ambiguity – Word Sense Disambiguation. Discourse Processing: cohesion - Reference Resolution – Discourse Coherence and Structure.

UNIT-IV: Natural Language Generation

12-Hours

Natural Language Generation: Architecture of NLG Systems - Generation Tasks and Representations - Application of NLG. Machine Translation: Problems in Machine Translation. Characteristics of Indian Languages – Machine Translation Approaches-Translation involving Indian Languages.

UNIT-V: Information retrieval and lexical resources

12-Hours

Information retrieval and lexical resources: Information Retrieval: Design features of Information Retrieval Systems - Classical, Non-classical, Alternative Models of Information Retrieval – valuation Lexical Resources: WorldNet – Frame Net Stemmers - POSTagger-Research Corpora SSAS.

Total Lecture Hours: 60

COURSE OUTCOME

On completion of this course, students will be able to

1. Describe the fundamental concepts and techniques of natural language processing. Explain the advantages and disadvantages of different NLP technologies and their applicability in different business situations.
2. Distinguish among the various techniques, taking in to account the assumptions, strengths, and weaknesses of each Use NLP technologies to explore and gain a broad understanding of text data.

3. Use appropriate descriptions, visualizations, and statistics to communicate the problems and their solutions. Use NLP methods to analyze sentiment of a text document.
4. Analyze large volume text data generated from arrange of real-world applications. Use NLP methods to perform topic modeling.
5. Develop robotic process automation to manage business processes and to increase and monitor their efficiency and effectiveness. Determine the framework in which artificial intelligence and the Internet of things may function, including interactions with people, enterprise functions, and environments.

TEXT BOOK(S)

1. Daniel Jurafsky, James H. Martin, – Speech & language processing, Pearson publications.
2. Allen, James. Natural language understanding. Pearson, 1995.

REFERENCE BOOK(S)

1. Pierre M. Nugues, – An Introduction to Language Processing with Perl and Prolog, Springer
2. Yue Zhang & Zhiyang, Natural Language Processing: A Machine Learning Perspective, 1st edition, Cambridge University, 2020.
3. Quantum Technologies, Natural Language Processing with python updated edition, Staten House, 2024
4. Raymond S. T. Lee, Natural Language Processing: A Textbook with python implementation, 2nd Edition Springer, 2025.
5. Christopher D. Manning Foundation of Statistical Natural Language Processing, MIT press, 1st edition, 1999.

WEB RESOURCES

1. https://en.wikipedia.org/wiki/Natural_language_processing
2. <https://www.techtarget.com/searchenterpriseai/definition/natural-language-processing-NLP>
3. <https://www.deeplearning.ai/resources/natural-language-processing/>
4. <https://www.analyticsvidhya.com/blog/2022/01/master-natural-language-processing-in-2022-with-best-resources/>
5. <https://www.ibm.com/think/topics/natural-language-processing>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	3						3	2	2		
CO2	3	3	3	2	3						3	3	3	2	
CO3	3	3	2	2	3	1			2		3	3	2	2	
CO4	3	3	3	3	3	1			2		3	3	3	2	1
CO5	3	3	3	3	3	2			2		3	3	3	3	1

Strong-3 Medium-2 low-1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016.

(For the Candidates admitted in the academic year 2024– 2025)

DEPARTMENT OF COMPUTER APPLICATIONS

BACHELOR OF COMPUTER APPLICATIONS (BCA)



Semester: V-EC-II: IoT and its Applications

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24CAE52C

UNIT-I: Introduction

12-Hours

IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.

UNIT-II: M2M to IoT

12-Hours

M2M to IoT – A Basic Perspective – Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT – An Architectural Overview–Building architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT-III: IoT Architecture

12-Hours

IoT Architecture - State of the Art – Introduction, State of the art, Architecture. Reference Model-Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture-Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views

UNIT-IV: Natural Language Generation

12-Hours

IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brown field IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management

UNIT-V: Information retrieval and lexical resources

12-Hours

Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security.

Total Lecture Hours: 60

COURSE OUTCOME

On completion of this course, students will be able to

1. Work with big data tools and its analysis techniques.

2. Analyze data by utilizing clustering and classification algorithms.
3. Learn and apply different mining algorithms and recommendation systems for large volumes of data.
4. Perform analytics on data streams.
5. Learn NoSQL databases and management.

TEXT BOOK(S)

1. Vijay Madisetti and Arshdeep Bahga, –Internet of Things: (A Hands – on Approach), Universities Press(INDIA) Private Limited 2014, 1st Edition.

REFERENCE BOOK(S)

1. Michael Miller, –The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World, kindle version.
2. Francis da Costa, –Rethinking the Internet of Things: A Scalable Approach to Connecting Everything, A press Publications 2013, 1st Edition,.
3. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice 4.. Cuno Pfister, –Getting Started with the Internet of Things, O ‘Reilly Media 2011.
4. maciej Kranz, Building the Internet of Things, 1st edition, Wiley, 2016.
5. Peter waher, Learning Internet of Things, 2nd edition, Packt publishing, 2018.

WEB RESOURCES

1. <https://www.simplilearn.com>
2. <https://www.javatpoint.com>
3. <https://www.w3schools.com>
4. https://mrcet.com/downloads/digital_notes/EEE/IoT%20&%20Applications%20Digital%20Notes.pdf
5. <https://mindster.com/mindster-blogs/internet-of-things-and-its-applications/>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	3						3	3	2		
CO2	3	3	3	2	3						3	3	3	2	
CO3	3	3	3	2	3	1					3	3	3	2	1
CO4	3	2	3	2	3	1					3	3	2	2	
CO5	3	2	2	2	3	1					3	3	2	1	1

Strong-3 Medium-2 low-1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016.

(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF COMPUTER APPLICATIONS

BACHELOR OF COMPUTER APPLICATIONS (BCA)



Semester: V-Environmental Studies

Ins. Hrs./Week: 2

Course Credit: 2

Course Code:24UGCES

UNIT-I

The Multidisciplinary nature of environmental studies Definition, scope and importance. Need for public awareness

UNIT-II: Natural Resources

Renewable and non-renewable resources: Natural resources and associated problems.

- a) Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
 - b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
 - c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
 - e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
 - f) Land resources: Land as resources, land degradation, man induced Landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
 - Equitable use of resources for sustainable life styles.

