

DAYANANDA SAGAR ACADEMY OF TECHNOLOGY & MANAGEMENT



CURRICULUM

Scheme and Syllabus III to IV Semester

Outcome Based Education

(Academic Year 2026-2027)

Department of CSE-Cyber Security

3rd & 4th Semester B.E

ABOUT THE INSTITUTE

Dayananda Sagar Academy of Technology and Management- DSATM was established in 2011 with 5 UG Programmes and 1 PG Program, the programmes are approved by All India Council for Technical Education (AICTE) New Delhi, Affiliated to Visvesvaraya Technological University (VTU), Belagavi and DSATM is an autonomous institute from 2023-2024.

The Dayananda Sagar Institutions is one of pioneer institutions in India and abroad with six decades of excellence in Academic and Research. The newer campuses were necessary to accommodate the growing need of the technology and innovation.

DSATM nurtures the students in academic, research, sports, cultural and extracurricular activities.

- Creating an academic environment to nurture and develop competent entrepreneurs, leaders and professionals who are socially sensitive and environmentally conscious.
- Integration of Outcome Based Education and cognitive teaching and learning strategies to enhance learning effectiveness.
- Developing necessary infrastructure to cater to the changing needs of Business and Society.
- Optimum utilization of the infrastructure and resources to achieve excellence in all areas of relevance.
- Adopting learning beyond curriculum through outbound activities and creative assignments.
- Imparting contemporary and emerging techno-managerial skills to keep pace with the changing global trends.
- Facilitating greater Industry-Institute Interaction for skill development and employability enhancement.
- Establishing systems and processes to facilitate research, innovation and entrepreneurship for holistic development of students.
- Implementation of Quality Assurance System in all Institutional processes.

VISION OF THE INSTITUTE

To strive at creating the institution a centre of highest calibre of learning, so as to create an overall intellectual atmosphere with each deriving strength from the other to be the best of engineers, scientists with management & design skills

MISSION OF THE INSTITUTE

- To serve its region, state, the nation and globally by preparing students to make meaningful contributions in an increasing complex global society challenges.
- To encourage, reflection on and evaluation of emerging needs and priorities with state-of-the-art infrastructure at institution.
- To support research and services establishing enhancements in technical, economic, human and cultural development.
- To establish interdisciplinary centre of excellence, supporting/ promoting student's implementation.
- To increase the number of Doctorate holders to promote research culture on campus.
- To establish IIPC, IPR, EDC, innovation cells with functional MOU's supporting student's quality growth

QUALITY POLICY

Dayananda Sagar Academy of Technology and Management aims at achieving academic excellence through continuous improvement in all spheres of Technical and Management education. In pursuit of excellence cutting – edge and contemporary skills are imparted to the utmost satisfaction of the students and the concerned stakeholders.

ABOUT THE DEPARTMENT

Year of Establishment : 2023

Intake of the Department = 60

About the Course

“Security is the chief enemy of mortals.”

By William Shakespeare

In today's, economy organizations are using more and more digitization for all their financial transactions and other data communication and due to this organizations are more prone to attack; thus, we need a to secure our transaction. Cyber-Security is a process to secure all our transactions and assure the privacy, confidentiality and integrity for organizations as well as personal information. Cybersecurity is the practice of protecting critical systems and sensitive information from digital attacks. Also known as information technology (IT) security, cybersecurity measures are designed to combat threats against networked systems and applications, whether those threats originate from inside or outside of an organization. As per the survey done by IBM in 2020, the average cost of a data breach was USD 3.86 million globally and USD 8.64 million in the United States. A strong cybersecurity strategy has layers of protection to defend against cybercrime, including cyber-attacks that attempt to access, change, or destroy data; extort money from users or the organization; or aim to disrupt normal business operations. The Cyber Security must address the following cybersecurity issues in Critical infrastructure security, Network security, Application Security, Cloud security, Information security, End-user education, Disaster recovery/business continuity planning, Storage security, and Mobile security. This course provides a wide variety of knowledge to enrich the students to be ready for the world of securing life. With this small introduction, I would like to welcome all of you to the Department of CS in Cyber Security and Engineering.

VISION OF THE DEPARTMENT

To deliver quality education, foster professionalism, and develop cybersecurity skills to create globally competent, socially responsible engineers.

MISSION OF THE DEPARTMENT

M1: Foster dynamic learning with innovative curriculum and pedagogy for quality technical education.

M2: Partner with industry, academia, and society to enhance design thinking, research, innovation, and entrepreneurship.

M3: Promote Co-Curricular & extracurricular activities to build leadership, accountability, and ethical values.

PROGRAM EDUCATION OBJECTIVES (PEO'S):

PEO1: Excel in careers by applying knowledge in basic sciences, Computer Science, AI, ML, and Cybersecurity, contributing as skilled professionals or entrepreneurs.

PEO2: Pursue advanced studies and research in relevant fields.

PEO3: Adapt to technological advancements in multidisciplinary settings through lifelong learning, leadership, ethics, and strong soft skills.

PROGRAM OUTCOMES (PO's)

A Computer Science & Engineering (Cyber Security) graduate must demonstrate:

- **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSO's)

PSO1: Ability to understand, investigate, and analyze cybersecurity incidents to restore resources and develop cyber defense strategies.

PSO2: Apply advanced tools and techniques to identify, analyze, and mitigate cybersecurity threats and vulnerabilities effectively.

PSO3: Demonstrate awareness of ethical and socially responsible technical solutions during the design and development of applications.



Dayananda Sagar Academy of Technology & Management
Autonomous Institute under VTU)

Affiliated to **VTU**
Approved by **AICTE**
Accredited by **NAAC** with **A+** Grade
6 Programs Accredited by **NBA**
(CSE, ISE, ECE, EEE, MECH, CV)

PROPOSED UG CREDIT STRUCTURE IN ALIGNMENT WITH VTU

Sl.No	Semester	No. of Credits
1	1 st Semester	20
2	2 nd Semester	20
3	3 rd Semester	21
4	4 th Semester	21
5	5 th Semester	22
6	6 th Semester	22
7	7 th Semester	20
8	8 th Semester	14
Total		160

PROPOSED UG SCHEME

Sl. No	Course Category	BOS	TD	Teaching Hours/Week					Credits
				Lecture	Tutorial	Practical	Project	Total	
				L	T	P	S	(Hrs/week)	
1	BSC	MAT	MAT	3	0	0	0	3	3
2	IPCC-1	CSE-CY	CSE-CY	3	0	2	0	5	4
3	IPCC-2	CSE-CY	CSE-CY	3	0	2	0	5	4
4	PCC-1	CSE-CY	CSE-CY	3	0	0	0	3	3
5	PCC-2	CSE-CY	CSE-CY	3	0	0	0	3	3
6	PBL	CSE-CY	CSE-CY	0	0	0	2	2	2
7	AEC	CSE-CY	CSE-CY	0	0	2	0	2	1
8	SCR	BSC	BSC	0	0	2	0	2	1
9	NCMC	NSS / YOGA / PED							
10	AICTE Activity Points								
Total									21

Percentage of Mapping– Theory & Practical - Scheme & Syllabus- 3rd & 4th Sem

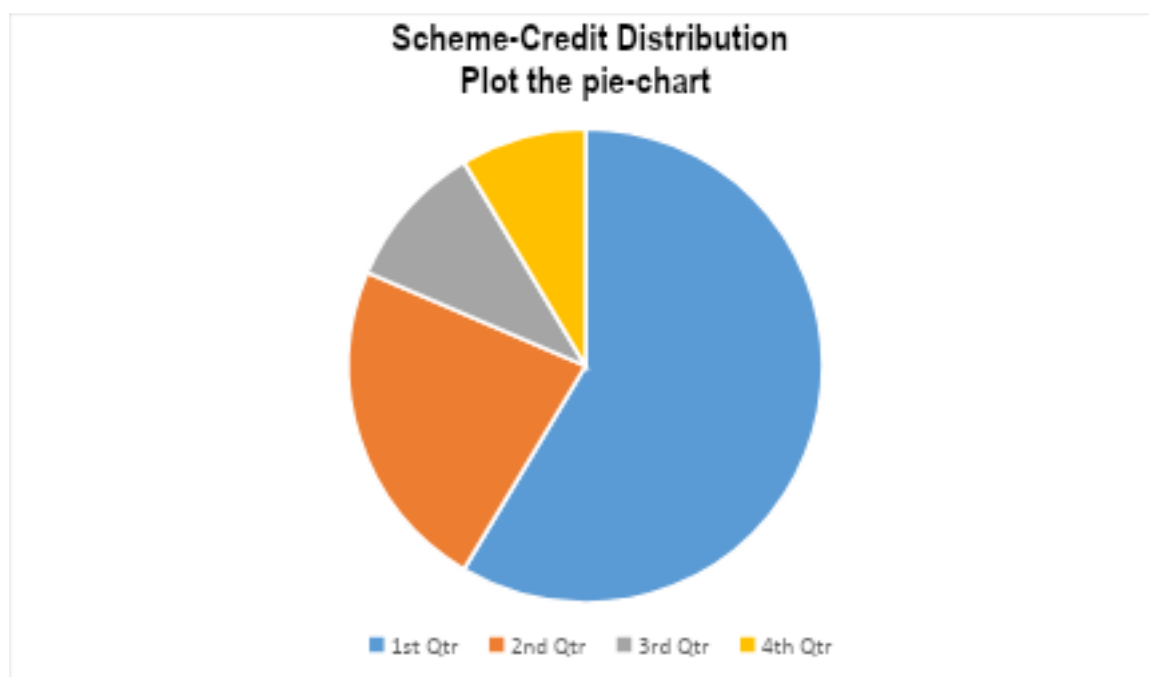
3rd Sem & 4th Sem

Sl. No	Course Category	Component			
		Theory	Practical	Outreach	YOGA/SPORTS
1	BSC	100%	--	--	--
2	IPCC-1	60%	40%	--	--
3	IPCC-2	60%	40%	--	--
4	PCC-1	100%	--	--	--
5	PCC-2	100%	--	--	--
6	PBL	--	100%	--	--
7	AEC	--	100%	--	--
8	SCR	--	--	100%	--
9	NCMC	--	--	--	100%
Total Percentage		53%	47%	13%	13%

Scheme Distribution

Department of Information Science & Engineering -3rd Semester

Course Component	Credits	% of Credits
Basic Science (BS)		
Engineering Science (ES)		
Humanities (HU)	3	
Program core (PC)	3+3	
Program core Integrated (PCI)	4+4	
Program core exclusive Lab	2	
Program elective (PE)		
Open Elective (OE)		
Internship (INT)		
Social Connect Responsibilities (SCR)	1	
Ability Enhancement course (AEC)	1	
Project (PR)		
Total	21	100



SEMESTER WISE CREDIT BREAKDOWN FOR B.E. DEGREE CURRICULUM

BATCH 2024-2028

[illegible]



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Scheme of Teaching and Examinations – 2024 Outcome Based Education (OBE) and Choice Based Credit System (CBCS) (Effective from 2025-26)

3rd SEMESTER: Cyber Security

Sl. No	Course Code	Course Title	Course Category	BOS	TD	Teaching Hours/Week					Credits	Examination			
						Lecture	Tutorial	Practical	Project	Total		SEE Duration (Hrs)	CIE Marks	SEE Marks	Total Marks
1	BMATA301	Linear Algebra and Discrete Mathematics	BSC	MAT	MAT	3	0	0	0	3	3	3	50	50	100
2	BCY302	Data Structures and Applications	IPCC-1	CSE-CY	CSE-CY	3	0	2	0	5	4	3	50	50	100
3	BCY303	Object Oriented Programming with c++	IPCC-2	CSE-CY	CSE-CY	3	0	2	0	5	4	3	50	50	100
4	BCY304	Operating Systems	PCC-1	CSE-CY	CSE-CY	3	0	0	0	3	3	3	50	50	100
5	BCY305	Data Communication	PCC-2	CSE-CY	CSE-CY	3	0	0	0	3	3	3	50	50	100
6	BCY306L	Unix and Shell Programming	PBL	CSE-CY	CSE-CY	0	2	0	2	4	2	2	50	50	100
7	BCY307X	Ability Enhancement Course	AEC	CSE-CY	CSE-CY	0	0	2	0	2	1	2	50	50	100
8	BCY308	Social Connect and Responsibility	SCR & NSS	BSC	Any Dept.	0	0	2	0	2	1	1	100	-	100
9	BYOK309	Yoga	NCMC*		PD	1	0	0	0	1	0	0	100	-	100
	BNSK309	NSS			NSS	1	0	0	0	1	0	0			
	BPEK309	Physical Education			PD	1	0	0	0	1	0	0			
Total						16	2	8	2	28	21		550	350	900

*Non-Credit Mandatory Course

3rd Sem Ability Enhancement Course

BCY307A	Agentic AI -1	BCY307B	Cyber Crime & Cyber Laws
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Scheme of Teaching and Examinations – 2024 Outcome Based Education (OBE) and Choice Based Credit System (CBCS) (Effective from 2025-26)

4th SEMESTER: Cyber Security

S L. N O	Course Code	Course Title	Course Category	BOS	TD	Teaching Hours/Week					Credits	Examination			
						Lec ture	Tutorial	Practi cal	Project	Total		SEE Duration (Hrs)	CIE Marks	SEE Marks	Total Marks
						L	T	P	S						
1	BMATA401	Statistics and Probability	BSC	MAT	MAT	3	0	0	0	3	3	3	50	50	100
2	BCY402	Design and Analysis of Algorithms	IPCC-1	CSE- CY	CSE-CY	3	0	2	0	5	4	3	50	50	100
3	BCY403	Database Management Systems	IPCC-2	CSE- CY	CSE-CY	3	0	2	0	5	4	3	50	50	100
4	BCY404	Information and Data Security	PCC-1	CSE- CY	CSE-CY	3	0	0	0	3	3	3	50	50	100
5	BCY405	Digital Logic Design and Computer Organization	PCC-2	CSE-CY	CSE-CY	3	0	0	0	3	3	3	50	50	100
6	BCY406	Full Stack Development	PBL	CSE- CY	CSE-CY	0	0	2	2	2	2	2	50	50	100
7	BCY407X	Ability Enhancement Course	AEC	CSE- CY	CSE-CY	0	0	2	0	2	1	2	50	50	100
8	BUHK408	Universal Human Values and Clean Technology	SCR & NSS	BSC	Any Dept.	0	2	0	0	2	1	1	50	50	100
9	BYOK409	Yoga	NCMC*		PD	1	0	0	0	1	0	0	100	0	-
	BNSK409	NSS			NSS										
	BPEK409	Physical Education			PD										
Total						16	2	8	2	26	21		500	400	900

*Non-Credit Mandatory Course

4 th Sem Ability Enhancement Couse			
BCY407A	Agentic AI-2	BCY407B	Technical writing using LATEX

IPCC: Integrated Professional Core Course,

PCC: Professional Core Course

PBL: Project Based Learning

AEC: Ability Enhancement Course,

NCMC: Non-Credit Mandatory Course

L: Lecture,

T: Tutorial,

P: Practical

S= SDA: Skill Development Activity,

CIE: Continuous Internal Evaluation,

SEE: Semester End Evaluation.

Integrated Professional Core Course (IPCC): Refers to Integrated Professional Core Course Theory Integrated with practical's of the same course. Credit for IPCC can be 04 and its Teaching Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper.

Non Credit Mandatory Course (NCMC) - National Service Scheme /Physical Education/Yoga: All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.

Newly introduced subjects in the syllabus

		3rd Semester
1.	List of Existing Elective Courses	No Elective Course in 3 rd Semester
2.	List of New Existing Elective Courses	No Elective Courses in 3 rd Semester
3.	List of New Industry Aligned Courses	1. Agentic AI Level-1 2. Cyber Crime & Cyber Laws
4.	Name of subject changed to IPCC	Object Oriented Programming with Java

Percentage of Change in the Syllabus

3 rd Semester						
Sl.No	Course Code	Course Name	Topics Added	Topics removed	Revised in %	Justification
1	BCY302	Data Structure and Applications	Heaps, AVL Trees, Red-Black Trees, Splay Trees. Program on arrays was included as a memory refreshment to C language. The program on stack modified to check if parentheses are balanced Lab Program on linear queue added Lab Program on circular queue modified to simulate a printer Lab program on singly linked list modified to evaluate a polynomial Lab program on doubly linked list modified to include Movie data Lab program on maxheap added	Strings, Threaded Binary Trees, Selection Trees, Forests, Representation of Disjoint sets, Counting Binary Trees, Single and double ended Priority Queues, Leftist Trees Lab Program 1 on dynamic memory allocation was removed to match with the theory syllabus Lab Program 2 on string pattern matching was removed and is taught in DAA.	30%	Strings were covered in POP using C. Threaded Binary Trees, Selection Trees, Forests, Representation of Disjoint sets, Counting Binary Trees were removed as the topics were theoretic and not frequently asked in exams. Balanced tree structures were included to provide a proper and thorough foundation on tree structures. Single and double ended Priority Queues, Leftist Trees, Optimal Binary Search Trees were to be included for competitive programming for 4th semester

2.	BCY304	Operating Systems	Allocating Kernel Memory, failures and recovery.	Computer System architecture, Operating System structure, Process management; Operations on processes, Thread.	40%	Failures and recovery of memory, files solves the troubleshooting problems.
3.	BCY305	Data Communication	Networking Tools: Network simulator2 Introduction, Fundamental aspects of Network simulator2, NS2 architecture, NS2 components, NS2 Installation, Installation of supporting software (Nam,Xgraph), Starting and handling NS2.	Subnetting, Classful and CIDR addressing, DHCP, NAT, Cellular Telephony, Wired LANs Ethernet: Ethernet Protocol	40%	As per the industrial needs the basic concepts are put in to practical form with respect to Network tools such as NS2. The topics which retain with the syllabus has the basic concepts as per the industry needs and removed topics to be included in Advance computer Network for higher semester.

3rd SEMESTER

**INTEGRATED
PROFESSIONAL CORE
COURSE (IPCC)**

IPCC Course – Integrated Professional Core Course

Teaching Hours/Week (L: T:P: S)	3:0:2:0
Total Hours of Pedagogy	40 hours Theory + 20 Hours of Practical Classes
Credits:	04
Theory - Each Module	8 Hrs.
Practical's	8-10 Programs / Experiments
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Theory

- The theory part of the IPCC shall be evaluated both by CIE and SEE.
- The practical part shall be evaluated by only CIE (no SEE).
- However, questions from the practical part of IPCC shall be included in the SEE question paper.

Integrated Professional Core Course (IPCC) - 4 Credit Course

Assessment Details (both CIE and SEE)

- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks).
- A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation (CIE) for the Theory component of the IPCC (Maximum marks 50)

Internal Assessment Test (IAT):

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are 25 marks and that for the practical component is 25 marks.
- 25 marks for the theory component are split into 15 marks for two Internal Assessment Tests
- (Two Tests, each of 50 Marks with 01-hour 30 minutes' duration, are to be conducted and average of two tests to be reduced to 15 marks) and 10 marks for Two Continuous Comprehensive Assessment(CCA) methods.
- The first Internal test at the end of 40-50% coverage of the syllabus
- The second Internal test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for 25 marks).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Revised Blooms Taxonomy (RBT) Levels. Emphasis to be given for Higher order Thinking Skills (HOTS).