UNIT-III: Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession.
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem:-
 - a. Forest ecosystem
 - b. Grass land ecosystem
 - c. Desert ecosystem
 - d. Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-IV: Bio diversity and its conservation

Introduction–Definition: Genetic, species and ecosystem diversity

- Bio geographical classification of India
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
- Bio diversity at global, National and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Biological Diversity Act 2002/BDRules, 2004

UNIT-V: Environmental Pollution

Definition, Causes, effects and control measures of:

- a. Air Pollution
 - b. Water Pollution
 - c. Soil Pollution
 - d. Marine Pollution
 - e. Noise pollution
 - f. Thermal Pollution
 - g. Nuclear hazards
- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
 - Role of an individual in prevention of pollution
 - Pollution case studies
 - Disaster management: floods, earth quake, cyclone and landslides.
 - Ill-Effects of Fireworks: Firework and Celebrations, Health Hazards, Types of Fire, Firework and Safety

UNIT-VI: Social Issues and the Environment

- From Unsustainable to Sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, water shed management.
- Resettlement and rehabilitation of people; its problems and concerns. Case studies
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.

- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wild life Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental legislation
- Public awareness.

UNIT-VII: Human Population and the Environment

- Population growth, variation among nations.
- Population explosion–Family Welfare Programmes
- Environment and human health
- Human Rights-Value Education
- HIV/ AIDS-Women and Child Welfare
- Role of Information Technology in Environment and human health
- Case studies.

UNIT-VIII: Field Work

Visit to a local area to document environmental asset river/forest grassland/hill/mountain

COURSE OUTCOMES:

- Understand the environmental importance including interactions across local to global scales.
- The learners to update and analyze environmental relationships and interactions of environmental components
- The student to gain knowledge on importance of natural resources in a systematic way.
- The course content is introduce the concept of renewable and non-renewable energy resources and its scenario in India and at global level
- The students will know the relationship between biodiversity and ecosystem functions, direct and indirect values of biodiversity resources and their bio prospecting opportunities.
- The learners can gain awareness related on environmental pollution, causes and pollution control with case studies.
- Student to obtain the environmental ethics and gain knowledge about the sustainable development.
- Learners should realize the environmental legislation and policies of national and international regime and know the regulations applicable to industries and other organizations with significant Environmental aspects.

REFERENCE BOOK(S)

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Public Ltd Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt Ltd, Ahmedabad – 380013, India, E-mail: mapin@icenet.net(R)
3. Brunner R.C. 1989, Hazardous Waste Incineration, McGraw Hill Inc 480p

4. Clark R.S. Marine Pollution, Clarendon Press Oxford (TB)
5. Cunningham, W.P. Cooper, T.H. Gorhani E & Hepworth, M.T. 2001.
6. De A.K. Environmental Chemistry, Wiley Eastern Ltd
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford University Press 473p.
9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge University Press 1140 p.
11. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub. House, Delhi 284 p.
12. McKinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition 639 p.
13. Mhaskar A.K. Matter Hazardous, Techno-Science Publications (TB)
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Co. USA. 574p
16. Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt Ltd 345 p.
17. Sharma B.K. 2001 Environmental chemistry Goel Publ House, Meerut.
18. Survey of the Environment, The Hindu (M).
19. Townsend C. Harper, J and Michael Begon, Essentials of Ecology, Blackwell science (TB)
20. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R).
21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).
22. Wagner K.D. 1998 Environmental Management. W.B. Saunders Co. Philadelphia USA 499 p
- (M) Magazine (R) Reference (TB) Textbook
23. <http://nbaindia.org/uploaded/Biodiversityindia/Legal/33%20Biological%20Diversity%20Rules,%202004.pdf>.

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	1			3	3	2	1		1				
CO2	2	3	2	1		3	3	2	1		1	1			
CO3	2	2	1			3	3	2	1		1				
CO4	2	2	2			3	3	2	1		1	1			
CO5	2	3	2	1		3	3	2	1		1	1			

Strong-3

Medium-2

low-1

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



**SUNDARAKKOTTAI, MANNARGUDI- 614016.
(For the Candidates admitted in the academic year 2024 – 2025)
DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: VI-CC-VIII: Data Analytics Using R Programming

Ins. Hrs./Week:6

Course Credit: 4

Course Code:U24CA613

UNIT-I - Introduction

18-Hours

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 - Map Reduce and YARN - Map Reduce Programming Model.

UNIT-II -Control Structures and Vectors

18-Hours

Control Structures And Vectors-Control structures, functions, scoping rules, dates and times, Introduction to Functions, preview of Some Important R Data Structures, Vectors, Character Strings, Matrices, Lists, Data Frames, Classes Vectors: Generating sequences, Vectors and sub scripts, Extracting elements of a vector using subscripts, Working with logical subscripts, Scalars, Vectors, Arrays, and Matrices, Adding and Deleting Vector Elements, Obtaining the Length of a Vector, Matrices and Arrays as Vectors Vector Arithmetic and Logical Operations, Vector Indexing, Common Vector Operations.

UNIT-III-Lists

18-Hours

LISTS- Lists: Creating Lists, General List Operations, List Indexing Adding and Deleting List Elements, Getting the Size of a List, Extended Example: Text Concordance Accessing List Components and Values Applying Functions to Lists, Data Frames, Creating Data Frames, Accessing Data Frames, Other Matrix-Like Operations.

UNIT-IV-Factors and Tables

18-Hours

FACTORS AND TABLES-Factors and Levels, Common Functions Used with Factors, Working with Tables, Matrix/Array – Like Operations on Tables, Extracting a Sub table, Finding the Largest Cells in a Table, Math Functions, Calculating a Probability, Cumulative Sums and Products, Minima and Maxima, Calculus, Functions for Statistical Distributions R Programming.

UNIT-V-Object - Oriented Programming

18-Hours

OBJECT - ORIENTED PROGRAMMING S3Classes, S3Generic Functions, Writing S3Classes, Using Inheritance, S4Classes, Writing S4Classes, Implementing a Generic Function on an S4Class, visualization, Simulation, code profiling, Statistical Analysis with R, data manipulation.

Total Lecture Hours: 90

COURSE OUTCOMES

On completion of this course, students will be able to

1. Work with big data tools and its analysis techniques.
2. Analyze data by utilizing clustering and classification algorithms.
3. Learn and apply different mining algorithms and recommendation systems for large volumes of data.

4. Perform analytics on data streams.
5. Learn No SQL data bases and management.

TEXT BOOK(S)

1. RogerD.Peng,||RProgrammingforDataScience–,2012
2. Norman Matloff, The Art of R Programming - A Tour of Statistical Software Design||, 2011

REFERENCE BOOK(S)

1. Garrett Grolemond, Hadley Wickham, Hands On Programming with R: Write Your Own Functions and Simulations||, 1st Edition 2014.
2. Venables, W. N.,and Ripley,Sprogramming–,Springer,2000.
3. VigneshPrajapati, Data Analytics with R: A Practical Approach for Data Science, Packet Publishing, 2013.
4. Nina Zumel, John Mount, Practical Data science with R, Manning Publications, 2019. isualize and Model data, O'Reily Media, 2nd edition 2023.
5. Foster provost, Tom Fawcett, Data science for Business: what you need to know about data mining and Data Analytic Thinking, O'Reily Media, 2nd edition 2023.

WEB RESOURCES

1. <https://www.simplilearn.com>
2. <https://userpilot.com/blog/resources-for-data-analyst/>
3. <https://www.nobledesktop.com/learn/data-analytics/free-resources-and-tutorials>
4. <https://roadmap.sh/data-analyst>
5. <https://www.udemy.com/topic/data-analysis/?srsltid=AfmBOooReoFMMYPf3ZR44xmwvpXjCZrfkVGJj8vC412sTocSsabnmEx8>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	3						3	3	2		
CO2	3	3	3	2	3						3	3	3	2	
CO3	3	3	3	2	3	1					3	3	3	2	1
CO4	3	2	3	2	3	1					3	3	2	2	
CO5	3	2	2	2	3	1					3	3	2	1	1

Strong-3

Medium-2

low-1



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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(For the Candidates admitted in the academic year 2024– 2025)

**DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: VI-CP-VI: R Programming Lab

Ins. Hrs./Week:6

Course Credit: 4

Course Code:U24CA614P

LIST OF PROGRAMS

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending up on user's choice.
2. Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
3. Write a program to find list of even numbers from 1 to n using R-Loops.
4. Create a function to print squares of numbers in sequence.
5. Write a program to join columns and rows in a data frame using cbind() and rbind() in R.
6. Implement different String Manipulation functions in R.
7. Implement different data structures in R (Vectors, Lists, Data Frames)
8. Write a program to read a csv file and analyze the data in the file in R.
9. Create pie chart and bar chart using R.
10. Create a data set and do statistical analysis on the data using R.
11. Program to find factorial of the given number using recursive function
12. Write a R program to count the number of even and odd numbers from array of N numbers.

Total Lab Hours: 90

COURSE OUTCOMES

On completion of this course, students will be able to

1. Acquire programming skills in core R Programming.
2. Acquire Object-oriented programming skills in R Programming.
3. Develop the skill of designing graphical-userinterfaces(GUI) in R Programming.
4. Acquire R Programming skills to move into specific branches.

TEXT BOOK(S)

1. Roger D. Peng, R Programming for Data Science, 2012
2. Norman Matloff, The Art of R Programming - A Tour of Statistical Software Design, 2011

REFERENCE BOOK(S)

1. Garrett Grolmund, Hadley Wickham, Hands On Programming with R: Write Your Own Functions and Simulations, 1st Edition, 2014.
2. Venables, W. N., and Ripley, Sprogramming-, Springer, 2000.
3. VigneshPrajapati, Data Analytics with R: A Practical Approach for Data Science, Packet Publishing, 2013.
4. Nina Zumel, John Mount, Practical Data science with R, Manning Publications, 2019. isualize and Model data, O'Reily Media, 2nd edition 2023.
5. Foster provost, Tom Fawcett, Data science for Business: what you need to know about data mining and Data Analytic Thinking, O'Reily Media, 2nd edition 2023.

WEB RESOURCES

1. <https://www.simplilearn.com>
2. <https://userpilot.com/blog/resources-for-data-analyst/>
3. <https://www.nobledesktop.com/learn/data-analytics/free-resources-and-tutorials>
4. <https://roadmap.sh/data-analyst>
5. <https://www.udemy.com/topic/data-analysis/?srsltid=AfmBOooReoFMMYPf3ZR44xmwvpXjCZrfkVGIj8vC412sTocSsabnmEx8>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	3						3	3	2		
CO2	3	3	3	2	3						3	3	3	2	
CO3	3	3	3	2	3	1					3	3	3	2	1
CO4	3	2	3	2	3	1					3	3	2	2	
CO5	3	2	2	2	3	1					3	3	2	1	1

Strong-3

Medium-2

low-1

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DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: VI-EC-III: Software Metrics

Ins. Hrs./Week: 4

Course Credit: 3

Course Code:U24CAE63A

UNIT-I: Fundamentals of Measurement

12-Hours

Fundamentals of Measurement: Need for Measurement: Measurement in Software Engineering, Scope of Software Metrics, The Basics of measurement: The representation al theory of measurement, Measurement and models, Measurement scales and Scale types, meaning fullness in measurement.

UNIT-II: A Goal-Based Framework for Software Measurement

12-Hours

A Goal-Based Framework for Software Measurement: Classifying software measures, Determining what to Measure, Applying the framework, Software measurement validation, Performing Software Measurement Validation Empirical investigation: Principles of Empirical Studies, Planning Experiments, Planning case studies as quasi-experiments, Relevant and Meaningful Studies.

UNIT-III: Software Metrics Data Collection

12-Hours

Software Metrics Data Collection: Defining good data, Data collection for incident reports, How to collect data, Reliability of data collection Procedures Analyzing software measurement data: Statistical distributions and hypothesis testing, Classical data analysis techniques, Examples of simple analysis techniques.

UNIT-IV: Measuring internal product attributes

12-Hours

Measuring internal product attributes: Size Properties of Software Size, Code size, Design size, Requirements analysis and Specification size, Functional size measures and estimators, Applications of size measures Measuring internal product attributes: Structure: Aspects of Structural Measures, Control flow structure of program units, Design-level Attributes, Object-oriented Structural attributes and measures.

UNIT-V: Measuring External Product Attributes

12-Hours

Measuring External Product Attributes: Modeling software quality, measuring aspects of quality, Usability Measures, Maintainability measures, Security Measures. Software Reliability: **Measurement** and Prediction: Basics of reliability theory, The software reliability problem, Parametric reliability growth models, Predictive accuracy.

Total Lecture Hours: 60

COURSE OUTCOMES

On completion of this course, students will be able to

1. Understand various fundamentals of measurement and software metrics.
2. Identify framework and analysis techniques for software measurement.
3. Apply internal and external attributes of software product for effort estimation.

4. Use appropriate analytical techniques to interpret software metrics data and derive meaningful insights.
5. Recommend reliability models for predicting software quality.