Continuous Internal Evaluation (CIE) for the practical component of the IPCC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report, **05 Marks** are for conducting the experiment, **05 Marks** for preparation of the laboratory record, **5 Marks** for conducting Open Ended Experiments Each experiment. Marks of all experiments' write-ups are added to 15 marks.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **5 Marks**.
- The open-ended experiment after completion of all the experiments shall be conducted for 20 marks with a split-up for 5 Marks for writeup, 10 Marks for Execution, and 5 Marks for Viva-Voce.
- Marks for writeup, Execution and Viva-Voce is added and scaled down to 05 marks.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for 25 marks.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

Semester End Examination (SEE) for IPCC Theory

SEE will be conducted as per the scheduled timetable, with common question papers for the course (duration 03 hours)

- The question paper will have ten questions. Each question is set for 20 marks.
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels.
- The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored by the student shall be proportionally scaled down to 50 Marks.
- The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only.
- Questions mentioned in the SEE paper may include questions from the practical component.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be $(CCA1+CCA2)/2$ and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The Assessment will be through rubrics.
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

Possible Continuous and Comprehensive Assessment (CCA):

- Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom,
- The assessment of these techniques shall be in rubrics.
- The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

4 Credits Courses – Integrated Professional Core Course (IPCC)

Assesment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50	----	----	20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module – 1 to 2.5	50	(50+50) / 2	15	6	Average of Two Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) - II	Module – 2.5 to 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives / Activity based learning	Considering all the Modules	50	(50+50) / 2	10	4	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives/ Activity based learning		50				
	Total CIE Theory						25	10

CIE									
	Practical	Conduction of Experiments	Performance-Continuous Evaluation of each experiment	05	15	Average of all Experiments	15	4	Performance of the Experiment (On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. 20 marks are for conducting the experiment and calculations/observations/output)
			Record	05					
			Observation book	05					
		Practical Test	Write up	15	50	----	05	4	One Internal Practical Test after conduction of all Experiments for 50 Marks
			Execution	25					
			Viva-voce	10					
		Open Ended Experiment	Write up	05	20	----	05	2	One experiment for 20 marks. 20 marks reduced to 05 marks
			Execution	10					
			Viva-voce	05					
Total CIE Practical						25	10	Scale down Marks of Experiments, Record, Observation, Practical Test and Open-Ended Experiment	

SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	
- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. - The Laboratory Component for the IPCC shall be for CIE only. - However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.								
Note: If few of the 3 Credit Courses are Integrated course type, for such courses the method suggested for 4 Credit IPCC Course shall be followed								



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Semester	:	III			
Course Title	:	Data Structure and Applications			
Course Code	:	BCY302			
Course Type (Theory/ Practical/ Integrated)	:	Integrated			
Category	:	IPCC-1			
Stream	:	Cyber Security	CIE	:	50
Teaching hours/ week (L:T:P:S)	:	3:0:2:0	SEE	:	50
Total Hours	:	40h Theory + 20h Practical	SEE	:	3 Hours
Credits	:	04	Duration		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the fundamentals of data structures and their applications.
2	Learn different data structures to solve given problems.
3	Know the real-world problems by solving with the appropriate data structures
4	Design solution for given problem using appropriate Data Structures.
5	Develop the correct data structure to build solutions for the real world applications.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for BE Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Basic Concepts: Introduction to Data Structures, Types of Data Structures, Applications of Data Structures, Pointers, Dynamic Memory Allocation. Arrays and Structures: Arrays, Dynamic Allocated Arrays, Structures and Unions, Polynomials, Sparse Matrices, Representation of multidimensional arrays. Textbook 1: Chapter 1:1.2 Chapter 2: 2.1 - 2.6	8
Pedagogy	Mind Mapping	
2	Stacks: Stacks, Stacks Using Dynamic Arrays, Evaluation of Expressions. Queues: Queues, Circular Queues using Dynamic Arrays, Multiple Stacks and Queues. Textbook 1: Chapter 3: 3.1 - 3.7(Excluding 3.5)	8
Pedagogy	Game-Based Learning	
3	Linked Lists: Singly Linked Lists and Chains, Representing Chains in C, Linked Stacks and Queues, Polynomials, Additional List Operations, Doubly Linked Lists. Textbook 1: Chapter 4: 4.1 - 4.8 (Excluding 4.6)	8
Pedagogy	Brine Storming	
4	Trees: Introduction, Binary Trees, Binary Tree Traversals, Heaps, Binary Search Trees. Efficient Binary Search Trees: AVL Trees, Red-Black Trees, Splay Trees. Textbook 1: Chapter 5: 5.1 - 5.3, 5.6 - 5.7, Chapter 10: 10.2 - 10.3	8
Pedagogy	Problem-Solving	
5	Graphs and AI Algorithms using Data Structures: The Graph Abstract Data Type, Elementary Graph Operations , Graph representations; AI-based graph search techniques (BFS, DFS, A* algorithm); heuristic functions and pathfinding applications. Hashing: Introduction; Static Hashing; Dynamic Hashing; hash functions in AI; efficient data retrieval for large-scale intelligent systems; applications in pattern matching, indexing and data-intensive AI problems. Textbook 1: Chapter 6: 6.1 - 6.2, 8.1 - 8.33 Textbook 2: Chapter 4: Informed (Heuristic) Search Strategies (121–165)	8
Pedagogy	Peer Learning	
	Pedagogical Initiatives (Not limited to): • Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another	

- **Problem Solving:** encourages cognitive thinking and enables creative problem solving
- **Poster Presentation:** allows students to represent the concepts visually in order to understand the topics easily.
- **Case studies:** maps different domains in real time applications
- **Demonstration:** exhibits the implementation process

List of Programs:

Sl. No.	Experiments/Programs	COs
1	Develop a C Program to implement the following operations on arrays: a) Create an array of N integers b) Insert an element at a given position Delete an element from a given position	CO4
2	Develop C program to implement push, pop, and display operations on a STACK of characters using functions for each. Display underflow and overflow messages appropriately. Demonstrate how the Stack can be used to check if the parentheses are balanced.	CO4
3	Implement a Program in C for converting an Infix Expression to a Postfix Expression. The program should support both parenthesized and free parenthesized expressions with the operators: +, -, *, /, % (Remainder), ^ (Power), and alphanumeric operands.	CO4
4	Develop a Program in C for the following Stack applications a. Evaluation of Suffix expression with single digit operands and operators: +, -, *, /, %, ^ b. Solving Tower of Hanoi problem with n disks	CO4
5	Develop a menu-driven program in C to implement insertion, deletion, and display operations on a linear queue of integers using functions for each operation. Demonstrate Overflow and Underflow situations.	CO4
6	Develop a program to simulate the working of a printer using a Circular Queue(CQ) of characters with functions for insertion, deletion, and display operations.	CO4
7	Design and Develop a menu-driven program in C to read a polynomial P of the form $a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots + a_1 x + a_0$ (Ex: $6x^4 + 3x^3 + 3x^2 + 2x + 1$) using rear insertion in a singly Linked List (SLL). Implement functions to display and evaluate the polynomial by taking the value of 'x' from the user.	CO4
8	Develop a menu-driven program in C to create a Doubly Linked List (DLL) of Movie Data with the fields: Title, Genre, Actor, Actress, and rating. Implement functions for insert at front, Delete from front, insert at rear, and delete from rear of the DLL. Display the linked list after each operation.	CO4

9	Develop a menu-driven program in C to create a Binary Search Tree (BST) of Integers. Traverse the BST in Inorder, Preorder and PostOrder. Search the BST for a given element (KEY) and display appropriate message	CO4
10	Develop a menu-driven program in C to create a Maxheap of Integers. Demonstrate deletion operation on max-heap	CO4
11	Develop a program to implement the A* algorithm to find the shortest path between a source and destination node using a suitable heuristic function.	CO4
12	Develop a program to implement hash-based indexing for an AI search system to quickly retrieve relevant data from large datasets.	CO4
Open ended Programs		
1	Develop a C program to implement BFS using queues.	CO5
2	Develop a C Program using a suitable data structure to implement job scheduling in OS	CO5
3	Implement a C Program with data structures to illustrate a File System Directory Structure	CO5
4	Create a C Program to implement a dictionary using a data structure	CO5
5	Develop a C Program using a suitable data structure to implement Back/Forward Navigation on a web browser	CO5

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Fundamentals of Data Structures in C, Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Universities Press, 2nd Edition, 2018
2	Data Structures using C, Reema Thareja, Oxford University Press, 3 rd Edition, 2021.
3	Artificial Intelligence A Modern Approach

Reference Books

1	Data Structures and Algorithms Implementation through C: In Depth, Dr. Brijesh Bakariya, BPB Publications, 1st Edition, 2021.
2	Data Structures & Algorithms using C, A. V. N. J. Rao and K. N. S. N. Raju, Pearson Education India, 1st Edition, 2021.
3	Data Structures Through C, Yashavant Kanetkar and Asang Dani, BPB Publications, 2nd Edition, 2020.

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand and explain the concepts of Data Structures and Applications.	Understand	L2
CO2	Apply the concepts of linear and non-linear Data Structures to solve a given problem.	Apply	L3
CO3	Analyze the given problem and use appropriate Data Structures like the stack, queue, linked lists, trees, graphs, and hash tables.	Analyze	L4
CO4	Evaluate linear, non-linear, hashed and composite Data Structures.	Evaluate	L5
CO5	Design solutions for real-world problems using appropriate Data Structures.	Create	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	2	0	0	1	1	1	0	2	1	1	1
CO2	3	3	2	2	3	0	0	1	1	2	1	2	2	2	1
CO3	2	3	3	3	3	1	1	2	2	2	1	3	3	3	2
CO4	2	2	3	3	3	1	1	2	2	2	1	3	3	3	2
CO5	2	2	3	3	3	1	2	2	3	3	2	3	3	3	3

Weblinks and Video Lectures (e-Resources)

1	https://nptel.ac.in/courses/106102064
2	https://archive.nptel.ac.in/courses/106/106/106106130/
3	https://academicearth.org/computer-science/
4	https://online.vtu.ac.in/course-details/Skill-enhancement-with-Data-structure-algorithm-C-language-822203
5	https://online.vtu.ac.in/course-details/Data-Structures-and-Applications

6	https://www.geeksforgeeks.org/data-structures/?ref=lbp
7	https://www.w3schools.com/dsa/dsa_intro.php
8	https://www.youtube.com/watch?v=BBpAmxU_NQo
9	https://www.youtube.com/watch?v=8hly31xKli0
10	https://www.youtube.com/watch?v=MtVZAXepMPM
11	https://www.classcentral.com/course/udemy-data-structures-stack-queue-linkedlist-55316
12	https://onlinecourses.swayam2.ac.in/cec19_cs04/preview
13	https://www.udemy.com/course/datastructurescncpp/?couponCode=LETSLEARNNOWPP
14	https://www.geeksforgeeks.org/courses/dsa-self-paced?itm_source=geeksforgeeks&itm_medium=main_header&itm_campaign=courses

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	
Remember	5	-	10	-	10
Understand	5	5	20	-	15
Apply	20	25	20	20	25
Analyse	10	10	-	10	-
Evaluate	10	10	-	5	-
Create	-	-	-	15	-

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	5				5	15	15%
CO2	5	10	5	10	10	5	45	45%
CO3	5	5			5	5	20	20%
CO4		5	5	5	5		20	20%
CO5								
Total							100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	10%
Understand	10%
Apply	40%
Analyse	10%
Evaluate	20%
Create	10%

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	5		5	5	10	10%
CO2	5	10	10	10	5	40	10%
CO3		5		5		10	40%
CO4		10	5	5		20	10%
CO5	2	2	2	2	2	10	20%
Total	12	32	17	27	12	100	10%



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III			
Course Title	:	Object Oriented Programming with C++			
Course Code	:	BCY303			
Course Type (Theory/ Practical/ Integrated)	:	Integrated			
Category	:	IPCC-2			
Stream	:	Cyber Security		CIE	: 50
Teaching hours/ week (L:T:P:S)	:	3:0:2:0		SEE	: 50
Total Hours	:	40h Theory + 20h Practical		SEE	: 3 Hours
Credits	:	4		Duration	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand basic OOP concepts in C++ .
2	Develop programs using classes and objects .
3	Apply class relationships and functions
4	Use constructors for object initialization.
5	Create, read, and process data using file handling (File I/O) techniques in Java applications

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



Scheme of Teaching and Examinations for BE Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	An overview of C++: What is object-Oriented Programming? Introducing C++ Classes, The General Form of a C++ Program. Classes and Objects: Classes, Friend Functions, Friend Classes, Inline Functions, Parameterized Constructors, Static Class Members, When Constructors and Destructors are Executed, The Scope Resolution Operator, Passing Objects to functions, Returning Objects, Object Assignment Textbook: Ch 11, Ch 12	8
Pedagogy	Chalk and Talk	
2	Arrays, Pointers, References, and the Dynamic Allocation Operators: Arrays of Objects, Pointers to Objects, The this Pointer, Pointers to derived types, Pointers to class members. Functions Overloading, Copy Constructors: Functions Overloading, Overloading Constructor Functions. Copy Constructors, Default Function Arguments, Function Overloading and Ambiguity. Textbook: Ch 13, Ch 14	8
Pedagogy	Presentation and Demonstration	
3	Operator Overloading: Creating a Member Operator Function, Operator Overloading Using a Friend Function, Overloading new and delete Inheritance: Base-Class Access Control, Inheritance and Protected Members, Inheriting Multiple Base Classes , Constructors, Destructors and Inheritance, Granting Access, VirtualBase Classes Textbook: Ch 15, Ch 16	8
Pedagogy	Think-Pair-Share	
4	Virtual Functions and Polymorphism: Virtual Functions, The Virtual Attribute is Inherited, Virtual Functions are Hierarchical, Pure Virtual Functions, Using Virtual Functions, Early vs Late Binding. Templates: Generic Functions, Applying Generic	8

	Functions, Generic Classes. The type name and export Keywords. The Power of Templates Textbook: Ch 17, Ch 18	
Pedagogy	Demonstration	
5	Exception Handling: Exception Handling Fundamentals, Handling Derived-Class Exceptions, Exception Handling Options, Applying Exception Handling. The C++ I/O System Basics: C++ Streams, The C++ Classes, Formatted I/O File I/O: <fstream> and File Classes, Opening and Closing a File, Reading and Writing Text Files, Detecting EOF. Textbook: Ch 19, Ch 20, Ch 21	8
Pedagogy	Problem Solving	
	Pedagogical Initiatives (Not limited to): • Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another • Problem Solving: encourages cognitive thinking and enables creative problem solving • Poster Presentation: allows students to represent the concepts visually in order to understand the topics easily. • Case studies: maps different domains in real time applications • Demonstration: exhibits the implementation process	

List of Programs:

Sl. No.	Experiments/Programs	COs
1	Write a C++ program to sort the elements in ascending and descending order.	CO3
2	Write a C++ program to find the sum of all the natural numbers from 1 to n.	CO3
3	Write a C++ program to swap 2 values by writing a function that uses call by reference technique	CO3
4	Write a C++ program to demonstrate function overloading for the following prototypes.	CO3
5	Create a class named Shape with a function that prints "This is a shape". Create another class named Polygon inheriting the Shape class with the same function that prints "Polygon is a shape". Create two other classes named Rectangle and Triangle having the same function which prints "Rectangle is a polygon" and "Triangle is a polygon" respectively. Again, make another class named Square having the same function which prints "Square is a rectangle". Now, try calling the function by the object of each of these classes. .	CO3

6	Suppose we have three classes: Vehicle, FourWheeler, and Car. The class Vehicle is the base class, the class FourWheeler is derived from it and the class Car is derived from the class FourWheeler. Class Vehicle has a method 'vehicle' that prints 'I am a vehicle', class FourWheeler has a method 'fourWheeler' that prints 'I have four wheels', and class Car has a method 'car' that prints 'I am a car'. So, as this is a multi-level inheritance; we can have access to all the other classes methods from the object of the class Car. We invoke all the methods from a Car object and print the corresponding outputs of the methods. So, if we invoke the methods in this order, car(), fourWheeler(), and vehicle(), then the output will be I am a car I have four wheels I am a vehicle Write a C++ program to demonstrate multilevel inheritance using this.	CO3
7	Write a C++ program to create a text file, check file created or not, if created it will write some text into the file and then read the text from the file.	CO3
8	Write a C++ program to write and read time in/from binary file using fstream	CO3
9	Write a function which throws a division by zero exception and catch it in the catch block. Write a C++ program to demonstrate usage of try, catch and throw to handle exception.	CO3
10	Write a C++ program function which handles array out of bounds exception using C++.	CO3
Open ended Programs		
1	Develop a C++ program for managing student grades. The program should allow users to enter grades for multiple students and compute statistics such as average grade, highest grade, and lowest grade. Additionally, it should display a grade report showing each student's name and corresponding grade.	CO5
2	Develop a C++ program to reverse the digits of the input integer of unfixed length	CO5
3	Develop a C++ program to implement Bubble sort technique.	CO5
4	Develop a C++ program to create an interface Flyable with a method called fly_obj(). Create three classes Spacecraft, Airplane, and Helicopter that implement the Flyable interface. Implement the fly_obj() method for each of the three classes.	
5	Develop a C++ program that reads a list of integers from the user and throws an exception if any numbers are duplicates.	

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Herbert schildt, The Complete Reference C++, 4th edition, TMH, 2005
2	Textbook 2. Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill Education Pvt.Ltd , Fourth Edition 2010.
Reference Books	
1	Learn To Program With C++,John Smiley, 1st Edition
2	The Design and Evolution of C++, Bjarne Stroustrup, 1st Edition
3	Effective Modern C++, Scott Meyers, O'reilly

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the fundamental principles of object-oriented concepts.	U	L2
CO2	Apply appropriate classes for the given real world scenario.	A	L3
CO3	Analyze the knowledge of compile-time / run-time polymorphism to solve the given problem	An	L4
CO4	Determine the knowledge of inheritance for developing optimized solutions	E	L5
CO5	Develop the concepts of templates and exception handling for the given problem	C	L6

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	-	-	1	1	1	1	2	1	1	1
CO2	2	2	3	1	2	1	1	1	2	2	2	2	2	2	2
CO3	3	2	3	2	2	-	-	1	2	2	1	2	2	2	1
CO4	3	2	3	2	2	1	-	1	2	2	2	2	2	2	2

CO5	3	2	2	2	3	1	1	2	2	2	2	2	2	3	2
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Mapping of Course Outcomes to Program Outcomes:

Weblinks and Video Lectures (e-Resources)

1	https://archive.nptel.ac.in/courses/106/105/106105234/
2	https://archive.nptel.ac.in/courses/106/101/106101208/
3	https://www.youtube.com/watch?v=-TkoO8Z07hI
4	https://ocw.mit.edu/courses/6-s096-introduction-to-c-and-c-january-iap-2013/
5	https://www.tutorialspoint.com/cplusplus/index.htm
6	https://www.w3schools.com/cpp/
7	https://www.geeksforgeeks.org/cpp/cpp-tutorial/
8	https://www.youtube.com/watch?v=vLnPwxZdW4Y
9	https://www.youtube.com/watch?v=iw1Xf_33YM0&list=PLQEaRBV9gAFujcBWJhBT2XXsuMlIfETBy
10	https://www.youtube.com/watch?v=wpDSWDbGXrQ&list=PLfVsf4Bjg79CFqMJ6C6M2SOLITGVliSPu

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	
Remember	5		10		
Understand	5	5	10		10
Apply	20	25	25		20
Analyse	10	10	5	20	10

Evaluate	10	10		20	
Create				10	10

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	5				5	15	15%
CO2	5	10	5	10	10	5	45	45%
CO3	5	5			5	5	20	20%
CO4		5	5	5	5		20	20%
CO5								
Total							100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	5%
Understand	15%
Apply	40%
Analyse	20%
Evaluate	10%
Create	10%

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	5		5	5	10	10%
CO2	5	10	10	10	5	40	10%
CO3		5		5		10	40%
CO4		10	5	5		20	10%
CO5	2	2	2	2	2	10	20%
Total	12	32	17	27	12	100	10%

PROFESSIONAL CORE COURSE (PCC)

PCC Course - Professional Core Course

Teaching Hours/Week (L: T:P: S)	3:0:0:0
Total Hours of Pedagogy	40 hours
Credits:	03
Each Module	8 Hrs
CIE Marks	50

SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Theory

3 Credit Course – Professional Core Course (PCC)

Assessment Details (both CIE and SEE)

- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks).
- A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

Internal Assessment Test (IAT):

- For the Internal Assessment Test component of CIE, there are 25 marks and for Assignment component of the CIE, there are 25 marks. Two Tests, each of 50 Marks with 01-hour 30 minutes' duration, are to be conducted and average of two tests to be reduced to 25 marks
- The first test will be administered after 40-50% of the syllabus has been covered, and
- The second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.
- Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Semester-End Examination:

Theory SEE will be conducted as per the scheduled timetable (duration 03 hours).

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored shall be proportionally reduced to 50 marks.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

Possible Continuous and Comprehensive Assessment (CCA):

- Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom,
- The assessment of these techniques shall be in rubrics.
- The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Professional Core Course (PCC) – 3 Credit course – Theory

Assessme nt Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50	----	----	20	
	Theory	Internal Assessment Test (IAT) - II	Module – 1 to 2.5	50	(50+50) / 2	25	10	Average of Two Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) - II	Module – 2.5 to 5	50				
	Continuous Comprehensi ve Assessment (CCA)	CCA-1- Pedagogical Initiatives / Activity Based learning	Considering all the Modules	50	(50+50) / 2	25	10	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives / Activity Based learning		50				

	Total CIE Theory	50	20	Total Marks of IAT and CCA is 50
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SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III			
Course Title	:	Operating System			
Course Code	:	BCY304			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Category	:	PCC			
Stream	:	Cyber Securit y		CIE	50
Teaching hours/ week (L:T:P:S)	:	3:0:0:0		SEE	50
Total Hours	:	40h Theory		SEE Duration	3
Credits	:	3			

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the structure and services of the operating system that provides to users and system.
2	Learn the various CPU scheduling algorithms, storage management and disk management concepts.
3	Examine multithreading concepts, methods for handling deadlocks and recognize the classic synchronization problems.
4	Estimate Real-Time knowledge on how programming languages, operating systems, and architectures interact and how to use each effectively
5	Understand the structure and services of the operating system that provides to users and system.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.

- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**



DSATM

Scheme of Teaching and Examinations for BE Programme -2026-27

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2026-27)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction to Operating Systems: Computer System Architecture, Operating System Operations. Operating System Structure: Operating System Services, User Operating System Interface, System Calls, Operating-System Design and Implementation, Operating System Structure, Distributed System, Virtualization, Allocating Kernel Memory. Text: Chapter 1: 1.1-1.12, 1.3-1.3.3, 1.5-1.5.2: Chapter 2: 2.1-2.2.3, 2.3, 2.6-2.6.3, 2.7-2.7.5: Chapter 16: 16.1	8
Pedagogy	Collaborative Learning	
2	Processes: Process Concept, Process Scheduling - FCFS, SJF, Priority, RR, Interprocess Communication, Multithreading Models. Process Synchronization: The Critical Section Problem, Peterson's Solution, Mutex Locks, Semaphores, Classical Problems of Synchronization, Failures and Recovery. Text: Chapter 3: 3.1-3.2, 3.4: Chapter 4: 4.1, 4.3: Chapter 5: 5.1 -5.3, 5.5-5.7	8
Pedagogy	Problem Solving	
3	Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock. Text: Chapter 6: 6.1-6.3.4: Chapter 7: 7.1-7.7	8
Pedagogy	Problem Solving	
4	Memory Management: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table. Virtual Memory: Background, Demand Paging, Copy on Write, Page Replacement Algorithms, Thrashing. Text: Chapter 8: 8.1-8.6: Chapter 9: 9.1-9.4, 9.6	8
Pedagogy	Poster Presentation and Problem Solving	

5	Secondary Storage Structure: Mass Storage Structures; Disk Structure; Disk Attachment; Disk Scheduling - FCFS, SCAN, CSCAN, LOOK, SSTF, CLOOK, Disk Management File system Interface: File Concept, Access Methods, Directory Structure. AI based Disk Scheduling, AI based File Systems (Access & Search Optimization) Chapter 10: 10.1-10.5: Chapter 11:11.1-11.3	8
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Pedagogy	Problem Solving
	Pedagogical Initiatives (Not limited to): • Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another • Problem Solving: encourages cognitive thinking and enables creative problem solving • Poster Presentation: allows students to represent the concepts visually in order to understand the topics easily. • Case studies: maps different domains in real time applications • Demonstration: exhibits the implementation process

Text Books	
Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Operating System Concepts, by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 09th Edition, Wiley India, 2018.
Reference Books	
1	Operating Systems, A Concept-Based Approach, by DM Dhamdhere, 3rd Edition, Tata McGraw-Hill, 2012
2	P.C.P. Bhatt, An Introduction to Operating Systems: Concepts and Practice 4th Edition, PHI(EEE), 2014.
3	Operating System: Internals and Design Principles, William Stallings, 8 th, Prentice Hall 2014

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the functionalities of binary logic systems and the computer organization.	U	L2
CO2	Apply the combinational, sequential logic system and the input/output devices communicating with the computer system.	A	L3

CO3	Analyze digital circuits, including storage elements and computer architectures, to assess their functionality and efficiency.	An	L4
CO4	Evaluate different data types on a simple arithmetic and logical unit, and assess the functions of a basic processing unit, including parallel processing.	E	L5
CO5	Design digital circuits and develop corresponding HDL codes.	C	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	0	0	0	1	1	0	2	2	2	1
CO2	3	3	2	2	2	0	0	0	2	1	0	2	3	3	1
CO3	3	3	2	3	2	0	0	0	2	1	0	2	3	3	2
CO4	3	3	2	3	2	0	0	0	1	1	0	2	3	3	2
CO5	3	3	3	2	3	1	1	1	2	2	1	2	3	3	3