TEXT BOOK(S)

1. Software Metrics A Rigorous and Practical Approach, Norman Fenton, James Bieman, Third Edition, 2014

REFERENCE BOOK(S)

1. Software metrics, Norman E,Fenton and Shari Lawrence Pfleeger, International Thomson Computer Press,1997.
2. Metric and models in software quality engineering, Stephen H.Kan, Second edition,2002, Addison Wesley Professional.
3. Practical Software Metrics for Project Management and Process Improvement, Robert B.Grady, 1992, Prentice Hall.
4. software Metrics: A Rigorous and Practical approach, Norman Fenton, James Bieman, 3rd edition, CRC Press, 2014.
5. Metrics and Models in software quality engineering, Stephen H.Kan, 2nd Edition, Addison-wesly.

WEB RESOURCES

1. <https://lansa.com/blog/general/what-are-software-metrics-how-can-i-measure-these-metrics/>
2. <https://stackify.com/track-software-metrics/>
3. <https://www.geeksforgeeks.org/software-measurement-and-metrics/>
4. <https://www.geeksforgeeks.org/web-metrics-in-software-testing/>
5. <https://in.mathworks.com/discovery/software-metrics.html>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	2						2	2	1		
CO2	3	3	2	2	3						3	3	2	1	
CO3	3	3	3	2	3	1					3	3	3	2	
CO4	3	3	3	3	3	1					3	3	3	2	1
CO5	3	3	2	3	3	1					3	3	2	2	1

Strong-3

Medium-2

low-1



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

SUNDARAKKOTTAI, MANNARGUDI- 614016.

(For the Candidates admitted in the academic year 2024 – 2025)

**DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: VI-EC-III: Machine Learning

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24CAE63B

UNIT-I: INTRODUCTION

12-Hours

Introduction Machine Learning: Difference between AI, Machine Learning and Big data. Supervised and unsupervised learning, parametric vs non-parametric models, parametric models for classification and regression-Linear Regression, Logistic Regression, Naïve Bayes classifier, simple non-parametric classifier-K-nearest neighbour, support vector machines

UNIT-II: Neural networks and genetic algorithms

12-Hours

Neural networks and genetic algorithms: Neural Network Representation –Problems –Perceptrons – Multilayer Networks and Back Propagation Algorithms– Advanced Topics–Genetic Algorithms– Hypothesis Space Search–Genetic Programming–Models of Evaluation and Learning.

UNIT-III: Bayesian and computational learning

12-Hours

Bayesian and computational learning: Bayes Theorem–Concept Learning–Maximum Likelihood– Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier –Bayesian Belief Network–EM Algorithm –Probability Learning–Sample Complexity– Finite and Infinite Hypothesis Spaces –Mistake Bound Model.

UNIT-IV: Instant based learning

12-Hours

Instant based learning: K-Nearest Neighbour Learning–Locally weighted Regression– Radial Basis Functions – Case Based Learning.

UNIT-V: Advanced learning

12-Hours

Advanced learning: Recommendation systems–opinion mining, sentiment analysis. Learning Sets of Rules– Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules–Induction on Inverted Deduction – Inverting Resolution–Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm–Reinforcement Learning – Task –Q-Learning – Temporal Difference Learning..

Total Lecture Hours: 60

COURSE OUTCOMES

On completion of this course, students will be able to

1. Appreciate the importance of visualization in the data analytics solution.
2. Apply structured thinking to unstructured problems.
3. Understand a very broad collection of machine learning algorithms and problems.
4. Learn algorithmic topics of machine learning and mathematically deep
5. Develop an appreciation for what is involved in learning from data.

TEXT BOOK(S)

1. Tom M. Mitchell, —Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.
2. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville. "Deep learning" 2015, MIT Press

REFERENCE BOOK(S)

1. Ethem Alpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
2. Stephen Marsland, —Machine Learning: An Algorithmic Perspective, CRC Press, 2009.
3. Kevin P. Murphy, Machine Learning: A Probabilistic Perspective, 1st edition, MIT Press, 2012.
4. Christopher M. Bishop, Pattern Recognition and Machine Learning, 1st edition, Springer, 2016.
5. Sebastian Raschka and Vahid Mirjalili, Python Machine Learning, packet publishing, 3rd edition, 2019.

WEB RESOURCES

1. <https://www.tensorflow.org/resources/learn-ml>
2. <https://www.geeksforgeeks.org/machine-learning/>
3. <https://developers.google.com/machine-learning>
4. <https://www.kaggle.com/general/196686>
5. <https://www.tensorflow.org/resources/learn-ml>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	3						3	2	2		
CO2	3	3	3	2	3						3	3	3	2	
CO3	3	3	3	2	3	1					3	3	3	2	1
CO4	3	3	3	3	3	1					3	3	3	3	1
CO5	3	2	2	2	3	1					3	2	3	2	1

Strong-3 Medium-2 low-1

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



**SUNDARAKKOTTAI, MANNARGUDI- 614016.
(For the Candidates admitted in the academic year 2024– 2025)
DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: VI-EC-III: Cloud Computing

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24CAE63C

UNIT-I: Introduction to Cloud Computing

12-Hours

Introduction to Cloud Computing: Definition of Cloud Computing –Characteristics of Cloud Computing – Cloud Models – Cloud Service Examples–Cloud-based Services and Applications. Cloud Concepts and Technologies: Virtualization – Load balancing –Scalability and Elasticity – Deployment – Replication – Monitoring –Software Defined Networking–Network Function Virtualization–MapReduce – Identity and Access Management–Service Level Agreements–Billing.

UNIT-II: Cloud Services & Platforms

12-Hours

Compute Services: Amazon Elastic Computer Cloud - Google Compute Engine-Windows Azure Virtual Machines Storage Services: Amazon Simple Storage Service-Google Cloud Storage-Windows Azure Storage Database Services: Amazon Relational Data Store - Amazon Dynamo DB - Google Cloud SQL - Google Cloud Data Store - Windows Azure SQL Database-Windows Azure Table Service Application Services: Application Runtimes and Frameworks – Queuing Services – Email Services-Notification Services – Media Services Content Delivery Services: Amazon Cloud Front – Windows Azure Content Delivery Network Analytics Services: Amazon Elastic MapReduce - Google MapReduce Service-Google Big Query Windows Azure HD Insight Deployment and Management Services: Amazon Elastic Bean stack – Amazon Cloud Formation Identity and Access Management Services: Amazon Identity and Access Management –Windows Azure Active Directory Open Source Private Cloud Software: Cloud Stack– Eucalyptus - Open Stack.

UNIT-III: Cloud Application Design

12-Hours

Cloud Application Design: Introduction – Design Consideration for Cloud Applications–Scalability–Reliability and Availability–Security – Maintenance and Upgradation – Performance – Reference Architectures for Cloud Applications–Cloud Application Design Methodologies: Service Oriented Architecture(SOA), Cloud Component Model, IaaS, PaaS and SaaS Services for Cloud Applications, Model View Controller (MVC), RESTful Web Services –Data Storage Approaches: Relational(SQL) Approach, Non-Relational(NoSQL) Approach.

UNIT-IV: Cloud Application Bench marking and Tuning

12-Hours

Cloud Application Bench marking and Tuning: Introduction to Bench marking – Steps in Bench marking – Workload Characteristics –Application Performance Metrics–Design Consideration for Benchmarking Methodology–Bench marking Tools and Types of Tests–Deployment Prototyping. Cloud Security: Introduction – CSA Cloud Security Architecture – Authentication – Single Sign On (SSO)–Authorization–Identity and Access Management – Data Security: Securing data at rest, securing data in motion –Key Management–Auditing.

UNIT-V: Case Studies

12-Hours

Case Studies: Cloud Computing for Healthcare – Cloud Computing for Energy Systems - Cloud Computing for Transportation Systems – Cloud Computing for Manufacturing Industry-Cloud Computing for Education.

Total Lecture Hours: 60

COURSE OUTCOMES

On completion of this course, students will be able to

1. Understand the fundamental concepts and Technologies in Cloud Computing.
2. Able to understand various cloud service types and their uses and pitfalls.
3. Able to understand Cloud Architecture and Application design.
4. Understand the various aspects of application design, bench marking and security in the Cloud.
5. Understand various Case Studies in Cloud Computing.

TEXT BOOK(S)

1. ArshdeepBahga, Vijay Madiseti, Cloud Computing – A Hands On Approach, Universities Press(India)Pvt.Ltd.,2018

REFERENCE BOOK(S)

1. AnthonyTVelte,Toby J Velte, Robert Elsenpeter, Cloud Computing : A Practical Approach, Tata McGraw-Hill,2013.
2. Barrie Sosinsky, Cloud Computing Bible,WileyIndiaPvt.Ltd.,2013.
3. David Crookes, Cloud Computing in Easy Steps, Tata McGraw Hill,2015.
4. Dr.KumarSaurabh, Cloud Computing, Wiley India, Second Edition 2012.
5. Dan C.Marinescu, Cloud Computing: Theory and Practice, 2nd edition, Elsevier/Morgan.

WEB RESOURCES

1. https://en.wikipedia.org/wiki/Cloud_computing
2. https://link.springer.com/chapter/10.1007/978-3-030-34957-8_7
3. <https://webobjects.cdw.com/webobjects/media/pdf/solutions/cloud-computing/121838-CDW-Cloud-Computing-Reference-Guide.pdf>
4. <https://www.ibm.com/think/topics/cloud-computing>
5. <https://www.geeksforgeeks.org/cloud-computing/>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	3						3	2	2		
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CO3	3	3	3	2	3	1					3	3	3	2	
CO4	3	3	3	3	3	1					3	3	3	3	1
CO5	3	2	2	2	3	1					3	2	2	2	1

Strong-3

Medium-2

low-1

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



**SUNDARAKKOTTAI, MANNARGUDI- 614016.
(For the Candidates admitted in the academic year 2024 – 2025)
DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: VI-EC-IV: Agile Project Management

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24CAE64A

UNIT-I: Introduction

12-Hours

Introduction: Modernizing Project Management: Project Management Needed a Makeover – Introducing Agile Project Management. Applying the Agile Manifesto and Principles: Understanding the Agile manifesto – Outlining the four values of the Agile manifesto –Defining the 15 Agile Principles – Adding the Platinum Principles –Changes as a result of Agile Values–The Agile litmus test. Why Being Agile Works Better: Evaluating Agile benefits – How Agile approaches beat historical approaches – Why people like being Agile.

UNIT-II: Being Agile

12-Hours

Being Agile:Agile Approaches: Diving under the umbrella of Agile approaches –Reviewing the Big Three: Lean, Scrum, Extreme Programming-Summary Agile Environments in Action: Creating the physical environment – Low – tech communicating – High – tech communicating–Choosing tools. Agile Behaviours in Action: Establishing Agile roles–Establishing new values–Changing team philosophy.

UNIT-III: Agile Planning and Execution

12-Hours

Agile Planning and Execution Defining the Product Vision and Roadmap: Agile planning–Defining the product vision – Creating a product roadmap – Completing the product backlog. Planning Releases and Sprints: Refining requirements and estimates –Release planning–Sprint planning. Working Throughout the Day: Planning your day–Tracking progress– Agile roles in the sprint – Creating shippable functionality – The end of the day. Show casing Work, Inspecting and Adapting: The sprint review – These print retrospective .Preparing for Release: Preparing the product for deployment (there leases print)–Preparing the operational support–Preparing the organization for product deployment - Preparing the marketplace for product deployment.

UNIT-IV: Agile Management

12-Hours

Agile Management Managing Scope and Procurement: What's different about Agile scope management – Managing Agile scope–What's different about Agile procurement–Managing Agile procurement. Managing Time and Cost: What's different about Agile time management–Managing Agile schedules – What's different about Agile cost management–Managing Agile budgets. Managing Team Dynamics and Communication: What's different about Agile team dynamics– Managing Agile team dynamics– What's different about Agile communication – Managing Agile communication. Managing Quality and Risk: What's different about Agile quality – Managing Agile quality – What's different about Agile risk management– Managing Agile risk.

UNIT-V: Implementing Agile Building a Foundation

12-Hours

Implementing Agile Building a Foundation: Organizational and individual commitment –Choosing the right pilot team members– Creating an environment that enables Agility–Support Agility initially and over time. Being a Change Agent: Becoming Agile requires change–why change doesn't happen on its own – Platinum Edge's Change Roadmap –Avoiding pitfalls–Signs your changes are slipping.Benefits, Factors for Success and Metrics: Ten key benefits of Agile project management – Ten key factors for project success – Ten metrics for Agile Organizations.

Total Lecture Hours: 60

COURSE OUTCOMES

On completion of this course, students will be able to

1. Understanding of software design, software technologies and APIs using Agile Management.
2. Understanding of Agile development and testing techniques.
3. Understanding about Agile Planning and Execution using Sprint.
4. Understanding of Agile Management Design, scope, Procurement, managing Time and Cost and Quality Check.
5. Analysing of Agile development and testing techniques.

TEXT BOOK(S)

1. Mark C. Layton, Steven J. Ostermiller, Agile Project Management for Dummies, 2nd Edition, Wiley India Pvt. Ltd., 2018.
2. Jeff Sutherland, Scrum – The Art of Doing Twice the Work in Half the Time, Penguin, 2014.