Weblinks and Video Lectures (e-Resources)

1	https://www.youtube.com/watch?v=783KABtuE4&list=PLIemF3uozcAKTgsCij82voMK3TMR0YE_f (nptel and mooc link)
2	https://www.youtube.com/watch?v=3-ITLMMeeXY&list=PL3pGy4HtqwD0n7bQfHjPnsWzkeRn6mkO
3	Operating System Full Course Operating System Tutorials for Beginners (youtube.com)
4	Introduction to Operating Systems (youtube.com)
5	https://www.youtube.com/watch?v=783KABtuE4&list=PLIemF3uozcAKTgsCij82voMK3TMR0YE_f (nptel and mooc link)
6	https://www.youtube.com/watch?v=3-ITLMMeeXY&list=PL3pGy4HtqwD0n7bQfHjPnsWzkeRn6mkO
7	Operating System Full Course Operating System Tutorials for Beginners (youtube.com)
8	Introduction to Operating Systems (youtube.com)

9	https://www.youtube.com/watch?v=783KABtuE4&list=PLIemF3uozcAKTgsClj82voMK3TMR0YE f (nptel and mooc link)
10	https://www.youtube.com/watch?v=3-ITLMMeeXY&list=PL3pGy4HtqwD0n7bQfHjPnsWzkeRn6mkO
11	Operating System Full Course Operating System Tutorials for Beginners (youtube.com)
12	Introduction to Operating Systems (youtube.com)
13	https://www.youtube.com/watch?v=783KABtuE4&list=PLIemF3uozcAKTgsClj82voMK3TMR0YE f (nptel and mooc link)
14	https://www.youtube.com/watch?v=3-ITLMMeeXY&list=PL3pGy4HtqwD0n7bQfHjPnsWzkeRn6mkO

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory			
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks
Remember	05	0	0	0
Understand	15	10	0	0
Apply	25	25	0	0
Analyse	05	15	0	0
Evaluate	0	0	25	25
Create	0	0	25	25

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	5	0	0	0	0	10	10%
CO2	9	20	5	5	10	5	36	54%
CO3	0	3	3	5	10	15	34	36%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	14	28	8	10	20	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	05%
Understand	25%
Apply	35%
Analyse	35%
Evaluate	-
Create	-

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	5	0	0	0	0	10	10%
CO2	9	20	5	5	10	5	54	54%
CO3	0	3	3	5	10	15	36	36%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	14	28	8	10	20	20	100	100%



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III		
Course Title	:	Data Communication		
Course Code	:	BCY305		
Course Type (Theory/ Practical/ Integrated)	:	Theory		
Category	:	PCC-1		
Stream	:	Cyber Security	CIE	50
Teaching hours/ week (L:T:P:S)	:	3:0:0:0	SEE	50
Total Hours	:	40h Theory	SEE Duration	3
Credits	:	3		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the concept of Data communication
2	Configure network devices and implement basic networking protocols
3	Apply Subnetting and IP addressing schemes to design a network.
4	Analyze performance of topologies and protocols
5	Evaluate flow control, error control, and LAN protocols; assess impact of network configurations and protocols using NS2

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for BE Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction: Data communication, Networks, Networks Types, Protocol layering, TCP/IP protocol suits, OSI Models Text Book 1: Chapter 1: 1.1 -1.6	8
Pedagogy	Role Play	
2	Physical Layer: Signals, Digital Transmission, Analog Transmission, Multiplexing, Transmission Media Text Book 1:Chapter 2: 2.1 - 2.6 (excluding 2.2)	8
Pedagogy	Problem based Learning	
3	Data Link Layer: Introduction, Data-Link Control, Media Access Protocol, Link layer addressing. LAN: Ethernet, WIFI, IEEE 802.11, Bluetooth; WAN: Telephone Network, Cable Networks Text Book 1: Chapter 3: 3.1 - 3.4: Chapter 4: 4.1 - 4.3: Chapter 5: 5.1 - 5.2	8
Pedagogy	Flip Class room	
4	Network Layer: Network Layer: Data Transfer: Services, Packet Switching, Performance, Internet Protocol version4, IPV6, Transition from IPV4 to IPV6. Network Layer-Routing of packets: Introduction, Routing Algorithm –Distance-Vector Routing Text Book 1: Chapter 7: 7.1 - 7.6: Chapter 8: 8.1 - 8.2.1	8
Pedagogy	Case Study	
5	Networking Tools: Introduction to AI in Computer Networks,Machine Learning for traffic prediction & congestion control & intelligent path selection ,Reinforcement Learning for network optimization,Anomaly detection in network traffic, AI for QoS improvement ,Data-driven networking systems Text Book 3: Chapter 1 : Chapter 2.	8
Pedagogy	Demonstration	
	Pedagogical Initiatives (Not limited to):	

	• Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another • Problem Solving: encourages cognitive thinking and enables creative problem solving • Poster Presentation: allows students to represent the concepts visually in order to understand the topics easily. • Case studies: maps different domains in real time applications • Demonstration: exhibits the implementation process
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Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Data Communication and Network with TCP/IP Protocol suite, Behrouz A. Forouzan, Mc Graw Hill, 6 th Edition, 2022
2	Computer Network simulation in NS2, Neeraj Bhargava, BPB Publishers, 1 st Edition, 2020
3	<i>Machine Learning for Networking: Principles and Practice</i> – Mohamed Medhat Gaber

Reference Books

1	Computer Networks and Internets, Douglas Comer, Pearson Education Publishers, 5 th Edition, 2008
2	Computer Networks, Andrew Tanenbaum, Pearson Education Publishers, 6 th Edition, 2022
3	William Stallings: Data and Computer Communication, Pearson Education, 8 th Edition, 2007

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the basics of data communication, networking, internet and their importance.	U	L2
CO2	Apply the concept of flow control, error control and LAN protocols; to explain the design of, and algorithms used in, the physical, data link layers.	A	L3
CO3	Analyze the performance and efficiency of different network layer protocols and addressing schemes	An	L4

CO4	Evaluate the effectiveness of routing algorithms and protocols.	E	L5
CO5	Create and simulate simple network scenarios using NS2 to demonstrate the interactions between multiple layers	C	L6

Course Outcomes: At the end of the course, the student will be able to:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	Weblinks and Video Lectures (e-Resources)							2	2	2	1
CO2	3	3	2	2	2	-	-	2	1	-	2	3	3	3	2
CO3	3	3	2	3	2	-	-	-	1	1	-	2	3	3	2
CO4	3	3	2	3	2	-	-	-	1	1	-	2	3	3	2
CO5	3	3	3	3	3	-	-	-	2	2	1	2	3	3	3

4	https://archive.nptel.ac.in/courses/106/105/106105080/
5	https://archive.nptel.ac.in/courses/106/105/106105183/
6	https://www.youtube.com/playlist?list=PLBlnK6fEygRgMCUAG0XRw78UA8qnv6jEx
7	https://www.youtube.com/watch?v=ly8ikWtAY7s&list=PLBlnK6fEygRgMCUAG0XRw78UA8qnv6jEx&index=3
8	https://www.youtube.com/watch?v=9jF4Frqb3W4&t=89s
9	https://www.youtube.com/watch?v=JSjbtvOFGhQ
10	https://www.udemy.com/course/computer-networks-data-communication-essentials/?couponCode=ST16MT70224
11	https://www.youtube.com/watch?v=rNN8WwKS74U&t=4s

12	https://www.youtube.com/watch?v=qAFI-2I7wPE&list=PLoCMsyE1cvdWKsLVyf6cPwCLDIZnOj0NS
13	https://www.youtube.com/watch?v=l4q8iugbuiQ&list=PLByK_3hwzY3Tysh-SY9MKZhMm9wlfNOas&index=7
14	https://www.youtube.com/watch?v=olbr3WZwrU&list=PLByK_3hwzY3Tysh-SY9MKZhMm9wlfNOas&index=27

Mapping of Course Outcomes to Program Outcomes:

COs Mapped to POs and PSOs:

Course Outcomes	Program Outcomes	PSOs
CO1	-	-
CO2	PO1, PO12	-
CO3	PO1, PO2, PO10, PO12	-
CO4	PO1, PO4, PO12	-
CO5	PO1, PO9, PO10, PO12	PSO1, PSO2

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory			
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks
Remember	5		10	
Understand	5	5	10	
Apply	20	25	25	
Analyse	10	10	5	20
Evaluate	10	10		20

Create				10
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CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	5				5	15	15%
CO2	5	10	5	10	10	5	45	45%
CO3	5	5			5	5	20	20%
CO4		5	5	5	5		20	20%
CO5								
Total							100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	5%
Understand	15%
Apply	40%
Analyse	20%
Evaluate	10%
Create	10%

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module -3	Module-4	Module-5		
CO1	5	5		5	5	10	10%
CO2	5	10	10	10	5	40	10%
CO3		5		5		10	40%
CO4		10	5	5		20	10%
CO5	2	2	2	2	2	10	20%
Total	12	32	17	27	12	100	100%

PROJECT BASED LEARNING (PBL)

PBL- Project Based Learning

Teaching Hours/Week (L: T:P: S)	0:0:0:2
Total Hours of Pedagogy	25 hours – Project
Credits:	02
Modules	3
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Project Evaluation

	CIE		SEE	
	Project Weekly Assessment		Final Project Evaluation	
Project	Project Understanding	05 Marks	Write up	10 Marks
	Technical Competence	10 Marks	Presentation & Demonstration	50 Marks
	Innovation	10 Marks	Project report	25 Marks
	Problem Solving	15 Marks	Viva-Voce	15 Marks
	Project Demonstration	10 Marks	Total	100 Marks
Total		50 Marks	100 Marks Reduced to 50 Marks	

1. Introduction

Project Based Learning is a model for classroom activity that shifts away from the classroom practices of short, isolated, teacher-centered lessons and instead emphasizes learning activities that are long-term, interdisciplinary, and student-centered.

A systematic teaching method that engages students in learning essential knowledge and life-enhancing skills through an extended, student-influenced inquiry process structured around complex, authentic questions and carefully designed products and tasks.

Project learning, also known as project-based learning, is a dynamic approach to teaching, in which students explore real-world problems and challenges, simultaneously developing cross-curriculum skills while working in small collaborative groups.

2. Characteristics of Project-Based Learning:

- Students making decisions within a framework
- A problem or challenge to be solved;
- Students designing the process for reaching a solution
- Students gathering and managing information
- Continuous Evaluation
- Students regularly reflecting on the process
- A final product to be evaluated for quality
- An atmosphere that tolerates error and change

3. Purpose

- Introducing project-based learning on the curriculum.
- To help students to gain in-depth knowledge of the subject via project.
- During this process, students will be able to learn and understand the various stages of project development.

4. Objectives

- Introducing mini project based on the curriculum.
- Develop in depth knowledge of the topic and technology.
- Use critical thinking skills and make real world connections
- Demonstrate and understand through products.
- Industry and concept-oriented learning.

5. Why Incorporate PBL?

- Promotes collaboration and interaction
- Learners communicate meaningfully and for authentic purposes
- Allows students with a variety of learning styles to demonstrate their acquired knowledge
- Students learn language, content, and skills simultaneously
- Increases learner autonomy
- Provides opportunities for students to pursue their own interests and questions and make decisions about how they will find answers and solve problems.
- Improves education for all students Facilitates student integration of the content of different subjects
- Teaches children to use their own minds well and applies what they learn in school to life-long endeavors.
- Helps students to become technologically literate
- Establishes connections to life outside the classroom, addressing real-world concerns, and developing real-world skills
- Skills learned through PBL are those desired by today's employers.

6. Benefits of PBL

- Offers multiple ways for students to participate and to demonstrate their knowledge.
- Accommodates different kinds of intelligences.
- Shifts students away from doing only what they typically do in a classroom Environment.
- Encourages the mastery of technological tools, thus preparing them for the workforce.
- Serves as a medium for students who don't usually participate.
- Prompts students to collaborate while at the same time support self-directed learning.
- Offers a learning experience that draws on the thinking and shared efforts of several individuals.
- Helps students develop a variety of social skills relating to group work and negotiation.
- Promotes the internalization of concepts, values, and modes of thought, especially those related to cooperation and conflict resolution.
- Establishes a supportive and non-competitive climate for students.
- Provides a means for transferring the responsibility for learning from teachers to students.
- Calls upon students to explain or defend their position to others in their project groups, so that learning is more apt to be personalized and valued.

7. Process

- Project batches will be formed after the commencement of 3rd semester.
- The Students Batch Comprising of 4 members in a batch should be formed by the Project Based

Learning co-ordinator.

- Each Semester consists of 16 Weeks of Project based Learning.
- The Level of the Projects to be identified.
 - **Level 1**- 2nd Year – 3rd Semester & 4th Semester
 - **Level 2**- 3rd year – 5th Semester & 6th Semester
 - **Level 3** – Final Year Project
- The Faculty handling the respective Theory Subject will be the PBL Coordinator and all the three Batches to be handled by the PBL Coordinator with additional faculty.
- The List of Project Batches to be identified by the faculty assigned in consultation with HOD.
- The batch can select any topic from the list circulated by the PBL Coordinator
- The details of students Interaction with the guide shall be maintained by the guide in the prescribed format.
- The Students Project should be continuously evaluated and PBL Coordinator should submit weekly report to the HOD.
- The Rubrics for the PBL should be followed.
- The Students batches shall give the presentation on understanding of the topic and plan for implementation.
- The Evaluation of the Projects is done in Two Phases

7.1 Two phases for Assessment

Phase 1:

1. Phase 1 is for 4 weeks
2. During this phase, the students shall discuss about the Objectives, Literature Survey and plan for project execution.

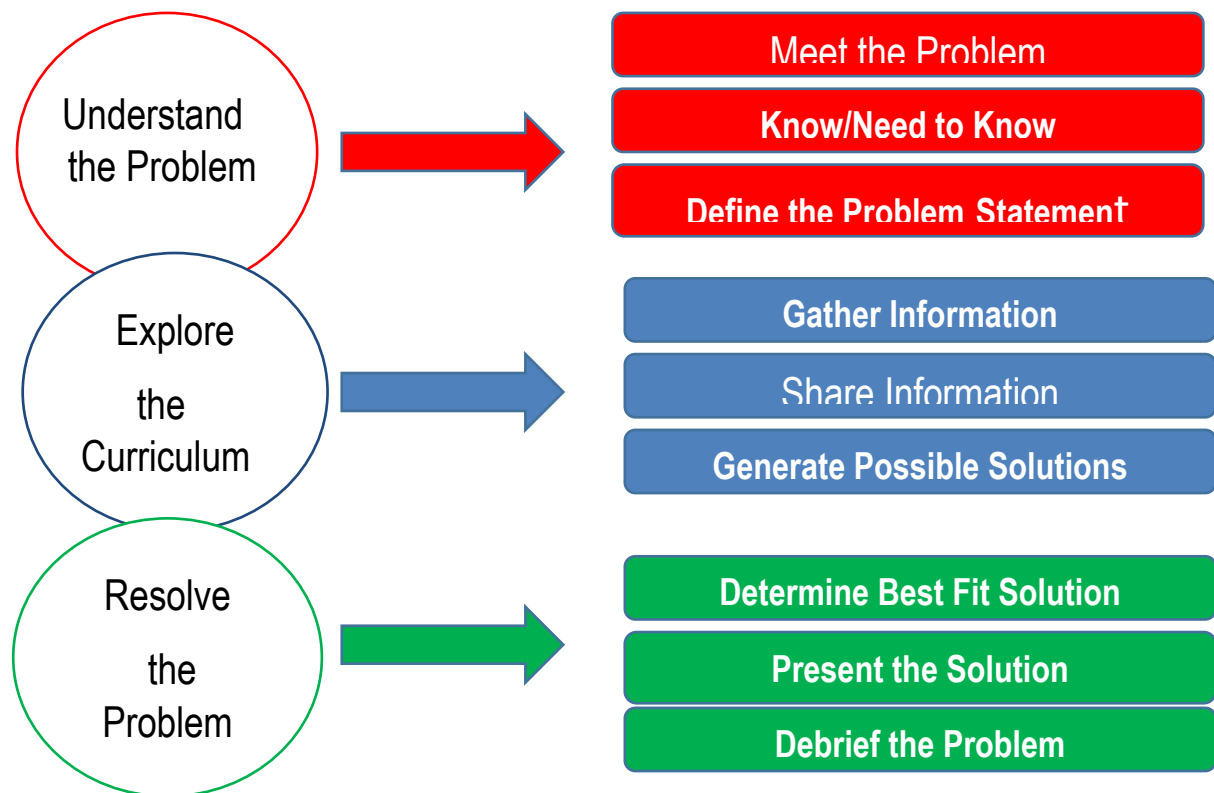
Phase 2:

1. Phase 2 is for 11 Weeks
2. During this phase, the students shall carry out the project under regular supervision of the guide/subject expert, Implementation and give final presentation/demonstration with project documents.

The marks distribution for PBL Work:

1. Phase 1 – 25 Marks
2. Phase 2 – 25 Marks

8. PBL Teaching and Learning Template



9. Practice

- Every week 3 hour is exclusively dedicated to Project Based Learning.
- Assess their progress until they resolve the problem and summarise their learning.
- Provide opportunities for in-depth investigations of worthy topics.
- Allow learners to become more autonomous as they construct personally-meaningful artefacts that are representations of their learning.
- Motivate students by engaging them in their own learning. PBL affords students opportunities for development.
- Building communication, technical and management skills.

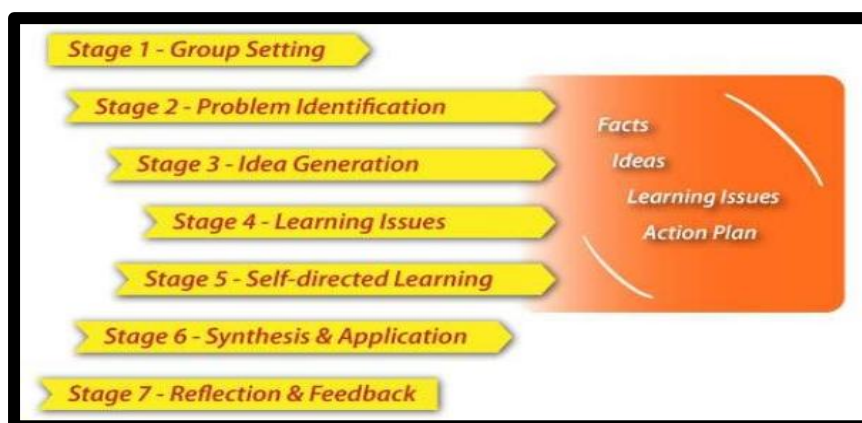
10. Obstacles/Gaps

- Lack of student's interest
- Lack of assessment
- Lack of Basic knowledge
- Lack of consistence attendance and monitoring.
- Lack of abundant time allotment and time management

11. How to Overcome?

- Periodic process – stage wise assessment has to be done.
- Basic Knowledge- A complete guidelines and videos will be provided by the faculty who is handling the respective subject and allotted guide.
- Regular evaluation and periodic monitoring is done by 2 stages.
- For Successful execution and demonstration of end-to-end system, exclusive 3hr/week project time is allotted.

12. Block diagram of PBL



13. Impact Analysis

- It encourages students to draw on their own creativity on problem solving and they learn the bridge gap between theory and practice.
- Final products resulting from project-based learning can be shared with the department at large, thus fostering ownership and technically strong with the subject scenario.

14. PBL – Guidelines

The guidelines are for successful completion of the project and to facilitate effective and uniform conduction of projects by the students. It is expected that these guidelines will help in overall improvement in the quality of the project.

14.1 Main phases of the project

Sl.No	Topics	Duration
Phase-1		
1.	Understanding of the project and preparing a project plan	3 Weeks
2.	Literature review	1 Week

3.	Planning	1 Week
Phase-2		
4.	Analysis and Design	3 Weeks
5.	Implementation	6 Weeks
6.	Testing	1 Week
7.	Writing the project report	1 Week
Total		16 Weeks

14.2 Final Presentation Structure

1. Title of the project & Batch Information
2. Agenda / Topics
3. Problem Statement / Project Definition
4. Background / Literature Review
5. Methodology
6. Analysis and Design
7. Implementation
8. Testing
9. Conclusion and Scope for Future Works

14.3 Project Based Learning Report Structure

1. Cover Page
2. Certificate
3. Declaration
4. Acknowledgement
5. Table of Contents
6. List of Tables
7. List of Figures
8. Introduction
9. Background / Literature Review

- 10. Methodology / Solution
- 11. Analysis and Design
- 12. Implementation
- 13. Results
- 14. Conclusion and Future Works
- 15. Bibliography / References
- 16. Appendices

15. Guidelines to prepare the Project report

- Project reports should be typed neatly only on one side of the paper with 1.5 or double line spacing on a A4 size bond paper (210 x 297 mm).
- The margins should be: Left – 1.25", Right – 1", Top and Bottom – 0.75".
- The total number of reports to be prepared are
 - One copy to the department.
 - One copy to the concerned guide
 - One copy to the candidate.
- Before taking the final printout, the approval of the concerned guide is mandatory and suggested corrections, if any, must be incorporated in the Final Report.
- For making copies dry tone Xerox is suggested.
- An abstract (synopsis) not exceeding 100 words, indicating salient features of the work.

16. Outcome of the project

- Students will gain the knowledge and understand
- To think creatively, work collaboratively.
- Solve complex problems using digital technology.
- Students learn and desire to engage continuous gain about knowledge such as design, analysis, development, implementation and testing.
- Strong written communication skills and the ability to write technical documents that include specification, design, and implementation of a mini project.

Project - Based Learning Rubric

Score Levels	Content	Conventions	Organization	Presentation
5	- Is well thought out and supports the solution to the challenge or question - Reflects application of critical thinking - Has clear goal that is related to the topic - Is pulled from a variety of sources - Is accurate	- No spelling, grammatical, or punctuation errors - High-level use of vocabulary and word choice	- Information is clearly focused in an organized and thoughtful manner. - Information is constructed in a logical pattern to support the solution.	- Multimedia is used to clarify and illustrate the main points. - Format enhances the content. - Presentation captures audience attention. - Presentation is organized and well laid out.
4	- Is well thought out and supports the solution - Has application of critical thinking that is apparent - Has clear goal that is related to the topic - Is pulled from several sources - Is accurate	- Few (1 to 3) spelling, grammatical, or punctuation errors - Good use of vocabulary and word choice	Information supports the solution to the challenge or question.	- Multimedia is used to illustrate the main points. - Format is appropriate for the content. - Presentation captures audience attention. - Presentation is well organized.