REFERENCE BOOK(S)

1. Mark C. Layton, David Morrow, Scrum for Dummies, 2nd Edition, Wiley India Pvt. Ltd., 2018.
2. Mike Cohn, Succeeding with Agile – Software Development using Scrum, Addison-Wesley Signature Series, 2010.
3. Alex Moore, Agile Project Management, 2020.
4. Alex Moore, Scrum, 2020.
5. Andrew Stellman and Jennifer Greene, Learning Agile: Understanding Scrum, XP, Lean, and Kanban, Shroff O'Reilly, First Edition, 2014.

WEB RESOURCES

1. www.agilealliance.org/resources
2. <https://asana.com/resources/agile>
3. <https://www.pmi.org/learning/agile>
4. <https://www.atlassian.com/agile/project-management>
5. <https://www.saviom.com/blog/how-to-manage-resources-in-agile-project-management/>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	3	1			2		3	2	2		
CO2	3	3	3	2	3	1			2		3	3	3	2	
CO3	3	3	3	2	3	1			3		3	3	3	2	
CO4	3	3	3	3	3	2			3		3	3	3	3	1
CO5	3	3	3	3	3	2			2		3	3	3	2	1

Strong-3

Medium-2

low-1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016.

(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF COMPUTER APPLICATIONS

BACHELOR OF COMPUTER APPLICATIONS (BCA)



Semester: VI-EC-IV: Human Computer Interaction

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24CAE64B

UNIT-I: Foundations of HCI

12-Hours

Foundations of HCI: The Human: I/O channels–Memory Reasoning and problem solving; The Computer: Devices–Memory–processing and networks; Interaction: Models– frameworks–Ergonomics–styles– Elements – interactivity - Paradigms – Case Studies.

UNIT-II: Design & Software Process

12-Hours

Design & Software Process: Interactive Design: Basics– process–scenarios - Navigation: screen design Iteration and prototyping –HCI in software process: Software life cycle – usability engineering – Prototyping in practice–design rationale. Design rules: principles, standards, guidelines, rules. Evaluation Techniques–Universal Design.

UNIT-III: Models and Theories

12-Hours

Models and Theories: HCI Models: Cognitive models:-Socio-Organizational issues and stake holder requirements Communication and collaboration models-Hypertext, Multimedia and WWW.

UNIT-IV: Mobile HCI

12-Hours

Mobile HCI: Mobile Eco system: Platforms, Application frameworks - Types of Mobile Applications: Widgets, Applications, Games Mobile Information Architecture, Mobile2.0, Mobile Design: Elements of Mobile Design, Tools. – Case Studies.

UNIT-V: Web Interface Design

12-Hours

Web Interface Design: Designing Web Interfaces – Drag &Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow –Case Studies.

Total Lecture Hours: 60

COURSE OUTCOMES

On completion of this course, students will be able to

1. Understand the fundamentals of HCI.
2. Understand the design and software process technologies.
3. Understand HCI models and theories.
4. Understand Mobile Ecosystem, types of Mobile Applications, mobile Architecture and design.
5. Understand the various types of Web Interface design.

TEXT BOOK(S)

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, Human-Computer Interaction, 3rd Edition, Pearson Education, 2004 (UNITI,II&III)

2. Brian Fling,—Mobile Design and Development, 1st Edition, OReilly Media Inc., 2009 (UNIT–IV)
3. Bill Scott and Theresa Neil, — Designing Web Interfaces, First Edition, OReilly, 2009.(UNIT-V)

REFERENCE BOOK(S)

1. Shneiderman, –Designing the User Interface: Strategies for Effective Human-Computer Interaction, 5th Edition, Pearson Education.
2. Jenny Preece, Helen Sharp, Yvonne Rogers, Interaction Design: Beyond Human-Computer Interaction, 5th edition, Wiley,2023.
3. Scott Mackenzie, Human computer interaction: An Empirical Research Perspective, 2nd edition, Morgan Kaufmann, 2023.
4. Ben shneiderman, Catherine Plaisant, Maxine Chen, Steven Jacobs, NikasElmqvist, Designing the user Interface: Strategies for effective Human-Computer Interaction, 6th edition, Pearson, 2017.
5. Don Norman, The Design of everyday Things, Basic books,2013.

WEB RESOURCES

1. <https://www.interaction-design.org/literature/topics/human-computer-interaction>
2. https://link.springer.com/10.1007/978-0-387-39940-9_192
3. https://en.wikipedia.org/wiki/Human%E2%80%93computer_interaction
4. <https://www.hcibook.com/hci2e/links.html>
5. <https://www.hcibook.com/hci2e/resource.html>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
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CO2	2	3	2	1	2	1	1	1	2	2	3	3	2	1	2
CO3	3	2	2	1	1	1	1	1	2	1	3	2	2	1	1
CO4	2	3	3	2	3	1	1	1	2	2	3	3	3	2	3
CO5	2	2	3	2	3	1	1	1	3	2	2	3	3	2	3

Strong-3 Medium-2 low-1

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



**SUNDARAKKOTTAI, MANNARGUDI- 614016.
(For the Candidates admitted in the academic year 2024– 2025)
DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)**

Semester: VI-EC-IV: Grid Computing		
Ins. Hrs./Week: 4	Course Credit: 3	Course Code: U24CAE64C

UNIT-I: Introduction **12-Hours**
Introduction: Early Grid Activity, Current Grid Activity, Overview of Grid Business areas, Grid Applications, Grid Infrastructures.

UNIT-II: Grid computing organization **12-Hours**

Grid Computing organization and their Roles: Organizations Developing Grid Standards, and Best Practice Guidelines, Global Grid Forum (GCF), Organization Developing Grid Computing Tool kits and Framework, Organization and building and using grid based solutions to solve computing, commercial organization building and Grid Based solutions.

UNIT-III: Grid Computing Anatomy **12-Hours**

Grid Computing Anatomy: The Grid Problem, The conceptual of virtual organizations, Grid Architecture and relationship to other distributed technology.

UNIT-IV: The Grid Computing Road Map **12-Hours**

The Grid Computing Road Map: Autonomic computing, Business on demand and infrastructure virtualization, Service-Oriented Architecture and Grid, Semantic Grids.

UNIT-V: Merging the Grid services Architecture **12-Hours**

Merging the Grid services Architecture with the Web Services Architecture: Service-Oriented Architecture, Web Service Architecture, XML messages and Enveloping, Service message description Mechanisms, Relationship between Web Services and Grid Services, Web services Interoperability and the role of the WS-I Organization.

Total Lecture Hours: 60

COURSE OUTCOMES

On completion of this course, students will be able to

1. To understand the basic elements and concepts of Grid computing
2. To understand the Grid computing toolkits and framework.
3. To understand the concepts of Anatomy of Grid Computing.

4. To understand the concept of service oriented architecture.
5. To Gain knowledge on grid and web service architecture.

TEXT BOOK(S)

1. Joshy Joseph and Craig Fellenstein, Grid computing, Pearson / IBM Press, PTR, 2004.

REFERENCE BOOK(S)

1. Ahmer Abbas and Graig computing, A Practical Guide to technology and applications, Charles River Media, 2003.
2. Frederic Magoules, Fundamentals of Grid computing: Theory, algorithms and Technologies, Chapman & Hall. CRC, 1st edition, 2009.
3. Joshy Joseph & Craig Fellenstein, Grid Computing, IBM press 1st edition, 2004.
4. Fran Berman, Geoffrey Fox, Anthony J.G. Hey, Grid Computing: Making the Global Infrastructure a reality, 1st edition, Wiley, 2003.
5. Bart Jacobhar Trivedi, Michael Brown, Kentaro Fukui, Ni Introduction to Grid Computing, 1st edition, IBM Redbooks, 2005.

WEB RESOURCES

1. https://en.wikipedia.org/wiki/Grid_computing
2. https://link.springer.com/chapter/10.1007/978-1-84882-409-6_4
3. <https://www.redbooks.ibm.com/redbooks/pdfs/sg246778.pdf>
4. <https://www.geeksforgeeks.org/grid-computing/>
5. <https://www.ibm.com/think/topics/grid-computing>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	1	3	1	1	1	1	1	3	2	1	1	1	2
CO2	3	2	1	3	1	1	1	2	1	3	3	2	2	1	2
CO3	2	2	1	2	1	1	1	1	1	3	2	2	2	1	1
CO4	3	3	2	3	1	1	1	2	2	3	3	3	3	2	2
CO5	3	2	2	3	1	1	1	2	2	3	3	3	3	2	3

Strong-3 Medium-2 low

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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(For the Candidates admitted in the academic year 2024 – 2025)
DEPARTMENT OF COMPUTER APPLICATIONS
BACHELOR OF COMPUTER APPLICATIONS (BCA)

Semester: VI: Value Education

Ins. Hrs./Week: 2

Course Credit: 2

Course Code:24UGVED

UNIT-I: Philosophy of Life and Social Values

Human Life on Earth(Kural629)-Purpose of Life(Kural46)-Meaning and Philosophy of Life (Kural 131, 226) -Family (Kural 45), Peace in Family (Kural1025) Society(Kural446), The Law of Life (Kural 952),Brotherhood(Kural807)Five responsibilities/duties of Man(a) to himself(b) to his family(c) to his environment(d)to his society, (e)to the Universe in his lives(Kural43,981).

Unit-II Human Values and Citizenship

Aim of education and value education: Evolution of value oriented education, Concept of Human values: types of Values- Character Formation – Components of Value education- API Kalam's ten points for enlightened citizenship-The role of media in value building

UNIT-III:Value Education towards National and global Development:

Constitutional or national values: Democracy, socialism, secularism, equality, Justice, liberty, freedom and fraternity - Social Values: Pity and probity, self-control, universal brotherhood - Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith - Religious Values: Tolerance, wisdom, character – Aesthetic Values- Love and appreciation of literature and fine arts and respect for the same- National Integration and International Understanding.

Unit-IV:Yoga and Health

Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga – Yoga Education with modern context - Different traditions and schools of Yoga - Yoga practices: Asanas, Pranayama and Meditation.

UNIT V: Human Rights

Concept of Human Rights: Indian and international perspectives- Evolution of Human Rights- definitions under Indian and International documents -Broad classification of Human Rights and Relevant Constitutional Provisions: Right to Life, liberty ad Dignity- Right to equality- Right against exploitation- Cultural and Educational Right- Economic Rights- Political Rights- Social Rights - Human Rights of Women and Children – Peace and harmony.

UNIT-VI: CURRENT CONTOURS: (for continuous internal assessment only)

COURSE OUTCOMES

After completion of the course, the student will be able to:

- Apply the values in Thirukkural to be peaceful, dutiful and responsible in family and society
- Develop character formation and sense of citizenship
- Be secular, self-control, sincere, respectful and moral.
- Master yoga, asana and meditation to promote mental health
- Be attitudinal to follow the constitutional rights

BOOKS FOR REFERENCES:

1. Thirukkural with English Translation of Rev.Dr.G.U.Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004
2. Leah Levin, Human Rights, NBT, 1998
3. V.R.Krishna Iyer, Dialectics and Dynamics of Human Rights in India, Tagore Law Lectures.
4. Yogic Therapy – Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
5. SOUNDHEALTH THROUGH YOGA- Dr.K.Chandrasekaran, Prem Kalyan Publications, Sedapatti, 1999.
6. Grose.D.N–“A text book of Value Education’ New Delhi(2005)
7. Gawande . EN – “Value Oriented Education” – Vision for better living. New Delhi (2002) Sarupsons
8. Brain Trust Aliyar- “Value Education for Health, Happiness and Harmony” Erode (2004) Vethathiri publications

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	1	1	3	3	3	2	2	1	1	1	1	1
CO2	1	1	1	1	1	3	2	3	3	2	1	1	1	1	1
CO3	1	1	1	1	1	3	3	3	2	2	1	1	1	1	1
CO4	1	1	1	1	1	2	2	3	2	2	1	1	1	1	1
CO5	1	1	1	1	1	3	3	3	3	3	1	1	1	1	1

Strong-3 Medium-2 low-1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016.

(For the Candidates admitted in the academic year 2024– 2025)

DEPARTMENT OF COMPUTER APPLICATIONS

BACHELOR OF COMPUTER APPLICATIONS (BCA)



Semester: VI-PCC-Mobile Application Development

Ins. Hrs./Week: 2

Course Credit: 2

Course Code:U24PCCA61

UNIT-I: Introduction: Android Fundamentals

6-Hours

Android Fundamentals: Android overview and Versions –Features of Android – Architecture of Android - Setting up Android Environment(Eclipse/Android Studio, SDK, AVD)-Anatomy of an Android Application – Simple Android Application Development.

UNIT-II: Android User Interface

6-Hours

Android User Interface: Layouts: Linear, Relative, Frame and Scroll view- Managing changes to Screen Orientation. Views: Text View, Button, Image Button, Edit Text, Check Box, Radio Button, Radio Group, Progress Bar, Auto Complete Text View, List Views and Web View.