3	▪ Supports the solution ▪ Has application of critical thinking that is apparent ▪ Has no clear goal ▪ Is pulled from a limited number of sources ▪ Has some factual errors or inconsistencies	▪ Minimal (3 to 5) spelling, grammatical, or punctuation errors ▪ Low-level use of vocabulary and word choice	▪ Project has a focus but might stray from it at times. ▪ Information appears to have a pattern, but the pattern is not consistently carried out in the project. ▪ Information loosely supports the solution.	▪ Multimedia loosely illustrates the main points. ▪ Format does not suit the content. ▪ Presentation does not capture audience attention. ▪ Presentation is loosely organized.
2	▪ Provides inconsistent information for solution ▪ Has no apparent application of critical thinking ▪ Has no clear goal ▪ Is pulled from few sources ▪ Has significant factual errors, misconceptions, or misinterpretations	▪ More than 5 spelling, grammatical, or punctuation errors ▪ Poor use of vocabulary and word choice	▪ Content is unfocused and haphazard. ▪ Information does not support the solution to the challenge or question. ▪ Information has no apparent pattern.	▪ Presentation appears sloppy and/or unfinished. ▪ Multimedia is overused or underused. ▪ Format does not enhance content. ▪ Presentation has no clear organization.

Subject Identified for Project Based Learning

Semester	III
Subject Identified for PBL	Advanced Python Programming
Prerequisite	Basic Python, Basics of scientific computing using python, Object Oriented Concept
Justification for the selected subject	It is required to analyze the data, building projects in different domains like E-commerce, healthcare, social media etc.

List of possible projects	Educational Tools, Social Media Applications, Healthcare, Transport, E-Commerce, IoT Applications, Machine Learning and Artificial Intelligence, Desktop GUI Applications, Game Development, Web Scraping and Data Mining: Database Applications, Networking and Cybersecurity. (Not limited to)
----------------------------------	---

Signature of the Guide

Signature of H



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III		
Course Title	:	Unix and Shell Programming		
Course Code	:	BCY306L		
Course Type (Theory/ Practical/ Integrated)	:	Practical		
Category	:	PBL		
Stream	:	Cyber Security		CIE 50
Teaching hours/ week (L:T:P:S)	:	0:2:0:2		SEE 50
Total Hours	:	25h Theory		SEE Duration 2
Credits	:	2		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To introduce the basics of Unix/Linux operating systems and shell programming.
2	To develop practical skills in writing automation and system scripts for administration and security.
3	To implement cybersecurity-focused mini projects using shell scripting.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for BE Programme -2024-25
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COURSE CURRICULUM

Module No.	
1	. Basics of Unix/Linux and Shell Programming Covers Unix/Linux architecture, essential terminal commands, file management, permissions, shell scripting basics including variables, loops, and conditional statements, plus simple automation tasks. Textbook 1: Chapters 1, 2, and 3 (Introduction, Unix Commands, Basic Shell Scripting)
Pedagogy	Hands on Practical
2	. Advanced Shell Scripting and Security Automation Focuses on advanced scripting concepts such as functions, error handling, text processing using awk and sed, job scheduling with cron, log analysis, system monitoring, and basic network security scripting. Textbook: Chapters 4, 5, and 6 (Advanced Shell Programming, Text Processing, Job Scheduling)
Pedagogy	Problem Solving
3	Mini Projects on Cybersecurity and Automation Applies scripting skills to real-world projects including log analyzers, port scanners, file integrity checks, session tracking, and automation of cybersecurity-related tasks. Ref: Textbook 1, Chapter 7 and Appendix (Projects and Case Studies, Practical Applications)
Pedagogy	Demonstration
4	Pedagogical Initiatives (Not limited to): • Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another

	• Problem Solving: encourages cognitive thinking and enables creative problem solving
	• Poster Presentation: allows students to represent the concepts visually in order to understand the topics easily. • Case studies: maps different domains in real time applications • Demonstration: exhibits the implementation process

	Text Books	
	Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
	1	Unix and Shell Programming by B.M. Harwani, Oxford University Press, 2013.
	2	Linux Command Line and Shell Scripting Bible by Richard Blum & Christine Bresnahan, Wiley, 4th Edition, 2021.
	Reference Books	
	1	Advanced Bash-Scripting Guide by Mendel Cooper, Linux Documentation Project.
	2	The Linux Programming Interface by Michael Kerrisk, No Starch Press, 2010.

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand and apply fundamental Unix/Linux commands and shell scripting basics.	U & A	L2 & L3
CO2	Develop and Discover advanced shell scripts for automation and system security tasks.	A & An	L3 & L4
CO3	Design and execute mini projects focusing on system security using Unix/Linux tools.	C	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	1	2	0	0	1	1	2	1	2	1	2	1
CO2	2	2	2	2	3	1	1	1	2	2	2	2	2	3	2



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(CSE, ISE, ECE, EEE, MECH, CV)

Project Based Learning - Batch

From,

Date:

Name: & USN:

Name: & USN:

Name: & USN:

Name: & USN:

Semester:

Respected Sir/Madam,

Sub: Regarding PBL Batch

With respect to the above subject, we are the students mentioned above would like to form the batch
for carrying out the mini project
on.....

Thanking you,

Yours faithfully

Sl. No.	Name of the student	Signature
1.		

2.		
3.		
4.		

Signature of the Guide

Name of the Guide

Designation

Department of Cyber Security Engineering



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Project Based Learning – Student(s) – Guide – Interaction

Date		
PBL Batch No.		
Title of the project		
Week No.		
Content of the Discussion		
Suggestion by the guide		

Name of Signature of students		

Signature of the Guide

Signature of PBL Coordinator

Signature of



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Project Based Learning – Continuous Evaluation

Batch No.	Name	USN	Marks assigned	Remarks by the guide on the progress of the project

Signature of the Guide

Signature of PBL Coordinator

Signature of HOD



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Project Based Learning – Review

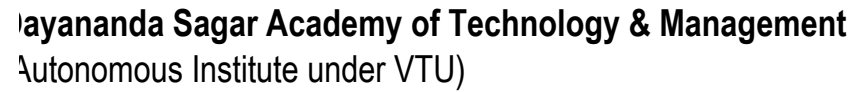
CONTINUOUS INTERNAL ASSESSMENT

Batch No.	Name of the Student	USN	Phase I (25 Marks)		Phase II (25 Marks)		Final CIE Marks (Phase I & Phase II) (50 Marks)
			Abstract / Understanding of the Project (5 Marks)	Analysis & Design (20 Marks)	Implementation (20 Marks)	Demonstration (5 Marks)	

Signature of the Guide

Signature of PBL Coordinator

Signature of HOD



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[illegible]

ABILITY ENHANCEMENT COURSE (AEC)

AEC Course – Ability Enhancement Course

Teaching Hours/Week (L: T:P: S)	0:0:2:0
Total Hours of Pedagogy	28 hours Practical
Credits:	02
Programs / Experiments	10
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	2
Examination nature (SEE)	Practical



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Semester	:	III				
Course Title	:	Agentic AI-1				
Course Code	:	BCY307A				
Course Type (Theory/Practical/ Integrated)	:	Practical				
Category	:					
Stream	:	Cyber Security		CIE	:	50
Teaching hours/ week (L:T:P:S)	:	0:0:2:0		SEE	:	50
Total Hours	:	28 Hours		SEE	:	2 Hours
Credits	:			Duration	:	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the fundamentals of data structures in intelligent/agent-based systems.
2	Learn to select appropriate data structures for autonomous decision-making tasks.
3	Analyze real-world problems and model them using agentic AI with suitable data structures .
4	Design solutions using data structures for agent reasoning, planning, and learning .
5	Develop efficient data structures to support real-world agentic AI applications.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



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Scheme of Teaching and Examinations for BE Programme -2024-25

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Module <u>Artificial Intelligence Fundamentals</u> Learn the basics of AI and the tech behind its amazing capabilities. Module <u>Generative AI Basics</u> -Discover the capabilities of generative AI and the technology that powers it. <u>Natural Language Processing Basics</u> -Learn how AI enables computers to interpret and generate natural human language.	3
Pedagogy	Hands on Practical	
2	Module Large Language Models-Learn about large language models (LLMs) and how Salesforce uses them.How Salesforce Shapes Ethical AI Standards in the Agent Era Build trust between humans and agents with responsible AI principles that guide design, development, and use of AI.	3
Pedagogy	Hands on Practical	
3	Module Data Fundamentals for AI-Learn the importance of data and ethics to prep for the AI innovations shaping our future..Data + AI + CRM: Quick Look-Discover how Data + AI + CRM work together to supercharge your business.Prompt Fundamentals Write prompts effectively to get the most out of generative AI.	8
Pedagogy	Hands on Practical	
4	Module Prompt Builder Basics-Learn how to create prompt templates and use them in your orgs. The Einstein Trust Layer-Learn how the Einstein Trust Layer protects your generative AI data. Autonomous Agents -Discover the transformative power and business impact of autonomous agents.	8

Pedagogy	Hands on Practical	
5	Module-Introduction to Agentforce-Learn how Agentforce gets work done and what jobs Agentforce can perform.Introduction to Agentforce Builder-Tour Agentforce Builder features that make it easy to create and customize agents.	3
Pedagogy	Hands on Practical	
6	Module Agentforce for Service Learn how AI agents help customers via autonomous, natural responses grounded in data. Module Agentforce for Sales: Quick Look Learn how Agentforce can help sales reps nurture leads and close deals.	3
Pedagogy	Hands on Practical	
7	Agentblazer Community Skill up on AI, discuss best practices, gain access to product experts, showcase your expertise, and supercharge your career.	3
Pedagogy	Hands on Practical	
8	Quick Start: Build a Service Agent with Agentforce Create a service agent to assist with recommendations and bookings	3
Pedagogy	Hands on Practical	
9	<i>Project</i> Connect Data Cloud to Agentforce and Prompt Builder <i>Combine harmonized data and generative AI to create powerful interactions and automations.</i>	3
Pedagogy	Peer Learning & Presentation	
	Pedagogical Initiatives (Not limited to): • Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another • Problem Solving: encourages cognitive thinking and enables creative problem solving • Poster Presentation: allows students to represent the concepts visually in order to understand the topics easily. • Case studies: maps different domains in real time applications • Demonstration: exhibits the implementation process	
Text Books		

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Agentforce Unleashed: The Unofficial Guide for Business Users and Salesforce Admins, by Jeffrey A. Doornbos PhD, 2024
2	https://www.salesforce.com/agentforce/use-cases/
Reference Books	
1	https://www.salesforce.com/en-us/wp-content/uploads/sites/4/documents/partners/agentforce-partner-guidebook-technology-partners.pdf

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand and Explain Core Agentforce and AI Concepts	Understand	L2
CO2	Apply Agentforce Tools to Build a Basic AI Agent	Apply	L3
CO3	Analyze and Present Business Use Cases for AI Agents.	Analyze	L4

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	1	0	2	1	2	1	2	1	1	3
CO2	2	2	3	2	3	1	1	1	2	2	2	2	2	3	2
CO3	2	3	3	2	2	2	1	2	2	3	2	3	2	2	3



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Semester	:	III		
Course Title	:	Cyber Crime & Cyber Laws		
Course Code	:	BCY307B		
Course Type (Theory/ Practical/ Integrated)	:	Theory		
Category	:	AEC		
Stream	:	CIE	:	50
Teaching hours/ week (L:T:P:S)	:	SEE	:	50
Total Hours	:	SEE Duration	:	2 Hours
Credits:				

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To describe different type of cyber crimes
2	To able to know IT Act:2000
3	To introduce types of e-business and Laws that govern them

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.

- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



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Module No.	Hours	COURSE CURRICULUM	
1	Cyber Crimes: meaning, categories and kinds. Introduction to IT Act, E-business meaning, significance and models. Text Book 1: Chapter 1 (1.1 to 1.10) Chapter 2 (2.1to 2.8) Chapter 3 (3.1 to 3.8)		2
Pedagogy	Chalk and talk		
2	Contemporary business issues in cyberspace: Instant messaging, social networking sites, mobile application, IoT, Domain name disputes, e-form, e money and transfer, Text Book 1: Chapter 5 (5.1 to 5.7)		3
Pedagogy	Discussion		
3	Prepaid Payment Instruments, privacy of data and secure ways of operation in cyberspace. Digital Signature, Text Book 1: Chapter 5 (5.8 to 5.9) Chapter 6 (6.1 to 6.6).		3
Pedagogy	Discussion		
4	Regulation of certifying authorities, Text Book 1: Chapter 8 (8.1 to 8.12)		3
Pedagogy	Assignment		
5	Cyber contraventions, adjudication, appellate tribunal and offences, Case laws relating to IT act Text Book 1:Chapter 9 (9.1 to 9.9) Chapter 10 (10.1 to 10.13)		3
Pedagogy	Presentation		
	Pedagogical Initiatives (Not limited to): Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another Problem Solving: encourages cognitive thinking and enables creative problem-solving Poster Presentation: allows students to represent the concepts to understand the topics easily visually. Case studies: maps different domains in real-time applications Demonstration: exhibits the implementation process		

Text Books		
Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year	
1	Sushma Arora, Raman Arora, "Cyber Crime and Cyber laws" . Taxmann's publication 4th edition 2021	
Reference Books		
1	The Institute of Company Secretaries of India "Cyber Crime Law and Practice" 2016.	
2	Dr. U.S. Pandey, Dr.Verendra kumar, Dr. Harman Preeth Singh, "Cyber Crime and Cyber Laws" Himalaya Publishing house, 1st edition 2017	

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Describe various types of cyber crimes	Remember	L1
CO2	Illustrate various applications through which cyber-crimes happens	Analyze	L3
CO3	Explain various cyber laws related to the Indian IT Act.	Understand	L2

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	2	1	2	1	2	0	2	3	2	3
CO2	3	3	1	2	2	2	1	1	1	2	1	2	3	3	2
CO3	2	2	1	1	1	3	2	3	1	2	1	2	2	2	3



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Experiential Learning - Batch

From,

Date:

Name: & USN:

Name: & USN:

Name: & USN:

Name: & USN:

Semester:

Respected Sir/Madam,

Sub: Regarding Experiential Learning Batch

With respect to the above subject, we are the students mentioned above would like to form the batch
for carrying out the mini project
on.....

Thanking you,

Yours faithfully

Sl. No.	Name of the student	Signature
1.		
2.		
3.		
4.		

Signature of the Guide

Name of the Guide

Designation



Department of Cyber Security Engineering

Jayananda Sagar Academy of Technology & Management
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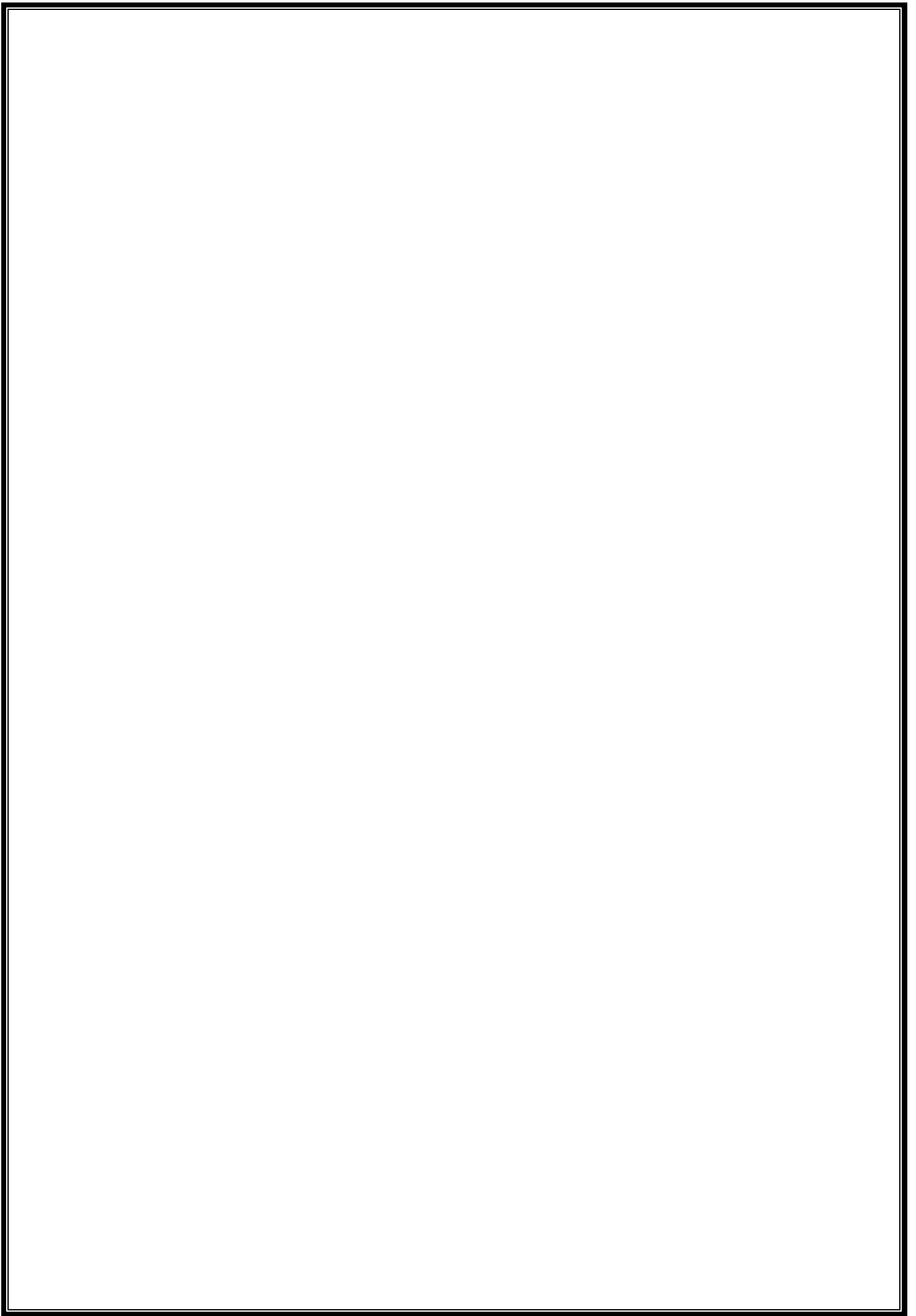
Experiential Learning (EL) – Student(s) – Guide – Interaction

Date		
EL Batch No.		
Title of the project		
Week No.		
Content of the Discussion		
Suggestion by the guide		
Name of Signature of students		

Signature of the Guide

Signature of EL Coordinator

Signature of HOD



Assessment

Rubrics for Project-Based Learning Assessment

Sl. No	Name of the Student	USN	Criteria	Exemplary (4)	Proficient (3)	Developing (2)	Beginning (1)	Total
			Project Understanding	Demonstrates deep understanding of project goals and requirements; identifies key issues and objectives.	Shows good understanding of project goals and requirements; recognizes most key issues and objectives.	Displays basic understanding of project goals and requirements; some key issues and objectives are unclear.	Lacks clear understanding of project goals and requirements; key issues and objectives are misunderstood.	
			Technical Competence	Mastery of technical skills required for the project; applies skills effectively and efficiently.	Good technical skills; applies skills competently with few errors.	Basic technical skills; occasionally makes errors in application.	Limited technical skills; frequently makes errors in application.	

			Innovation	Highly creative and original ideas; shows significant innovation and out-of-the-box thinking.	Somewhat creative and original ideas; demonstrates innovation in some aspects.	Limited creativity and originality; shows minimal innovation.	Lacks creativity and originality; no evidence of innovative thinking.	
			Problem Solving	Identifies problems accurately and develops effective, comprehensive solutions.	Identifies problems correctly and develops good solutions.	Identifies problems but solutions are somewhat effective or incomplete.	Struggles to identify problems and develop effective solutions.	
			Project Management	Manages project timelines, resources, and tasks exceptionally well; meets all deadlines.	Manages project timelines, resources, and tasks effectively; meets most deadlines.	Manages project timelines, resources, and tasks with some difficulty; misses some deadlines.	Poor management of project timelines, resources, and tasks; frequently misses deadlines.	

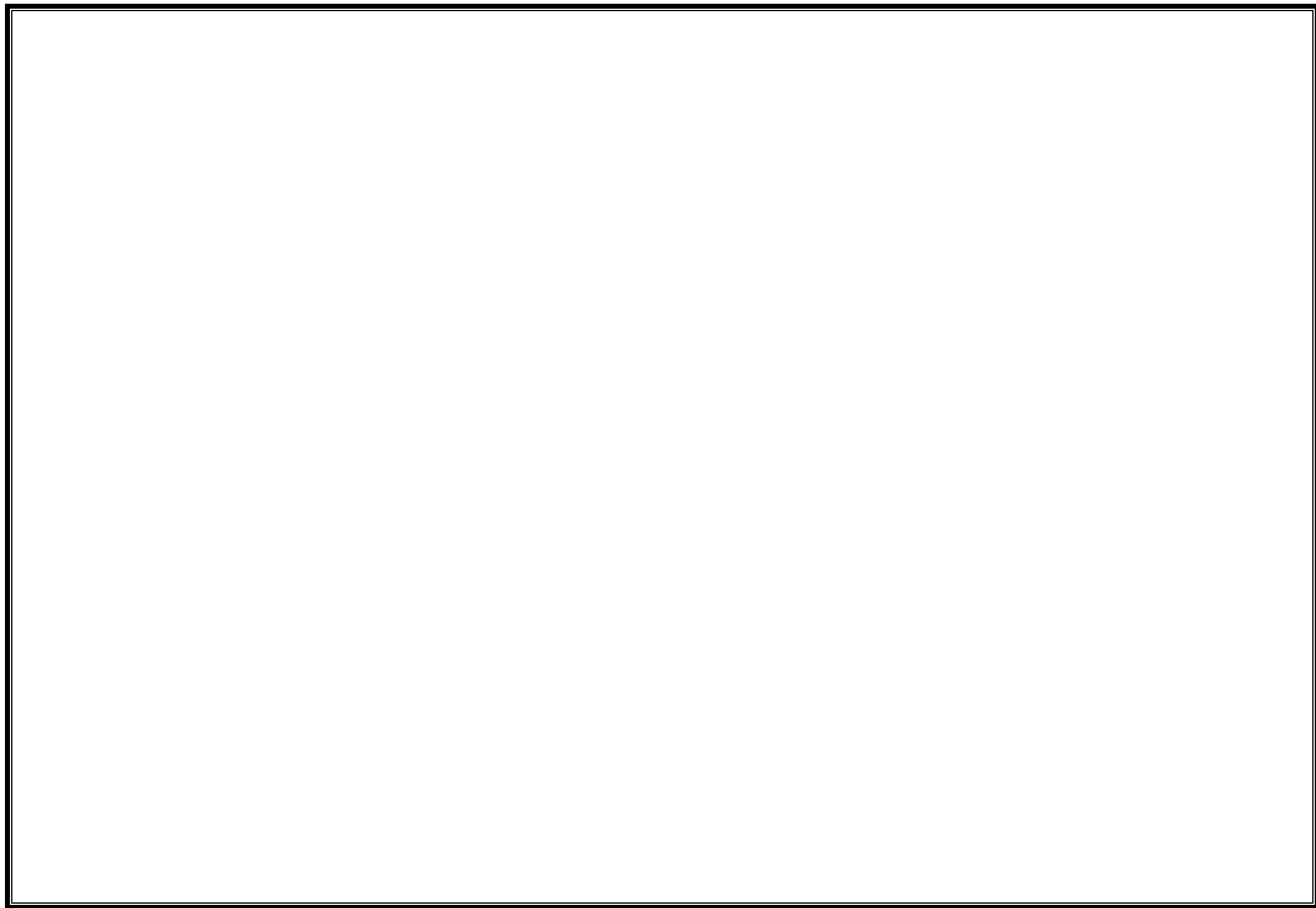
			Documentation	Thorough, clear, and well-organized documentation; all necessary details included.	Clear and organized documentation; most necessary details included.	Basic documentation; some necessary details are missing or unclear.	Poor documentation; lacks necessary details and organization.	
			Presentation Skills	Engaging and well-organized presentation; communicates ideas clearly and effectively.	Good presentation; communicates ideas clearly but lacks some engagement or organization.	Basic presentation; some ideas are unclear or poorly organized.	Ineffective presentation; ideas are unclear and poorly organized.	
			Collaboration	Works exceptionally well with team members; shows strong teamwork and leadership skills.	Works well with team members; demonstrates good teamwork.	Works with team members but has some difficulties in collaboration.	Struggles to work with team members; lacks teamwork and collaboration skills.	