UNIT-III: Data Persistence

6-Hours

Data Persistence: Saving and Loading User Preferences. File Handling: File System-Internal and External Storage – Permissions – File Manipulation-Managing Data using Sqlite: Creation of database-Insertion, Retrieval and Updation of records.

UNIT-IV: SMS Messaging

6-Hours

SMS Messaging: Sending and Receiving messages – Sending E-mail – Networking: Downloading Binary Data – Downloading Text Files.

UNIT-V: Location Based Services

6-Hours

Location Based Services: Displaying maps- Displaying zoom control-Changing view – Adding Markers- Getting the location – Geo-coding Publishing Android Applications: Preparing for publishing – Deploying APK Files.

Total Lecture Hours: 30

COURSE OUTCOMES

On completion of this course, students will be able to

1. Understand Android architecture, features, versions, and application development environment.
2. Design Android user interfaces using layouts and different UI controls.
3. Store and manage application data using Shared Preferences, files, and SQLite database.
4. Develop applications for SMS, email, and basic networking operations.
5. Create location-based Android applications and publish APK files.

TEXT BOOK(S)

1. Wei Meng Lee (2012), –*Beginning Android Application Development*, Wrox Publications (JohnWiley,NewYork)

REFERENCE BOOK(S)

1. Ed Burnette, –Hello Android: Introducing Google's Mobile Development Platform, 3rd edition, 2010, The Pragmatic Publishers.
2. RetoMeier, –Professional Android4 Application Development, 2012, WroxPublications (John Wiley,NewYork).
3. Bill Phillips, Chris Stewart, Kristin Marsicano, Android Programming: The Big Nerd Ranch Guide, 5th edition, Big Nerd Ranch Guides/Pearson, 2022.
4. Valen Lee, Heather Schneider, Robbie Schell, Mobile Application Development, 1st edition, CengageLearning, 2004.
5. Reto Meier, Ian Lake, Professional android, 5th edition, Wrox, 2022.

WEB RESOURCES

1. https://www.tutorialspoint.com/mobile_development_tutorials.htm
2. <https://www.tutorialspoint.com/Android/Android-Home>
3. <https://developer.android.com/>
4. <https://sempercon.com/mobile-app-development-resource-guide/>
5. <https://developer.android.com/guide/topics/resources/providing-resources>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	2	3	1	1	1	2	1	3	3	2	2	3
CO2	3	3	2	2	3	1	1	1	2	1	3	3	2	2	2
CO3	3	3	3	2	3	1	1	1	2	2	3	3	3	2	3
CO4	3	3	3	3	3	1	1	1	2	2	3	3	3	3	3
CO5	3	2	2	2	3	1	1	1	2	2	3	3	2	2	3

Strong-3 Medium-2 low-1

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(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF COMPUTER APPLICATIONS

BACHELOR OF COMPUTER APPLICATIONS (BCA)



Semester: VI: GS-Gender Studies

Ins. Hrs./Week: 1

Course Credit: 1

Course Code:24UGGS

UNIT-I: INTRODUCTION to Gender Studies Concepts

Gender Spectrum.-Sex – Gender distinction – Biological Determinism – Patriarchy – Feminism –Gender Socialization and Stereotyping-Gender Discrimination – Gender Division of labour and roles– Gender Sensitivity and awareness – Gender Equity – Equality – Gender Main streaming and Gender Analysis.

UNIT-II: UGC Initiatives on Women's Studies

Definition of Women's Studies –Gender Studies –UGC Initiatives and guidelines on Women's Studies- Beijing Conference, UNInitiatives – Convention on Elimination of All forms of Discrimination Against Women (CEDAW)- Sustainable Development Goals on Gender Equality (SDG 5) and targets.

UNIT-III: Areas of Gender Discrimination

Gender Socialization- Sex Ratio– Health and Nutrition– – Literacy and Education- Employment- Governance – participation in decision making- politics- property rights and access to credit- gender based violence- Social institutions –Family, Caste, Class, religion, gender, State. Market – Media – Politics – Judiciary

UNIT-IV: Women Development and Gender Empowerment

Towards Equality Report of Status of Women in India 1974– International Women's Decade – International Women's Year –National Policy for Empowerment of Women 2001

UNIT-V: Women's Movements and Safe Guarding Mechanism:

In India National /State Commission for Women(NCW) – All Women Police Station – Family Court Legislations safeguarding women –Transgender Policy—Constitutional amendments for women's political participation

UNIT-VI: CURRENT CONTOURS: (for continuous internal assessment only):

Tamil Nadu State Policy for Women 2021- National Policy for Women 2015 – Prevention of Sexual Harassment at Work places Act 2013- Protection of Children from Sexual Offences Act, 2012 - Analysis of regressive and progressive High court and supreme court judgments- women proactive policies, programmes, interventions

COURSE OUTCOMES:

- Students would have gained a perspective and understood the social reality of gender society understood the differences of gender and sex and may resort to building alternative perspectives

and critical thinking.

- Gained knowledge on the various social institutions governing gender and the intersectionality.
- Exposed to the kind of initiatives of the State towards gender equality

REFERENCE:

1. Bhasin Kamala, Understanding Gender: Gender Basics, New Delhi: Women Unlimited, 2004
2. Bhasin Kamala, Exploring Masculinity: Gender Basics, New Delhi: Women Unlimited, 2004
3. Bhasin Kamala, What is Patriarchy?: Gender Basics, New Delhi: Women Unlimited, 1993
4. Arya Sadhna Women, Gender Equality and the State, New Delhi: Deep & Deep Publication, 2000
5. Mishra. O.P, Law Relating to Women & Child, Allahabad: Central Law Agency, 2001
6. Uma Chakravarti, Gendering Caste Through a Feminist Lens, Sage Publication 2003
7. Bhattacharya Malini, Sexual Violence and Law, Kolkata: West Bengal a Commission for Women, 2002
8. Sexual Harassment at the Workplace – A Guide, New Delhi; Sakshi, 1999
9. Women's Integrated National Development Trust
9. <https://www.schooloflegaleducation.com/women-and-law-in-india-e-book/>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	2	1	1	1	3	3	3	2	2	1	1	1	1	1
CO2	1	2	1	1	1	3	3	3	2	2	1	1	1	1	1
CO3	1	1	1	1	1	3	2	3	2	2	1	1	1	1	1
CO4	1	1	1	1	1	3	3	3	3	2	1	1	1	1	1
CO5	1	1	1	1	1	3	3	3	3	3	1	1	1	1	1

Strong-3 Medium-2 low-1