			Faculty Assessment	Meets or exceeds faculty expectations in all areas; shows exceptional performance.	Meets faculty expectations in most areas; shows good performance.	Meets some faculty expectations; shows average performance.	Does not meet faculty expectations; shows poor performance.	
			Reflection	Provides deep insights and critical analysis of own work; demonstrates significant learning and growth.	Provides good insights and analysis of own work; demonstrates learning and growth.	Provides basic insights and analysis of own work; shows some learning and growth.	Provides minimal or no insights and analysis of own work; shows little to no learning and growth.	
			Overall Assessment	Exceptional overall performance; exceeds expectations in most or all areas.	Good overall performance; meets expectations in most areas.	Average overall performance; meets expectations in some areas.	Poor overall performance; does not meet expectations in most areas.	

Skills Assessment

Course :

[illegible]



**SOCIAL CONNECT
&
RESPONSIBILITY (SCR)**

SCR- Social Connect & Responsibility

Teaching Hours/Week (L: T: P: S)	0:0:2:0
Total Hours of Pedagogy	15 hour Practical
Credits:	01
Programs / Experiments	12
CIE Marks	100
SEE Marks	-----
Total Marks	100
Exam Hours	3
Examination nature (SEE)	No SEE only CIE For CIE Assessment - Activities Report Evaluation by College NSS Officer / HOD / Sports Dept / Any Dept.



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Semester	:	III			
Course Title	:	Social Connect and Responsibility			
Course Code	:	BCY308			
Course Type (Theory/ Practical/ Integrated)	:	Practical			
Category	:	SCR			
Stream	:	Cyber Security	CIE	:	100
Teaching hours/ week (L:T:P:S)	:	0:0:2:0	SEE	:	NA
Total Hours	:	15 hours	CIE	:	1 Hour
Credits	:	1	Duration	:	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the environment to build and elevate nature to the society
2	Explore the ancient monument with team, connecting to society with creative idea.
3	Demonstrate planning, organizational and management skills

Teaching-Learning Process

General Instructions - Pedagogy :

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

- In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the activities will develop students' theoretical and applied social and cultural skills.
- State the need for activities and its present relevance in the society and Provide real-life examples.
- Support and guide the students for self-planned activities.
- You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress in real activities in the field.
- Encourage the students for group work to improve their creative and analytical skills



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COURSE CURRICULUM

Contents :

The course is mainly activity-based that will offer a set of activities for the student that enables them to connect with fellow human beings, nature, society, and the world at large.

The course will engage students for interactive sessions, open mic, reading group, storytelling sessions, and semester-long activities conducted by faculty mentors.

In the following a set of activities planned for the course have been listed:

Module No.	Topics	Hours
1	Part I: Plantation and adoption of a tree: Plantation of a tree that will be adopted for four years by a group of BE students. They will also make an excerpt either as a documentary or a photoblog describing the plant's origin, its usage in daily life, and its appearance in folklore and literature.	8
Pedagogy		
2	Part II : Heritage walk and crafts corner: Heritage tour, knowing the history and culture of the city, connecting to people around through their history, knowing the city and its craftsman, photo blog and documentary on evolution and practice of various craft forms -- Objectives, Visit, case study, report, outcomes.	8
Pedagogy		
3	Part III : Animal adoption and Waste Management: Community Clean-Up Events and Pet -Adopting animals for shelters- Objectives, Visit, case study, report, outcomes, documentary or photo blog presenting the current practices	8
Pedagogy		
4	Part IV: Water conservation:	8

	Water Conservation Workshops about water-saving techniques, Educational Campaigns in Schools on Protection of Local Water Resources , - Objectives, Visit, case study, report, outcomes, documentary or photo blog presenting the current practices	
Pedagogy		
5	Part V : Food walk: Cooking without fire recipes with Tasting and Learning Sessions, Food Waste Awareness Healthy on Eating, Charitable Initiatives – Objectives, Visit, case study, report, outcomes, implementation in the campus, documentary or photo blog presenting the current practices.	8
	Pedagogical Initiatives: • Role play: form of experiential learning • Problem Solving: encourages cognitive thinking and enables creative problem solving • Poster Presentation: allows students to represent the concepts visually in order to understand the topics easily. • Case studies: maps different domains in real time applications • Demonstration: exhibits the implementation process	

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Apply food walk knowledge through case studies	Apply	L3
CO2	Analyse Animal adoption and water conservation process	Analyze	L4
CO3	Demonstrate the plantation of Tree and experiencing the Heritage trip	Create	L6

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3														
CO2		3													
CO3			3				3	3	3	2		3	2		

Mapping of Course Outcomes to Program Outcomes:

Activities:

Jamming session, open mic, and poetry: Platform to connect to others. Share the stories with others. Share the experience of Social Connect. Exhibit the talent like playing instruments, singing, one-act play, art-painting, and fine art.

PEDAGOGY:

The pedagogy will include interactive lectures, inspiring guest talks, field visits, social immersion, and a course project. Applying and synthesizing information from these sources to define the social problem to address and take up the solution as the course project, with your group. Social immersion with NGOs/social sections will be a key part of the course. Will all lead to the course project that will address the needs of the social sector?

COURSE TOPICS:

The course will introduce social context and various players in the social space, and present approaches to discovering and understanding social needs. Social immersion and inspiring conversational will culminate in developing an actual, idea for problem-based intervention, based on an in-depth understanding of a key social problem.

Duration :

A total of 40 - 50 hrs engagement per semester is required for the 3rd semester of the B.E. /B.Tech. program. The students will be divided into groups. Each group will be handled by faculty mentor. Faculty mentor will design the activities (particularly Jamming sessions open mic ,and poetry) Faculty mentors has to design the evaluation system as per guidelines of scheme & syllabus.

Continuous Internal Evaluation (CIE):

- After completion of the course, the student shall prepare, with daily diary as reference, a comprehensive report in consultation with the mentor/s to indicate what he has observed and learned in the social connect period.
- The report should be signed by the mentor.
- The report shall be evaluated on the basis of the following criteria and/or other relevant criteria pertaining to the activity completed. Marks allotted for the diary are out of 50.
- Planning and scheduling the social connect Information/Data collected during the social connect
Analysis of the information/data and report writing
- Considering all above points allotting the marks as mentioned below

Excellent : 80 to 100

Good : 60 to 79

Satisfactory : 40 to 59

Unsatisfactory and fail: <

Pedagogy – Guidelines:

It may differ depending on local resources available for the study as well as environment and climatic differences, location and time of execution.

Sl.No	Topic	Group size	Location	Activity execution	Reporting	Evaluation Of the Topic
1.	Plantation and adoption of a tree:	May be individual or team	Farmers land/ parks / Villages / roadside/ community area / College campus etc....	Site selection /proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty
2.	Heritage walk and crafts corner:	May be individual or team	Temples / monumental places / Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc.....	Site selection /proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty
3.	Waste management and Animal adoption	May be individual or team	Farmers land / parks / Villages visits / roadside/ community area / College campus etc....	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty
4.	Water conservation:	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/ Government Schemes officers / campus etc.....	Site selection / proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty
5.	Food walk: Practices in societ	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/ Government Schemes officers/ campus etc...	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty

1 Credit Course – Practical + Planning**Assessment Details (both CIE and SEE)****NO SEE – Semester End Exam – Completely Practical and activities based evaluation****Plan of Action (Execution of Activities)**

Sl.No	Practice Session Description
1.	Lecture session in field to start activities
2.	Students Presentation on Ideas
3.	Commencement of activity and its progress
4.	Execution of Activity
5.	Case study-based Assessment, Individual performance
6.	Sector/ Team wise study and its consolidation
7.	Video based seminar for 10 minutes by each student at the end of semester with Report.

- Each student should do activities according to the scheme and syllabus.
- At the end of semester student performance has to be evaluated by the faculty for the assigned activity progress and its completion.
- At last consolidated report of all activities from 1st to 5th, compiled report should be submitted as per the instructions and scheme.

Assessment Details for CIE (both CIE and SEE)

Weightage	CIE – 100%	• Implementation strategies of the project (NSS work). • The last report should be signed by NSS Officer, the HOD and principal. • At last report should be evaluated by the NSS officer of the institute.
Field Visit, Plan, Discussion	10 Marks	
Commencement of activities and its progress	20 Marks	
Case study-based Assessment Individual performance with report	20 Marks	
Sector wise study & its consolidation 5*5 = 25	25 Marks	
Video based seminar for 10 minutes by each student At the end of semester with Report. Activities 1 to 5, 5*5 = 25	25 Marks	
Total marks for the course in each semester	100 Marks	
For each activity, 20 marks CIE will be evaluated for IA marks at the end of semester, Report and assessment copy should be made available in the department.		
Students should present the progress of the activities as per the schedule in the prescribed practical session in the field. There should be positive progress in the vertical order for the benefit of society in general through activities.		



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III				
Course Title	:	Linear Algebra and Discrete Mathematics				
Course Code	:	BMATA301				
Course Type (Theory/ Practical/ Integrated)	:	Theory				
Category	:	ASC				
Stream	:	Common to CSE & Allied branches		CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	3:0:0:0		SEE	:	50 Marks
Total Hours	:	40 Hours		CIE Duration	:	3 Hours
Credits	:	3				

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Acquire basic knowledge of Mathematical concepts for understanding Engineering problems
2	Use concepts of probability, statistics, sampling theory, ANOVA and logic in solving problems
3	Analyze problems using concepts of probability, statistics, sampling theory, ANOVA and logic
4	Analysis of various real time problems using the skills acquired

Teaching-Learning Process

Pedagogy (General Instructions):

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.

6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can device innovative pedagogy to improve teaching-learning



DSATM

Scheme of Teaching and Examinations for BE Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Matrix Theory Elementary transformations on a matrix, echelon form & rank of a matrix, consistency of system of linear equations, Gauss elimination, Gauss – Seidel method to solve system of linear equations. eigen values and eigen vectors of a matrix, Rayleigh power method to determine the dominant eigen value of a matrix, diagonalization of matrices.	8
Pedagogy	Chalk and board, Group Discussion, ppt, Videos	
2	Vector Spaces Introduction to vector spaces, subspaces, linear combination, linear span, linear dependence and independence, basis and dimension.	8
Pedagogy	Chalk and board, Group Discussion, PPT, Videos	
3	Linear Transformation and Inner Product Spaces Linear mappings, Matrix representation of linear transformations, Rank-Nullity theorem, inner product spaces, length and orthogonality, orthogonal and orthonormal sets, projections, Gram-Schmidt process.	8
Pedagogy	Chalk and Board, Group Discussion, PPT, Videos	
4	Fundamentals of logic Basic connectives and truth tables, logical equivalence, laws of logic, logical implication-rules of inference, proofs of theorems.	8
Pedagogy	Chalk and Board, Group Discussion, PPT, Videos	
5	Relations and functions Cartesian products and relations, equivalence relations, partitions, partial orders, Hasse diagrams. Functions: one-one and onto functions, composition of functions and invertible functions.	8
Pedagogy	Chalk and Board, Group Discussion, PPT, Videos	

List of Experiments or Programs

Sl.No	Experiments/Programs	COs
	NIL	

Reference Books

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)
1. <i>Introduction to the History of Mathematics</i> by Carl B. Boyer and Uta C. Merzbach, John Wiley & Sons, 1968, 2nd Edition
2. <i>The History of Mathematics</i> by Victor J. Katz, Springer, 2009, 1st Edition
3. <i>Mathematics: Its Origins and Development</i> by Howard Eves, John Wiley & Sons, 1955, 2nd Edition
4. <i>The History of Mathematics</i> by Carl B. Boyer, John Wiley & Sons, 1938, 1st Edition
5. <i>Mathematics and Its History</i> by John J. O'Connor and Edmund F. Robertson, Springer, 2004, 1st Edition
6. <i>The History of Mathematics</i> by Howard Eves, John Wiley & Sons, 1955, 2nd Edition
7. <i>Mathematics: Its Origins and Development</i> by Howard Eves, John Wiley & Sons, 1955, 2nd Edition
8. <i>The History of Mathematics</i> by Carl B. Boyer, John Wiley & Sons, 1938, 1st Edition
9. <i>Mathematics and Its History</i> by John J. O'Connor and Edmund F. Robertson, Springer, 2004, 1st Edition
10. <i>The History of Mathematics</i> by Howard Eves, John Wiley & Sons, 1955, 2nd Edition

1	Erwin Kreyzig, “Advanced Engineering Mathematics”, 10 th Edition, Wiley Publications, 2018.
2	B. S. Grewal “Higher Engineering Mathematics”, Khanna publishers, 44th Ed., 2021
3	Fundamentals of Statistics by Sriji Bhushan, ISBN: 9789355428752, 9355428758

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the basic concepts of probability, statistics, sampling theory, ANOVA and logic	Remember, Understand	L1, L2
CO2	Apply techniques of probability, statistics, sampling theory, ANOVA and logic to solve Engineering Problems	Apply	L3
CO3	Analyze Engineering problems using probability, statistics, sampling theory, ANOVA and logic	Analyse	L4
CO4	Investigate problems arising in real life using the overall knowledge acquired	Evaluate	L5

Mapping of Course Outcomes to Program Outcomes:

[illegible]

CO4				2					1	1					
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Weblinks and Video Lectures (e-Resources)

1	https://tinyurl.com/43fve5na
2	https://rb.gy/csqq72
3	https://tinyurl.com/y7e8mx5z
4	http://www.class-central.com/subject/math(MOOCs)
5	http://academicearth.org/
6	VTU e-Shikshana Program
7	VTU EDUSAT Program

Assessment Pattern (both CIE and SEE)

Applied Science Courses

4 credits - Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50			20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	25	10	Average of Three Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) - II	Module - 3 & 4	50				
		Internal Assessment Test (IAT) - III	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	25	10	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then
		CCA-2- Pedagogical Initiatives		50				

								one assessment method may be adopted
	Total CIE Theory					50	20	Scale down Marks of IAT and CCA to 50
SEE		Theory exam	Entire theory syllabus including questions from lab component	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	
				- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. - The Laboratory Component for the IPCC shall be for CIE only. - However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.				

The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 Marks out of 100) in the total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IC

Internal Assessment test:

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **15 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

CIE for the practical component of the IC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **10 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester and **5 Marks** for conducting Open Ended Experiments.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks conduction(Observation Book) and 5 Marks for Record Book. Marks of all experiments' write-ups and conduction are added and scaled to **10 Marks**.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **10 Marks**.

- Open Ended Experiments are conducted after the completion of regular Experiments/Programs for 20 Marks and scaled down to **5 Marks**
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. The duration of SEE is 03 hours.
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks**.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions should be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks	
Remember				30		
Understand	10	10	10	20		
Apply	30	30	30			
Analyse	10	10	10			
Evaluate					50	
Create						

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	5	5	5	10	30	20%
CO2	15	15	15	15	30	90	60%
CO3	5	5	5	5	10	30	20%
CO4							
CO5							
CO6							
Total	25	25	25	25	50	150	

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	--
Understand	5
Apply	35
Analyse	10
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	--	--	--	--	5	10%
CO2	5	5	10	5	10	35	70%
CO3	--	5	--	5	--	10	20%
CO4	--	--	--	--	--	--	--
CO5	--	--	--	--	--	--	--
CO6	--	--	--	--	--	--	--
Total	10	10	10	10	10	50	100%

4th SEMESTER

Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Affiliated to VTU

Approved by AICTE

Accredited by **NAAC** with **A+** Grade

6 Programs Accredited by **NBA**

(CSE, ISE, ECE, EEE, MECH, CIVIL)

Scheme of Teaching and Examinations – 2024
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from 2025-26)

4th SEMESTER: Cyber Security

S L N O	Course Code	Course Title	Course Categor y	BOS	TD	Teaching Hours/Week					Credit s	Examination			
						Le ctu re L	Tutori al T	Prac tical P	Project S	Total		SEE Dura tion (Hr)	CIE Mark s	SEE Mark s	Total Mark s
1	BMATA401	Statistics and Probability	BSC	MAT	MAT	3	0	0	0	3	3	3	50	50	100
2	BCY402	Design and Analysis of Algorithms	IPCC-1	CSE- CY	CSE- CY	3	0	2	0	5	4	3	50	50	100
3	BCY403	Database Management Systems	IPCC-2	CSE- CY	CSE- CY	3	0	2	0	5	4	3	50	50	100
4	BCY404	Information and Data Security	PCC-1	CSE- CY	CSE- CY	3	0	0	0	3	3	3	50	50	100
5	BCY405	Digital Logic Design and Computer Organization	PCC-2	CSE-CY	CSE- CY	3	0	0	0	3	3	3	50	50	100
6	BCY406	Full Stack Development	PBL	CSE- CY	CSE- CY	0	0	2	2	4	2	2	50	50	100
7	BCY407X	Ability Enhancement Course	AEC	CSE- CY	CSE- CY	0	0	2	0	2	1	2	50	50	100
8	BUHK408	Universal Human Values and Clean Technology	SCR & NSS	BSC	Any Dept.	0	2	0	0	2	1	1	50	50	100
9	BYOK409	Yoga	NCMC*		PD	1	0	0	0	1	0	0	100	0	-
	BNSK409	NSS			NSS										

	BPEK409	Physical Education			PD										
Total						15	2	8	2	28	21		500	400	900
*Non-Credit Mandatory Course															

4 th Sem Ability Enhancement Couse															
BCY407A		Agentic AI -2				BCY407B				Technical writing using LATEX					

IPCC: Integrated Professional Core Course,

PCC: Professional Core Course

PBL: Project Based Learning

AEC: Ability Enhancement Course,

NCMC: Non-Credit Mandatory Course

L: Lecture,

T: Tutorial,

P: Practical

S= SDA: Skill Development Activity,

CIE: Continuous Internal Evaluation,

SEE: Semester End Evaluation.

Integrated Professional Core Course (IPCC): Refers to Integrated Professional Core Course Theory Integrated with practical's of the same course. Credit for IPCC can be 04 and its Teaching Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper.

Non Credit Mandatory Course (NCMC) - National Service Scheme /Physical Education/Yoga: All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.

Newly introduced subjects in the syllabus

		4th Semester
1.	List of Existing Elective Courses	No Elective Course in 4 th Semester
2.	List of New Existing Elective Courses	No Elective Courses in 4 th Semester
3.	List of New Industry Aligned Courses	1. Agent AI Level-2
4.	Name of subject changed to IPPC	Database Management Systems

Percentage of Change in the Syllabus

4th Semester

Sl.No	Course Code	Course Name	Topics Added	Topics removed	Revised in %	Justification
1	BCY405	Digital Logic Design and Computer Organization	Simplification by Quine-McClusky Method. Asynchronous-Ripple Counter and Synchronous Counters.	Cache Memories	30%	Cache memories and pipelining were excluded to focus on the fundamental concepts, as it is often essential to narrow the course content for a comprehensive understanding. Quine-McCluskey method offers a step-by-step algorithmic approach to logic simplification, promoting systematic problem-solving skills.



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	4 th		
Course Title	:	Statistics and Probability		
Course Code	:	BMATA401		
Course Type (Theory/ Practical/ Integrated)	:	Theory		
Course Category	:	ASC		
Stream	:	CSE, ISE, AIML, CSE-AI, CSE-DS & CYB. SEC.	CIE	50 Marks
Teaching hour/week (L:T:P:S)	:	3:0:0:0	SEE	50 Marks
Total Hours	:	40 Hrs	SEE Duration	3 Hours
Credits:	:	3		

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	Acquire basic knowledge of Mathematical concepts for understanding engineering problems
2	Use concepts of statistics and probability in solving problems
3	Analyze problems using concepts of statistics and probability
4	Use MATLAB to obtain solutions of various mathematical problems.

Teaching-Learning Process

Pedagogy (General Instructions):

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.

5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can device innovative pedagogy to improve teaching-learning.



DSATM

**Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)**

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Probability Distribution Review of basic probability theory, random variables (discrete and continuous), binomial, Poisson, normal, exponential distribution, Weibull and uniform distributions.	8
Pedagogy	Chalk and board, group discussion, ppt, videos	
2	Joint Probability Distribution and Statistics Joint probability distribution(Discrete), correlation and correlation coefficient, regression lines, rank correlation.	8
Pedagogy	Chalk and board, group discussion, ppt, videos	
3	Sampling Theory Introduction, sampling distribution, standard error, testing of hypothesis, central limit theorem, levels of significance, z- test for large samples, confidence limits, Student's 't' distribution, Chi-square distribution as a test of goodness of fit, F-Distribution.	8
Pedagogy	Chalk and board, group discussion, ppt, videos	
4	ANOVA The ANOVA technique, basic principle of ANOVA, one-way ANOVA, Two-way ANOVA, Latin-square Design	8
Pedagogy	Chalk and board, group discussion, ppt, videos	
5	Time series and Markov chain Time series: Introduction to time series, Components of a time series, Decomposition of time series, method of semi averages, method of moving averages and least square method(straight line, parabola and exponential curve). Markov chain: Introduction to stochastic process, probability vectors, stochastic matrices, regular stochastic matrices, Markov chains, higher transition probabilities, stationary distribution of regular Markov chains.	8
Pedagogy	Chalk and board, group discussion, ppt, videos	

List of Experiments or Programs

Sl.No	Experiments/Programs	COs
	NIL	

Text Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	Probability and Statistics, Murray R. Spiegel, John Schiller, R. Alu Srinivasan, Schaum's outline series, Mc Graw Hill Publication, 4 th Edition, 2012.
2	Research Methodology Methods & Techniques, C R Kothari and Gaurav Garg, New Age International Limited, 3rd Edition, 2014
3	Probability & Statistics for Engineers & Scientists, Ronald E. Walpole, Raymond H Myers, Sharon L Myers & Keying Ye, Pearson Education, 9th edition, 2017.

Reference Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	Higher Engineering Mathematics, B. S. Grewal, Khanna publishers, 44th Ed., 2021.
2	Practical Statistics for Data Scientists, Peter Bruce, Andrew Bruce & Peter Gedeck O'Reilly Media, Inc., 2nd edition 2020.
3	Fundamentals of Mathematical Statistics, S.C.Gupta and V.K.Kapoor, Chand Publishers, 12 th edition, 2020.

Course Outcome: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the basic concepts of statistics and probability	Remember, Understand	L1, L2
CO2	Apply techniques of statistics and probability to solve engineering problems	Apply	L3
CO3	Analyze engineering problems using statistics and probability	Analyse	L4
CO4	Develop mathematical solutions to various real time problems using MATLAB	Evaluate	L5

Mapping of Course Outcomes to Program Outcomes:

Weblinks and Video Lectures (e-Resources)	
1	https://onlinecourses.nptel.ac.in/noc21_ma74/preview
2	https://avcce.digimat.in/nptel/courses/video/111107058/L05.html
3	https://archive.nptel.ac.in/courses/111/106/111106086/

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01													--	--
C02	3												--	--
C03		2											--	--
C04			2		2				1	1			--	--

Assessment Pattern (both CIE and SEE)

Applied Science Courses

3 credits - Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50			20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module – 1, 2 & 3(half module)	50	(50+50) / 2	25	10	Average of Two Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) - II	Module - 3(half module), 4 & 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	(50+50) / 2	25	10	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives		50				

	Total CIE Theory					50	20	Scale down Marks of IAT and CCA to 50
SEE		Theory exam	Entire theory syllabus including questions from lab component	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	
				- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. - The Laboratory Component for the IPCC shall be for CIE only. - However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.				

The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.

The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 Marks out of 100) in the total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IC

Internal Assessment test:

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Two Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 7th week of the semester (syllabus completion of 50%)

- Second test after 14th week of semester (syllabus completion of 100%)
- The average score of three test is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **50 Marks**

CIE for the practical component of the IC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **10 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester and **5 Marks** for conducting Open Ended Experiments.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks conduction(Observation Book) and 5 Marks for Record Book. Marks of all experiments' write-ups and conduction are added and scaled to **10 Marks**.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **10 Marks**.
- Open Ended Experiments are conducted after the completion of regular Experiments/Programs for 20 Marks and scaled down to **5 Marks**
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.

- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks. The theory component of the IC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. The duration of SEE is 03 hours.
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks**.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions should be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests		Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	
Remember			30		
Understand	10	10	20		
Apply	30	30			
Analyse	10	10			
Evaluate				50	
Create					

CIE Course Assessment Plan

CO's		Marks Distribution					Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module-3	Module-3	Module-4	Module-5		
CO1	5	5	5		5	5	25	25%
CO2	10	10	5	5	10	10	50	50%
CO3	5	5		5	5	5	25	25%
CO4								
CO5								
CO6								
Total	20	20	10	10	20	20	100	

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	--
Understand	5
Apply	35
Analyse	10
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	--	--	--	--	5	10%
CO2	5	5	10	5	10	35	70%
CO3	--	5	--	5	--	10	20%
CO4	--	--	--	--	--	--	--
CO5	--	--	--	--	--	--	--
CO6	--	--	--	--	--	--	--
Total	10	10	10	10	10	50	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Introduction to Curve fitting	1
1	Curve fitting (Least squares method)	1
1	Fitting of a straight line	1
1	Fitting of a second-degree parabola	1
1	Fitting of curves of the form $y=ab^x$	1
1	Fitting of curves of the form $y=ae^{bx}$, $y=ax^b$	1
1	Correlation coefficient r , Regression lines	1
1	Rank Correlation	1
2	Introduction on basic probability theory	1
2	Discrete random variables and Continuous random variables	1
2	Probability mass and density functions	1
2	Mathematical expectation, Mean and variance	1
2	Binomial distribution, Poisson distribution	1
2	Normal distribution	1
2	Exponential distribution	1
2	Weibull and uniform distribution	1
3	Introduction to Sampling Theory, Sampling distribution	1
3	Standard error, testing of hypothesis	1
3	Central limit theorem	1
3	Levels of significance	1
3	Test of significance, Confidence limits	1
3	Student's 't' distribution, Problems	1
3	Chi-square distribution as a test of goodness of fit	1
3	F-Distribution, Problems	1
4	Introduction to ANOVA.	1
4	The ANOVA technique.	1
4	Explanation on ANOVA technique.	1
4	Basic principle of ANOVA.	1
4	Explanation on one-way ANOVA.	1
4	Problems on one-way ANOVA.	1
4	Two-way ANOVA and problems	1
4	Latin-square Design and problems	1
5	Introduction to time series data, Components of a time series	1
5	Decomposition of time series	1
5	Method of semi averages	1
5	Fitting a various mathematical curve and growth curves.	1
5	Introduction to stochastic process	1

5	Probability vectors	1
5	Stationary distribution of regular Markov chains	1
5	Markov chains	1
Total		40 Hrs

**INTEGRATED
PROFESSIONAL CORE
COURSE (IPCC)**

IPCC Course – Integrated Professional Core Course

Teaching Hours/Week (L: T:P: S)	3:0:2:0
Total Hours of Pedagogy	40 hours Theory + 20 Hours of Practical Classes
Credits:	04
Theory - Each Module	8 Hrs.
Practical's	8-10 Programs / Experiments
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Theory

- The theory part of the IPCC shall be evaluated both by CIE and SEE.
- The practical part shall be evaluated by only CIE (no SEE).
- However, questions from the practical part of IPCC shall be included in the SEE question paper.

Integrated Professional Core Course (IPCC) - 4 Credit Course

Assessment Details (both CIE and SEE)

- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks).
- A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation (CIE) for the Theory component of the IPCC (Maximum marks 50)

Internal Assessment Test (IAT):

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are 25 marks and that for the practical component is 25 marks.
- 25 marks for the theory component are split into 15 marks for two Internal Assessment Tests
- (Two Tests, each of 50 Marks with 01-hour 30 minutes' duration, are to be conducted and average of two tests to be reduced to 15 marks) and 10 marks for Two Continuous Comprehensive Assessment(CCA) methods.
- The first Internal test at the end of 40-50% coverage of the syllabus

- The second Internal test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for 25 marks).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Revised Blooms Taxonomy (RBT) Levels. Emphasis to be given for Higher order Thinking Skills (HOTS).

Continuous Internal Evaluation (CIE) for the practical component of the IPCC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report, **05 Marks** are for conducting the experiment, **05 Marks** for preparation of the laboratory record, **5 Marks** for conducting Open Ended Experiments Each experiment. Marks of all experiments' write-ups are added to 15 marks.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **5 Marks**.
- The open-ended experiment after completion of all the experiments shall be conducted for 20 marks with a split-up for 5 Marks for writeup, 10 Marks for Execution, and 5 Marks for Viva-Voce.
- Marks for writeup, Execution and Viva-Voce is added and scaled down to 05 marks.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for 25 marks.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

Semester End Examination (SEE) for IPCC Theory

SEE will be conducted as per the scheduled timetable, with common question papers for the course (duration 03 hours)

- The question paper will have ten questions. Each question is set for 20 marks.
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module. The two questions shall be of same

course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels.

- The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored by the student shall be proportionally scaled down to 50 Marks.
- The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only.
- Questions mentioned in the SEE paper may include questions from the practical component.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be $(CCA1+CCA2)/2$ and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The Assessment will be through rubrics.
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

Possible Continuous and Comprehensive Assessment (CCA):

- Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom,
- The assessment of these techniques shall be in rubrics.
- The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

4 Credits Courses – Integrated Professional Core Course (IPCC)

Assess ment Method	Component	Type of Assessments	Syllabus Coverage	Maximu m Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50	----	----	20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module – 1 to 2.5	50	(50+50) / 2	15	6	Average of Two Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) - II	Module – 2.5 to 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives / Activity based learning	Considering all the Modules	50	(50+50) / 2	10	4	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives/ Activity based learning		50				
	Total CIE Theory						25	10

CIE									
	Practical	Conduction of Experiments	Performance-Continuous Evaluation of each experiment	05	15	Average of all Experiments	15	4	Performance of the Experiment (On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. 20 marks are for conducting the experiment and calculations/observations/output)
			Record	05					
			Observation book	05					
		Practical Test	Write up	15	50	----	05	4	One Internal Practical Test after conduction of all Experiments for 50 Marks
			Execution	25					
			Viva-voce	10					
		Open Ended Experiment	Write up	05	20	----	05	2	One experiment for 20 marks. 20 marks reduced to 05 marks
			Execution	10					
			Viva-voce	05					
									Scale down Marks of Experiments, Record,

	Total CIE Practical					25	10	Observation, Practical Test and Open-Ended Experiment
SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	
- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. - The Laboratory Component for the IPCC shall be for CIE only. - However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.								
Note: If few of the 3 Credit Courses are Integrated course type, for such courses the method suggested for 4 Credit IPCC Course shall be followed								



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	IV			
Course Title	:	Design and Analysis of Algorithms			
Course Code	:	BCY402			
Course Type (Theory/ Practical/ Integrated)	:	Integrated			
Category	:	IPCC-1			
Stream	:	Cyber Security	CIE	:	50
Teaching hours/ week (L:T:P:S)	:	3:0:2:0	SEE	:	50
Total Hours	:	40h Theory + 20h Practical	SEE	:	3 Hours
Credits	:	04	Duration		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Learn the fundamental concept of algorithms, its types, parameters, asymptotic notation and various design techniques of algorithms.
2	Apply the appropriate data structure and algorithm design method for a specified application.
3	Inspect the problems using various algorithmic design technique methods such as the brute force method, greedy method, divide and conquer, decrease and conquer, transform and conquer, dynamic programming, backtracking and branch and bound.
4	Design the algorithms for real various real time applications using contemporary computing languages.
5	Able to demonstrate the experiments using the various algorithm techniques.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

Scheme of Teaching and Examinations for BE Programme -2024-25



Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction: Definition of Algorithm, Fundamentals of Algorithmic Problem Solving. Fundamentals of Analysis of Algorithm Efficiency: Analysis Framework, Asymptotic Notations and Basic Efficiency Classes, Mathematical Analysis of Non recursive Algorithms and Recursive Algorithms. Brute Force: Selection Sort, Bubble Sort, String Matching. Text Book: Chapter 1: 1.1-1.2: Chapter 2: 2.1 - 2.4: Chapter 3:3.1- 3.2	8
Pedagogy	Mind Mapping	
2	Brute Force Continued: Depth First Search (DFS), Breadth First Search (BFS), Applications of DFS and BFS Decrease and conquer: Topological Sorting, Variable size decrease algorithms: Computing a Median and the Selection Problem, Interpolation search Divide and Conquer: Master's Theorem, Merge sort, Quicksort, Strassen's matrix multiplication, Multiplication of large integers, Text Book: Chapter 3: 3.5 Chapter 4: 4.2, 4.5, Chapter 5: 5.1-5.2, 5.4	8
Pedagogy	Problem Solving	
3	Transform and Conquer: AVL Trees, Heaps and Heapsort Space and Time Trade-offs: Input enhancement in string matching: Boyer Moore Algorithm, Hashing Text Book: Chapter 6: 6.3,6.4 Chapter 7: 7.2-7.3	8
Pedagogy	Think - Pair- Share (TPS)	
4	Dynamic Programming: Knapsack Problem and Memory functions. Warshall's and Floyd's Algorithm Greedy Technique: Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm, Huffman trees. Text Book: Chapter 8: 8.2,8.4, Chapter 9: 9.1- 9.4	8
Pedagogy	Poster Presentation	
5	Limitations of Algorithm Power (with AI Perspective) : Decision Trees; P, NP, NP-Complete and NP-Hard Classes; AI perspective on computational complexity. Backtracking with AI Applications: N-Queen's Problem; Sum of Subset	8

	Problem; Constraint Satisfaction Problems (CSP); heuristic pruning techniques Branch and Bound with AI Optimization: Assignment Problem; optimization using evaluation functions; best-first search strategy AI-Based Search Algorithms: Greedy Best-First Search; A* Algorithm; heuristic functions AI Optimization Techniques: Introduction to Machine Learning optimization; Gradient Descent (basic idea); Local Search methods Text Book: Chapter 11: 11.2, Chapter 12: 12.1-12.2, Text Book 2: - Chapter 3: Solving Problems by Searching (BFS, DFS, A*) Chapter 4: Informed Search and Heuristics , Chapter 6: Constraint Satisfaction Problems	
Pedagogy	Case Studies	
	Pedagogical Initiatives (Not limited to): • Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another • Problem Solving: encourages cognitive thinking and enables creative problem solving • Poster Presentation: allows students to represent the concepts visually in order to understand the topics easily. • Case studies: maps different domains in real time applications • Demonstration: exhibits the implementation process	

List of Programs:

Sl. No.	Experiments/Programs	COs
1	Sort a given set of n integer elements using Quick Sort method and compute its time complexity. Run the program for varied values of $n > 5000$ and record the time taken to sort. Plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator	CO3
2	Sort a given set of n integer elements using the Merge Sort method and compute its time complexity. Run the program for varied values of $n > 5000$, and record the time taken to sort. Plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator	CO3
3	Solve All-Pairs Shortest Paths problem using Floyd's algorithm.	CO4
4	Find shortest paths from a given vertex in a weighted connected graph to other vertices using Dijkstra's algorithm.	CO4
5	Obtain the Topological ordering of vertices in a given digraph.	CO3
6	Solve 0/1 Knapsack problem using Dynamic Programming method.	CO4
7	Find a subset of a given set $S = \{s_1, s_2, \dots, s_n\}$ of n positive integers whose sum is equal to a given positive integer d.	CO4

8	a. Find Minimum Cost Spanning Tree of a given connected undirected graph using Kruskal's algorithm. b. Find Minimum Cost Spanning Tree of a given connected undirected graph using Prim's algorithm.	CO5
9	Implement Job sequencing problem using greedy approach	CO5
10	Implement N Queens problem using Backtracking.	CO4
Open ended Programs		
1	Design and implement C++ Program to solve discrete Knapsack and continuous Knapsack problems using greedy approximation method.	CO5
2	Design and implement C++ Program to solve Dynamic Programming Approach for Matrix Chain Multiplication	CO5
3	Design and implement C++ Program to implement Horspool's Algorithm for string matching	CO5
4	Design and implement C++ Program for Huffman coding and decoding.	CO5

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Introduction to the Design and Analysis of Algorithms, Anany Levitin, Pearson, 3rd Edition (Indian), 2017.
2	Artificial Intelligence: A Modern Approach

Reference Books

1	Computer Algorithms/C++, Ellis Horowitz, Satraj Sahni and Rajasekaran, Universities Press, 2nd Edition, 2014
2	Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, 3rd PHL., Edition.
3	Design and Analysis of Algorithms, S. Sridhar, Oxford (Higher Education)

zz	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the fundamental concepts of asymptotic notations and various design techniques of algorithms	U	L2
CO2	Apply the various data structures operations in problem solving techniques of algorithms.	A	L3
CO3	Analyze the performance and computational complexity of different algorithms.	AN	L4

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	
Remember	10	0	5	0	0
Understand	15	0	10	0	0
Apply	25	25	15	15	10
Analyse	0	15	20	10	5
Evaluate	0	10	0	10	10
Create	0	0	0	15	25

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	6	4	0	0	0	0	10	10%
CO2	21	10	5	0	0	0	36	36%
CO3	0	3	1	5	10	15	34	34%
CO4	-	-	-	5	10	5	20	20%
CO5	-	-	-	-	-	-	-	-
Total	27	17	6	10	20	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	5%
Understand	10%
Apply	35%
Analyse	25%
Evaluate	10%
Create	15%

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module-2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	-	-	-	2	3	10	10%

CO2	-	-	5	3	-	2	10	10%
CO3	10	10	-	10	5	-	35	35%
CO4	-	10	10	-	10	-	30	30%
CO5	-	-	-	-	5	10	15	15%
Total	15	20	15	13	22	15	100	100%

Cos Matched with POs

Cos	POs	PSOs
CO1	--	--
CO2	PO1	--
CO3	PO2, PO4	--
CO4	PO3	--
CO5	PO5, PO9, PO12	PSO1, PSO2



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	IV				
Course Title	:	Database Management Systems				
Course Code	:	BCY403				
Course Type (Theory/ Practical/ Integrated)	:	Integrated				
Category	:	IPCC-2				
Stream	:	Cyber Security		CIE	:	50

Teaching hours/ week (L:T:P:S)	:	3:0:2:0	SEE	:	50
Total Hours	:	40h Theory + 20h Practical	SEE	:	3 Hours
Credits	:	04	Duration		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Learn the strong foundation in database concepts, relational database design, NOSQL and database security.
2	Practice SQL programming through a variety of database problems.
3	Exemplify the representation of a database system using ER diagrams and to learn normalization techniques
4	Demonstrate the use of concurrency and transactions in the database.
5	Design and build database applications for real world problems.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for BE Programme -2025-26

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction to Databases and Relational Models Purpose of Database System — Views of data — Data Models — Database System Architecture — Introduction to relational databases — Relational Model — Keys — Relational Algebra — SQL fundamentals — Advanced SQL features — Embedded SQL– Dynamic SQL	

	Textbook 1: Chapter 1: 1.1 - 1.6: Chapter 2: 2.1 - 2.4: Chapter 3: 3.1 - 3.7: Chapter 9: 9.1	8
Pedagogy	Poster Presentation	
2	DATABASE DESIGN Entity-Relationship model — E-R Diagrams — Enhanced-ER Model — ER-to-Relational Mapping — Functional Dependencies — Non-loss Decomposition — First, Second, Third Normal Forms, Dependency Preservation — Boyce/Codd Normal Form — Multi-valued Dependencies and Fourth Normal Form — Join Dependencies and Fifth Normal Form Textbook 1: Chapter 5: 5.1 - 5.3: Chapter 8: 8.1 - 8.5: Chapter 6: 6.1-6.4	8
Pedagogy	Think Pair and Share	
3	TRANSACTIONS Transaction Concepts — ACID Properties — Schedules — Serializability — Concurrency Control — Need for Concurrency — Locking Protocols — Two Phase Locking — Deadlock — Transaction Recovery — Save Points — Isolation Levels — SQL Facilities for Concurrency and Recovery.	8
Pedagogy	Query Solving	
4	IMPLEMENTATION TECHNIQUES RAID — File Organization — Organization of Records in Files — Indexing and Hashing — Ordered Indices — B+ tree Index Files — B tree Index Files — Static Hashing — Dynamic Hashing — Query Processing Overview — Algorithms for SELECT and JOIN operations — Query optimization using Heuristics and Cost Estimation. Textbook 1: Chapter 20: 20.1 - 20.6, Chapter 21: 21.1.1 - 21.1.3, 21.2.1-21.2.2	8
Pedagogy	Problem Solving	
5	ADVANCED TOPICS Object-based Databases: Object Database Concepts, Object-Relational features, Case Studies on AI-based intrusion detection systems for database security, Machine Learning for anomaly detection in database access patterns- Introduction to NOSQL Databases –Machine Learning for large-scale data processing in NoSQL systems Textbook 1: Chapter 30: 30.1- 30.7: Chapter 24: 24.1 - 24.6	8
Pedagogy	Case Studies	
	Pedagogical Initiatives (Not limited to): Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another	

	• Problem Solving: encourages cognitive thinking and enables creative problem solving • Poster Presentation: allows students to represent the concepts visually in order to understand the topics easily. • Case studies: maps different domains in real time applications • Demonstration: exhibits the implementation process
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List of Programs:

Sl. No.	Experiments/Programs	COs
	Design & Implement Database tables & query	
1	Create a table called Employee & execute the following. Employee (EMPNO, ENAME, JOB, MANAGER_NO, SAL, COMMISSION) 1. Create a user and grant all permissions to the user. 2. Insert the any three records in the employee table contains attributes EMPNO, ENAME JOB, MANAGER_NO, SAL, COMMISSION and use rollback. Check the result. 3. Add primary key constraint and not null constraint to the employee table. 4. Insert null values to the employee table and verify the result.	CO3
2	Create a table called Employee that contain attributes EMPNO, ENAME, JOB, MGR, SAL & execute the following. 1. Add a column commission with domain to the Employee table. 2. Insert any five records into the table. 3. Update the column details of job 4. Rename the column of Employ table using alter command. 5. Delete the employee whose Empno is 105.	CO3
3	Queries using aggregate functions (COUNT, AVG, MIN, MAX, SUM), Group by, Orderby. Employee (E_id, E_name, Age, Salary) 1. Create Employee table containing all Records E_id, E_name, Age, Salary. 2. Count number of employee names from employee table 3. Find the Maximum age from employee table.	CO4

	4. Find the Minimum age from employee table. 5. Find salaries of employee in Ascending Order. 6. Find grouped salaries of employees.	
4	Consider the following schema for a Library Database: BOOK(Book_id, Title, Publisher_Name, Pub_Year) BOOK_AUTHORS(Book_id, Author_Name) PUBLISHER(Name, Address, Phone) BOOK_COPIES(Book_id, Programme_id, No-of_Copies) BOOK_LENDING(Book_id, Programme_id, Card_No, Date_Out, Due_Date) LIBRARY_PROGRAMME(Programme_id, Programme_Name, Address) Design SQL queries to 1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each Programme, etc. 2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun 2017. 3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation. 4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query. 5. Create a view of all books and its number of copies that are currently available in the library.	CO3
5	Design the core concepts on table like nested and correlated nesting queries and also EXISTS and NOT EXISTS keywords. Consider the schema for Company Database: EMPLOYEE (SSN, Name, Address, Sex, Salary, SuperSSN, DNo) DEPARTMENT (DNo, DName, MgrSSN, MgrStartDate) DLOCATION(DNo,DLoc) PROJECT (PNo, PName, PLocation, DNo) WORKS_ON (SSN, PNo, Hours) Develop SQL queries to 1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project. 2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise.	CO5

	3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department 4. Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator). 5. For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs.6,00,000.	
6	Create a row level trigger for the customers table that would fire for INSERT or UPDATE or DELETE operations performed on the CUSTOMERS table. This trigger will display the salary difference between the old & new Salary. CUSTOMERS(ID,NAME,AGE,ADDRESS,SALARY)	CO4
7	Develop NO SQL for Database and CRUD operations on database table. Install an Open-Source NoSQL Data base MongoDB & perform basic CRUD (Create, Read, Update & Delete) operations. Execute MongoDB basic Queries using CRUD operations.	CO3
8	Develop NoSQL database tools Create Document, column and graph-based data.	CO4
Open ended Programs		
1	Design an ER-diagram for the following scenario, Convert the same into a relational model, normalize Relations into a suitable Normal form and then solve the following queries. A country can have many Tourist places. Each Tourist place is identified by using tourist_place_id, having a name, belongs to a state, Number of kilometres away from the capital city of that state, history. There are many Tourists visits tourist places every year. Each tourist is identified uniquely by using Tourist_id, having a Name, age, Country and multiple emailids. A tourist visits many Tourist places, it is also required to record the visted_date in the database. A tourist can visit a Tourist place many times at different dates. A Tourist place can be visited by many tourists either in the same date or at different dates. Queries: 1. List the state name which is having maximum number of tourist places. 2. List details of Tourist place where maximum number of tourists visited. 3. List the details of tourists visited all tourist places of the state "KARNATAKA". 4. Display the details of the tourists visited at least one tourist place of the state, but visited all states tourist places. 5. Display the details of the tourist place visited by the tourists of all country.	CO5
2	Consider the following schema: Branch (branch-name: String, branch-city: String, assets: real) BankAccount (accno: int, branch-name: String, balance: real) BankCustomer(customer-name: String, customer-street: String, customer-city: String) Depositer(customer-name: String, accno: int)	CO5

	LOAN (loan-number: int, branch-name: String, amount: real) Design a database to satisfy the above requirements and answer the following queries: - Create the above tables by properly specifying the primary keys and the foreign keys. - Enter at least five tuples for each relation. - Display the branch name and assets from all branches in lakhs of rupees and rename the assets column to 'assets in lakhs'. - Find all the customers who have at least two accounts at the same branch (ex. SBI_ResidencyRoad). - Create A View Which Gives Each Branch the Sum of the Amount of All the Loans at The Branch	
3	Consider the following schema: SUPPLIERS (Sid: integer, sname: string, address: string) PARTS (PID: integer, pname: string,color: string) CATALOG (Sid: integer, PID: integer, cost: real) Design a database to satisfy the above requirements and answer the following queries: - Find the names of parts for which there is some supplier. - Find the names of suppliers who supply every part. - Find the id's of suppliers who supply only red parts.	CO5

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, Pearson ,7th Edition, 2017.
2	Database management systems, Ramakrishnan, and Gehrke, Tata McGraw Hill,3rd Edition, 2014
3	<i>Artificial Intelligence for Cyber Security</i> – Chintan Patel / Wiley (or similar AI-security focused book)

Reference Books

1	Database System Concepts, Silberschatz, Korth and Sudharshan, Tata McGraw Hill, 6th Edition, 2011.
2	An Introduction to Database Systems, C.J. Date, A. Kannan, S. Swaminathan, Pearson education, 8th Edition, 2009

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes												RBT Level	RBT Level Indicator	
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Understand and explore the needs and concepts of relational and Database Security.												U	L1, L2	
CO1	3	2	1	1	2	2	2	2	1	2	1		2	2	3
CO2	Apply various concepts of databases to obtain relational model and solve SQL queries.												A	L3	
CO2	3	3	2	2	3	1	1	1	1	2	1		3	3	2
CO3	Analyse ER diagram & Schema and for normal forms for given application.												An	L4	
CO3	3	3	3	2	2	1	1	1	1	2	2		3	3	2
CO4	Examine the concepts of transactions, concurrency control along with NoSQL databases.												E	L5	3
CO5	2	3	3	3	3	2	2	2	2	3	3		3	3	3
CO5	Develop database applications for the given mini-world problem using relational and NoSQL database.												C	L6	

Mapping of Course Outcomes to Program Outcomes:

Weblinks and Video Lectures (e-Resources)

1	https://www.coursera.org/courses?query=database%20management
2	https://onlinecourses.swayam2.ac.in/cec19_cs05/preview
3	https://nptel.ac.in/courses/106105175
4	http://www.w3schools.com/sql/
5	http://m5zn.com/newuploads/2015/04/27/pdf/
6	https://erdplus.com/
7	https://www.geeksforgeeks.org/dbms/
8	https://zodml.org/sites/default/files/%20An Introduction to Relational Database %20Theory 0.pdf

9	https://www.youtube.com/watch?v=4YilEjkNPrQ
10	https://www.youtube.com/watch?v=EGEwkad_IIA
11	https://www.youtube.com/watch?v=t5hsV9IC1rU
12	https://www.youtube.com/watch?v=4YilEjkNPrQ
13	https://www.youtube.com/watch?v=9TwMRs3qTcU
14	https://www.youtube.com/watch?v=3EJlovevfcA

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	
Remember	10	0	5	0	0
Understand	15	0	10	0	0
Apply	25	25	15	15	10
Analyse	0	15	20	10	5
Evaluate	0	10	0	10	10
Create	0	0	0	15	25

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	6	4	0	0	0	0	10	10%
CO2	21	10	5	0	0	0	36	36%
CO3	0	3	1	5	10	15	34	34%
CO4	-	-	-	5	10	5	20	20%
CO5	-	-	-	-	-	-	-	-

Total	27	17	6	10	20	20	100	100%
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SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	5%
Understand	10%
Apply	35%
Analyse	25%
Evaluate	10%
Create	15%

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module-2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	-	-	-	2	3	10	10%
CO2	-	-	5	3	-	2	10	10%
CO3	10	10	-	10	5	-	35	35%
CO4	-	10	10	-	10	-	30	30%
CO5	-	-	-	-	5	10	15	15%
Total	15	20	15	13	22	15	100	100%

Cos Matched with POs

Cos	POs	PSOs
CO1	--	--
CO2	PO1, PO2	--
CO3	PO2, PO3, PO4	--
CO4	PO2, PO3	--
CO5	PO3, PO5, PO8, PO9, PO10, PO11, PO12	PSO1, PSO2

PROFESSIONAL CORE COURSE (PCC)

IPCC Course – Integrated Professional Core Course

Teaching Hours/Week (L: T:P: S)	3:0:0:0
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Total Hours of Pedagogy	40 hours
Credits:	03
Each Module	8 Hrs.
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Theory

3 Credit Course- Professional Core Course (PCC)

Assessment Details (both CIE and SEE)

- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks).
- A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation (CIE) :

Internal Assessment Test (IAT):

- For the Internal Assessment Test component of CIE, there are 25 marks and for the Assignment component of the CIE, there are 25 marks. Two Tests, each of 50 Marks with 01-hour 30 minutes' duration, are to be conducted and average of two tests to be reduced to 25 marks
- The first test will be administered after 40-50% of the syllabus has been covered, and
- The second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.
- Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Semester-End Examination:

Theory SEE will be conducted as per the scheduled timetable (duration 03 hours).

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored shall be proportionally reduced to 50 marks.

Continuous and Comprehensive Assessment (CCA):

Two continuous and comprehensive assessments (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

Possible Continuous and Comprehensive Assessment (CCA):

- Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom,
- The assessment of these techniques shall be in rubrics.
- The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Professional Core Course (PCC) – 3 Credit course – Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50	----	----	20	
	Theory	Internal Assessment Test (IAT) - I	Module – 1 to 2.5	50	(50+50) / 2	25	10	Average of Two Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) - II	Module – 2.5 to 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives / Activity Based learning	Considering all the Modules	50	(50+50) / 2	25	10	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives / Activity Based learning		50				

	Total CIE Theory	50	20	Total Marks of IAT and CCA is 50
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SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	IV			
Course Title	:	Information and Data Security			
Course Code	:	BCY404			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Category	:	PCC-1			
Stream	:	Cyber Security	CIE	:	50
Teaching hours/ week (L:T:P:S)	:	3:0:0:0	SEE	:	50
Total Hours	:	40 Theory	SEE	:	3 Hours
Credits	:	3	Duration		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand Basic Cryptographic Concepts and History
2	Learn various skills based on Cryptanalysis
3	Explore Modern Cryptographic Techniques
4	Examine Key Management and Public-Key Infrastructure
5	Apply Cryptographic Concepts to Real-World Scenarios

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for BE Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Crypto Basics Introduction, How to Speak Crypto, Classic Crypto, Simple Substitution Cipher, Cryptanalysis of a Simple Substitution, Definition of Secure, Double Transposition Cipher, One-time Pad, Project VENONA, Codebook Cipher, Ciphers of the Election of 1876, Modern Crypto History, Taxonomy of Cryptography, Taxonomy of Cryptanalysis Textbook 1: Chapter 2	08
Pedagogy	Think Pair & Share	
2	Key management Key management fundamentals, Key lengths and lifetimes, Key generation, Key establishment, Key storage, Key usage Governing, key management, Public-Key Management Certification of public keys the certificate lifecycle, Public-key management models, Alternative approaches Textbook 2: Chapter 10 ,11	08
Pedagogy	Mind Mapping	
3	SIEM - Definition, objectives, and importance in enterprise security,SIEM vs. traditional log management, Role in SOC (Security Operations Center). SIEM Architecture - Components: log collection, normalization, correlation, storage, Event schema and lifecycle, Deployment models: on-premises vs. cloud SIEM. Threats & Attack Patterns - Malware, phishing, insider threats, advanced persistent threats (APT), Use of SIEM in detecting anomalies.	08
Pedagogy	Problem Solving	
4	Introduction to Data Security ,Definition, objectives, and importance,CIA triad (Confidentiality, Integrity, Availability),Data security vs. information security, Data Classification & Protection ,Types of data: personal, financial, organizational, classified>Data lifecycle management,Encryption and hashing basics, Access Control Mechanisms ,Role-based access control (RBAC),Mandatory vs. discretionary access control,Identity and access management (IAM), Cryptography in Data Security ,Symmetric	08

	and asymmetric encryption,Public Key Infrastructure (PKI),Digital signatures and certificates.	
Pedagogy	Poster presentation	
5	Applications;AI-based Threat Detection in Network Security - AI techniques for detecting threats in encrypted communication, web transactions, and wireless networks. Machine Learning for Intrusion and Anomaly Detection ,Detection of attacks in WLAN, mobile networks, and financial systems using ML models. AI-based Authentication and. AI in Secure Payment and Fraud Detection Systems ,Machine learning models for fraud detection, risk analysis, and secure financial transactions.	08

Text Books	
Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Information Security: Principles and Practice, 2nd Edition by Mark Stamp Wiley, 2011
2	Everyday Cryptography: Fundamental Principles and Applications Keith M. Martin Oxford Scholarship Online: December 2013
Reference Books	
1	Applied Cryptography Protocols, Algorithms, and Source Code in C by Bruce Schneier

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the basic concepts of Cryptography	U	L2
CO2	Apply the use of hash function to its applications	A	L3
CO3	Categorize knowledge of the Passwords, Dynamic password schemes Zero-knowledge mechanisms	An	L3
CO4	Examine the Digital security lapses	E	L4
CO5	Compose the cryptographic applications for the real-world scenario	C	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	2	2	2	0	2	1	2	3	2	3
CO2	3	2	2	2	3	2	1	1	1	2	1	2	3	3	2
CO3	3	2	2	2	2	2	2	1	1	2	2	2	3	3	3
CO4	2	3	2	3	2	2	2	2	2	2	2	3	3	3	3
CO5	2	3	3	3	3	3	2	2	2	3	3	3	3	3	3

Weblinks and Video Lectures (e-Resources)

1	https://www.crypto101.io
2	https://www.coursera.org/learn/crypto
3	https://www.khanacademy.org/computing/computer-science/cryptography
4	https://www.youtube.com/watch?v=Q5pGnupmHmk
5	https://www.youtube.com/watch?v=t_HehA8zBng
6	https://www.youtube.com/watch?v=GSIDS_lvRv4
7	https://www.youtube.com/watch?v=ZghMPWGXexs
8	https://en.wikipedia.org/wiki/Cryptography

3 Credit Course – Professional Core Course (PCC)

Assessment Details (both CIE and SEE)

- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.

- The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks).
- A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

Internal Assessment Test (IAT):

- For the Internal Assessment Test component of CIE, there are 25 marks and for Assignment component of the CIE, there are 25 marks. Two Tests, each of 50 Marks with 01-hour 30 minutes' duration, are to be conducted and average of two tests to be reduced to 25 marks
- The first test will be administered after 40-50% of the syllabus has been covered, and
- The second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.
- The Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Semester-End Examination:

Theory SEE will be conducted as per the scheduled timetable (duration 03 hours).

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored shall be proportionally reduced to 50 marks.

Continuous and Comprehensive Assessment (CCA):

Two continuous and comprehensive assessments (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after the 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics

- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

Possible Continuous and Comprehensive Assessment (CCA):

- Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom,
- The assessment of these techniques shall be in rubrics.
- The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory			
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks
Remember	5		10	
Understand	5	5	10	
Apply	20	25	25	
Analyse	10	10	5	20
Evaluate	10	10		20
Create				10

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	5				5	15	15%
CO2	5	10	5	10	10	5	45	45%

CO3	5	5			5	5	20	20%
CO4		5	5	5	5		20	20%
CO5								
Total							100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	5%
Understand	15%
Apply	40%
Analyse	20%
Evaluate	10%
Create	10%

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	5		5	5	10	10%
CO2	5	10	10	10	5	40	10%
CO3		5		5		10	40%
CO4		10	5	5		20	10%
CO5	2	2	2	2	2	10	20%



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	IV				
Course Title	:	Digital Logic Design and Computer Organization				
Course Code	:	BCY405				
Course Type (Theory/ Practical/ Integrated)	:	Theory				
Category	:	PCC-2				
Stream	:	Cyber Security		CIE	:	50
Teaching hours/ week (L:T:P:S)	:	3:0:0:0		SEE	:	50
Total Hours	:	40 Theory		SEE	:	3 Hours
Credits	:	3		Duration		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the requirement of digital system and the basic structure of computer.
2	Apply combinational and sequential circuits in the design of digital systems.
3	Analyze digital circuits, encompassing storage elements and different computer architectures, to gauge their operational effectiveness.
4	Demonstrate different data types on simple arithmetic and logical unit and the functions of basic processing unit, Parallel processing.
5	Design digital circuits and create corresponding HDL codes.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

Scheme of Teaching and Examinations for BE Programme -2025-26



Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	BASIC CONCEPTS OF DIGITAL SYSTEMS: Sum-of-Products Method, Truth Table to Karnaugh Map, Pairs Quads, and Octets, Karnaugh Simplifications, Don't-care Conditions, Product-of-sums Method, Product-of-sums simplifications, Simplification by Quine-McClusky Method. Textbook 1: Chapter 3: 3.1, 3.2 ,3.3 ,3.4 ,3.5	8
Pedagogy	Problem Solving	
2	DESIGN OF COMBINATIONAL LOGIC CIRCUITS: Introduction, Combinational Circuits, Decimal Adder, Decoders, Encoders, Multiplexers, De-multiplexers, Magnitude Comparator. SEQUENTIAL LOGIC: Introduction, Sequential Circuits, Storage Elements: Latches, Flip-Flops - SR, JK, D, T, and Master-Slave Flip-Flop – Characteristic table and equation. Textbook 1: Chapter 4: 4.1, 4.2 ,4.6 ,4.8 ,4.9, 4.10,4.11: Chapter 5: 5.1,5.2,5.3,5.4	8
Pedagogy	Virtual Lab, Think Pair and Share	
3	APPLICATION OF SEQUENTIAL CIRCUITS: Registers-Types of Registers, Universal Shift Register, Asynchronous-Ripple Counter and Synchronous Counters. Textbook 1: Chapter 6: 6.1, 6.2, 6.3, 6.4	8
Pedagogy	Problem Solving, Virtual Lab	
4	BASIC STRUCTURE OF COMPUTERS: Functional Units, Basic Operational Concepts, Bus structure, Performance – Processor Clock, Basic Performance Equation, Clock Rate, Performance Measurement. Machine Instructions and Programs: Memory Location and Addresses, Memory Operations, Instruction and Instruction sequencing, Addressing Modes. Textbook 2: Chapter 1: 1.2, 1.3, 1.4, 1.6: Chapter 2: 2.2, 2.3, 2.4, 2.5	8
Pedagogy	Poster presentation	
5	INPUT/OUTPUT ORGANIZATION ▯ AI-based I/O scheduling and optimization for efficient device handling ▯ Machine Learning for interrupt prediction and prioritization ▯ AI-driven DMA optimization for high-speed data transfer	8

	BASIC PROCESSING UNIT: □ AI-assisted instruction scheduling and execution optimization □ Machine Learning for predicting instruction execution patterns Textbook 3:	
Pedagogy	Case Study	
	Pedagogical Initiatives (Not limited to): • Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another • Problem Solving: encourages cognitive thinking and enables creative problem solving • Poster Presentation: allows students to represent the concepts visually in order to understand the topics easily. • Case studies: maps different domains in real time applications • Demonstration: exhibits the implementation process	

Text Books	
Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	M. Morris Mano & Michael D. Ciletti, Digital Design with an Introduction to Verilog Design, 5e, Pearson Education.
2	Carl Hamacher, Zvonko Vranesic, SafwatZaky, Computer Organization, 5th Edition, Tata McGraw-Hill.
3	<i>Computer Organization and Architecture</i> – (Carl Hamacher / William Stallings or equivalent)
Reference Books	
1	Digital Principles and Design, Donald D.Givone, Tata McGraw-Hill, 2003.
2	Digital Principles and Applications, Donald P Leach, Malvoni, GautamSaha Tata McGraw Hill, 7th Edition 2010
3	Fundamentals of logic design, Charles H Roth, Larry N. Kinney, Cengage Learning, 7 th Ed., 2014.
4	Computer Organization and Design, David A. Patterson and John L. Hennessy, Elsevier, 5th Edition, 2014

5	William Stallings "Computer Organization and Architecture", Seventh Edition, Pearson Education, 2006.
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Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the functionalities of binary logic system and the computer organization.	U	L2
CO2	Apply the combinational, sequential logic system and the input/output devices communicating with computer system.	A	L3
CO3	Analyze digital circuits, including storage elements and computer architectures, to assess their functionality and efficiency.	An	L4
CO4	Evaluate different data types on a simple arithmetic and logical unit, and assess the functions of a basic processing unit, including parallel processing.	E	L5
CO5	Design digital circuits and develop corresponding HDL codes.	C	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	0	0	0	1	1	0	2	2	2	1
CO2	3	3	2	2	2	0	0	0	2	1	0	2	3	3	2
CO3	3	3	2	3	2	0	0	0	1	1	0	2	3	3	2
CO4	3	2	2	2	2	0	0	0	1	1	0	2	3	3	2

Weblinks and Video Lectures (e-Resources)

1	https://www.youtube.com/watch?v=783KABtuE4&list=PLIemF3uozcAKTgsCij82voMK3TMR0YE_f (nptel and mooc link)
2	https://www.youtube.com/watch?v=3-ITLMMeeXY&list=PL3pGy4HtqwD0n7bQfHjPnsWzkeRn6mkO

3	Operating System Full Course Operating System Tutorials for Beginners (youtube.com)
4	Introduction to Operating Systems (youtube.com)
5	https://archive.nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs04/
6	https://archive.nptel.ac.in/noc/courses/noc21/SEM1/noc21-cs44/
7	https://archive.nptel.ac.in/noc/courses/106/
8	https://archive.nptel.ac.in/noc/courses/noc21/SEM2/noc21-cs88/
9	https://www.youtube.com/watch?v=vBURTt97EkA&list=PLBlnK6fEyqRiVhbXDGLXDk_OQAeuVcp20
10	https://www.youtube.com/watch?v=RozoeWzT7IM&list=PLdo5W4Nhv31a5ucW_S1K3-x6ztBRD-PNa
11	https://www.youtube.com/watch?v=9NpisfXy16o
12	https://www.youtube.com/watch?v=PYPIEgSB_Ho
13	https://www.youtube.com/watch?v=fkGCLIQx1MI
14	https://www.youtube.com/watch?v=ACsLvXuaKxw

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory			
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks
Remember	5		10	
Understand	5	5	10	
Apply	20	25	25	
Analyse	10	10	5	20
Evaluate	10	10		20

Create				10
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CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	5				5	15	15%
CO2	5	10	5	10	10	5	45	45%
CO3	5	5			5	5	20	20%
CO4		5	5	5	5		20	20%
CO5								
Total							100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	5%
Understand	15%
Apply	40%
Analyse	20%
Evaluate	10%
Create	10%

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	5		5	5	10	10%
CO2	5	10	10	10	5	40	10%
CO3		5		5		10	40%
CO4		10	5	5		20	10%
CO5	2	2	2	2	2	10	20%

PROJECT BASED LEARNING (PBL)

Teaching Hours/Week (L: T:P: S)	0:0:2:2
Total Hours of Pedagogy	25 hours – Theory + Project
Credits:	02
Modules	5
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Project Evaluation

	CIE		SEE	
	Project Weekly Assessment		Final Project Evaluation	
Project	Project Understanding	05 Marks	Write up	10 Marks
	Technical Competence	10 Marks	Presentation & Demonstration	50 Marks
	Innovation	10 Marks	Project report	25 Marks
	Problem Solving	15 Marks	Viva-Voce	15 Marks
	Project Demonstration	10 Marks	Total	100 Marks
Total		50 Marks	100 Marks Reduced to 50 Marks	

1. Introduction

Project Based Learning is a model for classroom activity that shifts away from the classroom practices of short, isolated, teacher-centered lessons and instead emphasizes learning activities that are long-term, interdisciplinary, and student-centered.

A systematic teaching method that engages students in learning essential knowledge and life-enhancing skills through an extended, student-influenced inquiry process structured around complex, authentic questions and carefully designed products and tasks.

Project learning, also known as project-based learning, is a dynamic approach to teaching, in which students explore real-world problems and challenges, simultaneously developing cross-curriculum skills while working in small collaborative groups.

2. Characteristics of Project-Based Learning:

- Students making decisions within a framework
- A problem or challenge to be solved;
- Students designing the process for reaching a solution
- Students gathering and managing information
- Continuous Evaluation
 - Students regularly reflecting on the process
- A final product to be evaluated for quality
- An atmosphere that tolerates error and change

3. Purpose

- Introducing project-based learning on the curriculum.
- To help students to gain in-depth knowledge of the subject via project.
- During this process, students will be able to learn and understand the various stages of project development.

4. Objectives

- Introducing mini project based on the curriculum.
- Develop in depth knowledge of the topic and technology.
- Use critical thinking skills and make real world connections

- Demonstrate and understand through products.
- Industry and concept-oriented learning.

5. Why Incorporate PBL?

- Promotes collaboration and interaction
- Learners communicate meaningfully and for authentic purposes
- Allows students with a variety of learning styles to demonstrate their acquired knowledge
- Students learn language, content, and skills simultaneously
- Increases learner autonomy
- Provides opportunities for students to pursue their own interests and questions and make decisions about how they will find answers and solve problems.
- Improves education for all students Facilitates student integration of the content of different subjects
- Teaches children to use their own minds well and applies what they learn in school to life-long endeavors.
- Helps students to become technologically literate
- Establishes connections to life outside the classroom, addressing real-world concerns, and developing real-world skills
- Skills learned through PBL are those desired by today's employers.

6. Benefits of PBL

- Offers multiple ways for students to participate and to demonstrate their knowledge.
- Accommodates different kinds of intelligences.
- Shifts students away from doing only what they typically do in a classroom Environment.
- Encourages the mastery of technological tools, thus preparing them for the workforce.
- Serves as a medium for students who don't usually participate.
- Prompts students to collaborate while at the same time support self-directed learning.
- Offers a learning experience that draws on the thinking and shared efforts of several individuals.
- Helps students develop a variety of social skills relating to group work and negotiation.
- Promotes the internalization of concepts, values, and modes of thought, especially those related to cooperation and conflict resolution.

- Establishes a supportive and non-competitive climate for students.
- Provides a means for transferring the responsibility for learning from teachers to students.
- Calls upon students to explain or defend their position to others in their project groups, so that learning is more apt to be personalized and valued.

7. Process

- Project batches will be formed after the commencement of 3rd semester.
- The Students Batch Comprising of 4 members in a batch should be formed by the Project Based Learning co-ordinator.
- Each Semester consists of 16 Weeks of Project based Learning.
- The Level of the Projects to be identified.

Level 1- 2nd Year – 3rd Semester & 4th Semester

Level 2- 3rd year – 5th Semester & 6th Semester

Level 3 – Final Year Project

- The Faculty handling the respective Theory Subject will be the PBL Coordinator and all the three Batches to be handled by the PBL Coordinator with additional faculty.
- The List of Project Batches to be identified by the faculty assigned in consultation with HOD.
- The batch can select any topic from the list circulated by the PBL Coordinator
- The details of students Interaction with the guide shall be maintained by the guide in the prescribed format.
- The Students Project should be continuously evaluated and PBL Coordinator should submit weekly report to the HOD.
- The Rubrics for the PBL should be followed.
- The Students batches shall give the presentation on understanding of the topic and plan for implementation.
- The Evaluation of the Projects is done in Two Phases

7.1 Two phases for Assessment

Phase 1:

1. Phase 1 is for 4 weeks
2. During this phase, the students shall discuss about the Objectives, Literature Survey and plan for project execution.

Phase 2:

1. Phase 2 is for 11 Weeks
2. During this phase, the students shall carry out the project under regular supervision of the

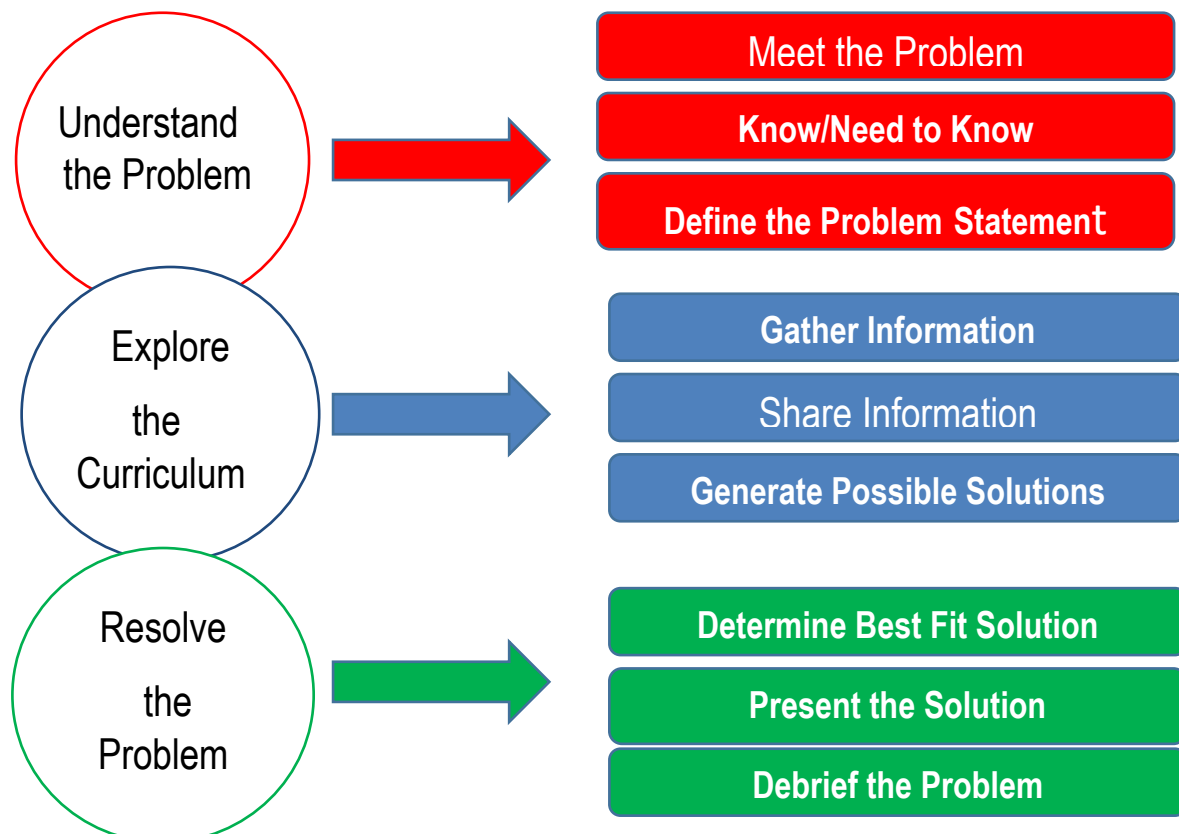
guide/subject expert, Implementation and give final presentation/demonstration with project documents.

The marks distribution for PBL Work:

8. Phase 1 – 25 Marks

9. Phase 2 – 25 Marks

8. PBL Teaching and Learning Template



9. Practice

- Every week 3 hour is exclusively dedicated to Project Based Learning.
- Assess their progress until they resolve the problem and summarise their learning.
- Provide opportunities for in-depth investigations of worthy topics.
- Allow learners to become more autonomous as they construct personally-meaningful artefacts that are representations of their learning.
- Motivate students by engaging them in their own learning. PBL affords students opportunities for development.
- Building communication, technical and management skills.

10. Obstacles/Gaps

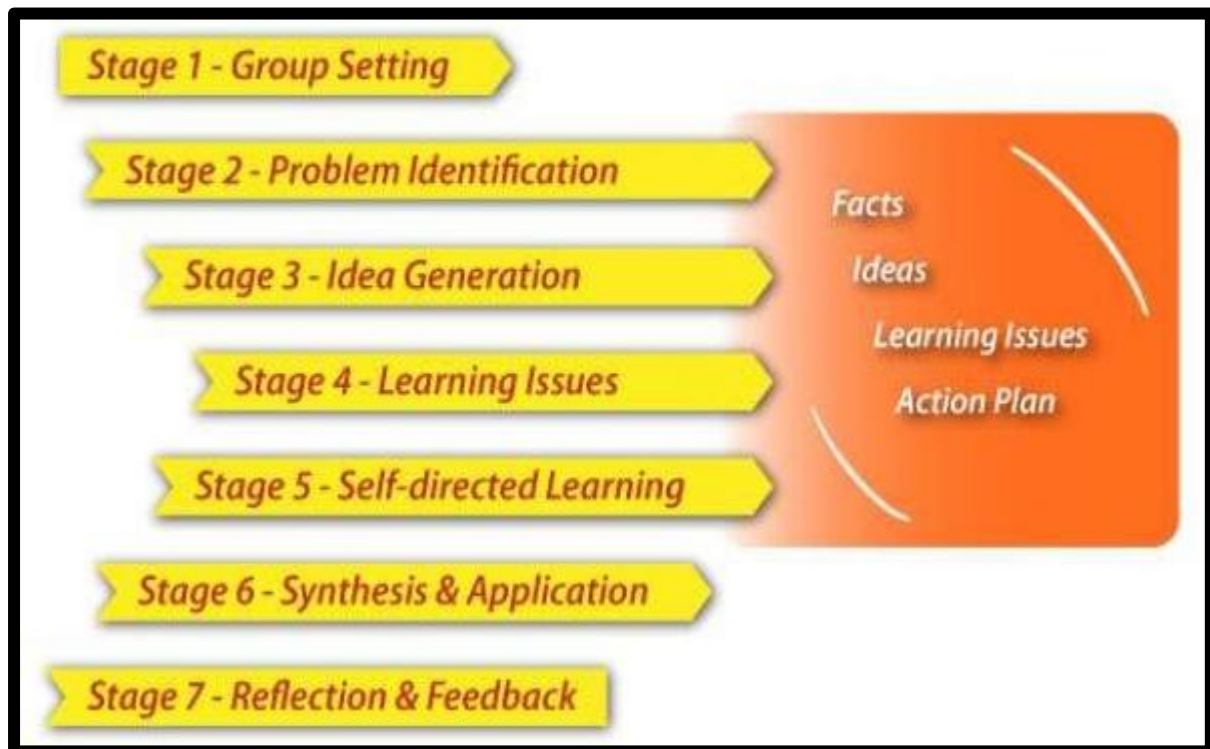
- Lack of student's interest
- Lack of assessment

- Lack of Basic knowledge
- Lack of consistence attendance and monitoring.
- Lack of abundant time allotment and time management.

11. How to Overcome?

- Periodic process – stage wise assessment has to be done.
- Basic Knowledge- A complete guidelines and videos will be provided by the faculty who is handling the respective subject and allotted guide.
- Regular evaluation and periodic monitoring is done by 2 stages.
- For Successful execution and demonstration of end-to-end system, exclusive 3hr/week project time is allotted.

12. Block diagram of PBL



13. Impact Analysis

- It encourages students to draw on their own creativity on problem solving and they learn the bridge gap between theory and practice.
- Final products resulting from project-based learning can be shared with the department at large, thus fostering ownership and technically strong with the subject scenario.

14. PBL – Guidelines

The guidelines are for successful completion of the project and to facilitate effective and uniform conduction of projects by the students. It is expected that these guidelines will help in overall improvement in the quality of the project.

14.1 Main phases of the project

Sl.No	Topics	Duration
Phase-1		
1.	Understanding of the project and preparing a project plan	3 Weeks
2.	Literature review	1 Week
15.	Planning	1 Week
Phase-2		
4.	Analysis and Design	3 Weeks
5.	Implementation	6 Weeks
6.	Testing	1 Week
7.	Writing the project report	1 Week
Total		16 Weeks

14.2 Final Presentation Structure

1. Title of the project & Batch Information
2. Agenda / Topics
3. Problem Statement / Project Definition
4. Background / Literature Review
5. Methodology
6. Analysis and Design
7. Implementation
8. Testing
9. Conclusion and Scope for Future Works

14.3 Project Based Learning Report Structure

1. Cover Page
2. Certificate
3. Declaration
4. Acknowledgement
5. Table of Contents
6. List of Tables
7. List of Figures
8. Introduction
9. Background / Literature Review
10. Methodology / Solution
11. Analysis and Design
12. Implementation
13. Results
14. Conclusion and Future Works
15. Bibliography / References
16. Appendices

15. Guidelines to prepare the Project report

- Project reports should be typed neatly only on one side of the paper with 1.5 or double line spacing on a A4 size bond paper (210 x 297 mm).
- The margins should be: Left – 1.25", Right – 1", Top and Bottom – 0.75".
- The total number of reports to be prepared are
 - One copy to the department.
 - One copy to the concerned guide
 - One copy to the candidate.
- Before taking the final printout, the approval of the concerned guide is mandatory and suggested corrections, if any, must be incorporated in the Final Report.
- For making copies dry tone Xerox is suggested.
- An abstract (synopsis) not exceeding 100 words, indicating salient features of the work.

16. Outcome of the project

- Students will gain the knowledge and understand
- To think creatively, work collaboratively.
- Solve complex problems using digital technology.
- Students learn and desire to engage continuous gain about knowledge such as design, analysis, development, implementation and testing.
- Strong written communication skills and the ability to write technical documents that include specification, design, and implementation of a mini project.

Project - Based Learning Rubric

Score Levels	Content	Conventions	Organization	Presentation
5	- Is well thought out and supports the solution to the challenge or question - Reflects application of critical thinking - Has clear goal that is related to the topic - Is pulled from a variety of sources - Is accurate	- No spelling, grammatical, or punctuation errors - High-level use of vocabulary and word choice	- Information is clearly focused in an organized and thoughtful manner. - Information is constructed in a logical pattern to support the solution.	- Multimedia is used to clarify and illustrate the main points. - Format enhances the content. - Presentation captures the audience's attention. - Presentation is organized and well laid out.

4	▪ Is well thought out and supports the solution ▪ Has application of critical thinking that is apparent ▪ Has clear goal that is related to the topic ▪ Is pulled from several sources ▪ Is accurate	▪ Few (1 to 3) spelling, grammatical, or punctuation errors ▪ Good use of vocabulary and word choice	▪ Information supports the solution to the challenge or question.	▪ Multimedia is used to illustrate the main points. ▪ Format is appropriate for the content. ▪ Presentation captures the audience's attention. Presentation is well organized.
3	▪ Supports the solution ▪ Has application of critical thinking that is apparent ▪ Has no clear goal ▪ Is pulled from a limited number of sources ▪ Has some factual errors or inconsistencies	▪ Minimal (3 to 5) spelling, grammatical, or punctuation errors ▪ Low-level use of vocabulary and word choice	▪ Project has a focus but might stray from it at times. ▪ Information appears to have a pattern, but the pattern is not consistently carried out in the project. ▪ Information loosely supports the solution.	▪ Multimedia loosely illustrates the main points. ▪ Format does not suit the content. ▪ Presentation does not capture audience attention. ▪ Presentation is loosely organized.

2	▪ Provides inconsistent information for solution ▪ Has no apparent application of critical thinking ▪ Has no clear goal ▪ Is pulled from few sources ▪ Has significant factual errors, misconceptions, or misinterpretations	▪ More than 5 spelling, grammatical, or punctuation errors ▪ Poor use of vocabulary and word choice	▪ Content is unfocused and haphazard. ▪ Information does not support the solution to the challenge or question. ▪ Information has no apparent pattern.	▪ Presentation appears sloppy and/or unfinished. ▪ Multimedia is overused or underused. ▪ Format does not enhance content. ▪ Presentation has no clear organization.
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Subject Identified for Project Based Learning

Semester	IV
Subject Identified for PBL	Full Stack Development
Prerequisite	HTML, CSS, database Management system and Python Programming
Justification for the selected subject	1. Develop comprehensive skillset by learning frontend and backend development. 2. Prepare students for roles as full stack developer, backend specialist or Django expert 3. Provides a strong foundation for more advanced topics such as cloud computing, DevOps, and machine learning.
List of possible projects	1. Weather Dashboard 2. IoT Device Management Dashboard 3. Augmented Reality (AR) Web Application 4. E-learning System with Adaptive Learning features 5. Cryptocurrency Exchange Platform 6. Real Time Collaboration Tools like To-Do list 7. Fitness Tracker with Activity Analysis 8. Event Calendar 9. Social Media Analytics Tool 10. Voice Controlled Web Application 11. Cyber security Threat Detection Response System 12. Predictive Maintenance Platform for Industrial IoT NOT LIMITED TO

Signature of the Guide

Signature of HOD



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	IV			
Course Title	:	Full Stack Development			
Course Code	:	BCY406			
Course Type (Theory/ Practical/ Integrated)	:	Practical			
Category	:	PBL			
Stream	:	Cyber Security		CIE	: 50
Teaching hours/ week (L:T:P:S)	:	0:0:2:2		SEE	: 50
Total Hours	:	30 Hours		SEE	: 2 Hours
Credits	:	2		Duration	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand Full Stack Web development concepts.
2	Apply the Django framework concepts to design the responsive web pages.
3	Demonstrate the use of state management and admin interfaces automation in Django.
4	Design and implement Django applications containing dynamic pages with SQL databases.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for BE Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Django Basics and MVC Pattern Understanding web frameworks: Overview of Django evolution and MVC pattern Views in Django, Function-based views and class-based views, Mapping URLs to views, URLConfs in Django, Error handling and wildcard patterns in URLs.	5
Pedagogy	Quiz	
2	Django Templates, Models and Admin Interfaces: Django Templates, Template system basics, Using Django template system effectively, Template tags, filters and template inheritance Configuring databases in Django, defining models, basic data access (CRUD operations), Schema evolution and migrations Activating and using Django admin interfaces, Customizing admin interfaces, Form processing and model forms.	5
Pedagogy	Quiz, Model Design	
3	Advanced Django Concepts and Integration: Generic Views and State Persistence, Using generic views for CRUD operations, MIME types and generating non-HTML content, Syndication feed framework and sitemap framework, Introduction to AJAX in Django, Using jQuery for AJAX requests, Practical integration examples like autocomplete.	5
Pedagogy	Demonstration	
4	Pedagogical Initiatives (Not limited to): • Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another • Problem Solving: encourages cognitive thinking and enables creative problem solving • Poster Presentation: allows students to represent the concepts visually in order to understand the topics easily.	

	• Case studies: maps different domains in real time applications • Demonstration: exhibits the implementation process	
--	--	--

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	The Definitive Guide to Django: Web Development Done Right, Adrian Holovaty, Jacob Kaplan Moss, Springer-Verlag Berlin and Heidelberg GmbH & Co. KG Publishers, Second Edition, 2009.
2	Django Java Script Integration: AJAX and jQuery, Jonathan Hayward, Pack Publishing, First Edition, 2011

Reference Books

1	Aidas Bendroraitis, Jake Kronika, Django 3 Web Development Cookbook, Packt Publishing, Fourth Edition, 2020
2	Antonio Mele, Django3 by Example, Pack Publishers, 3rd Edition, 2020

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the operation of full-stack web development using the Model-View-Template (MVT) architecture with Django.	U	L2
CO2	Apply Django framework libraries to design and build models, forms and webpages and render non-HTML contents such as CSV and PDF files.	A	L3
CO3	Analyze the significance of Template Inheritance and Generic Views in crafting full-stack web applications.	An	L4
CO4	Implement jQuery-based AJAX integration into Django applications to construct responsive full-stack web applications.	C	L6

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
-------	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------

CO1	3	2	2	1	2	1	1	1	0	2	1	2	2	2	2
CO2	3	3	2	2	3	1	1	1	1	3	2	2	3	3	2
CO3	3	3	2	2	2	2	1	1	1	2	2	3	3	3	2
CO4	3	3	3	2	3	2	2	1	2	3	3	3	3	3	3

Mapping of Course Outcomes to Program Outcomes:

Course Outcomes	Program Outcomes	Program Specific Outcomes
CO1	-	-
CO2	PO1	PSO1
CO3	PO2	-
CO4	PO5, PO8, PO9, PO10, PO11, PO12	PSO2

Weblinks and Video Lectures (e-Resources)

1	https://freevideolectures.com/course/3700/django-tutorials
2	https://www.youtube.com/watch?v=2BqoLiMT3Ao
3	https://freevideolectures.com/course/3700/django-tutorials
4	https://freevideolectures.com/course/3700/django-tutorials
5	https://freevideolectures.com/course/3700/django-tutorials



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6 Programs Accredited by **NBA**
(CSE, ISE, ECE, EEE, MECH, CV)

Project Based Learning - Batch

From,

Date:

Name: & USN:

Name: & USN:

Name: & USN:

Name: & USN:

Semester:

Respected Sir/Madam,

Sub: Regarding PBL Batch

With respect to the above subject, we are the students mentioned above would like to form the batch for carrying out the mini project on.....

Thanking you,

Yours faithfully

Sl. No.	Name of the student	Signature
1.		
2.		
3.		
4.		

Signature of the Guide

Name of the Guide

Designation

Department of Cyber Security Engineering



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Project Based Learning – Student(s) – Guide – Interaction

Date		
PBL Batch No.		
Title of the project		
Week No.		
Content of the Discussion		
Suggestion by the guide		
Name of Signature of students		

Signature of the Guide

Signature of PBL Coordinator

Signature of HOD



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Project Based Learning – Continuous Evaluation

Batch No.	Name	USN	Marks assigned	Remarks by the guide on the progress of the project

Signature of the Guide

Signature of PBL Coordinator

Signature of HOD



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Project Based Learning – Review

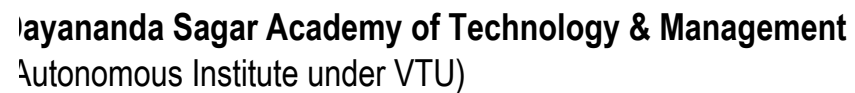
CONTINUOUS INTERNAL ASSESSMENT

Batch No.	Name of the Student	USN	Phase I (25 Marks)		Phase II (25 Marks)		Final CIE Marks (Phase I & Phase II) (50 Marks)
			Abstract / Understanding of the Project (5 Marks)	Analysis & Design (20 Marks)	Implementation (20 Marks)	Demonstration (5 Marks)	

Signature of the Guide

Signature of PBL Coordinator

Signature of HOD



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Project Based Learning Outcomes

[illegible]

**ABILITY ENHANCEMENT
COURSE (AEC)**

AEC Course – Ability Enhancement Course

Teaching Hours/Week (L: T:P: S)	0:0:2:0
Total Hours of Pedagogy	24 hours Practical
Credits:	01
Programs / Experiments	
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	2
Examination nature (SEE)	Practical



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	IV			
Course Title	:	Agentic AI -2			
Course Code	:	BCY407A			
Course Type (Theory/ Practical/ Integrated)	:	Practical			
Category	:	AEC			
Stream	:	Cyber Security		CIE	: 50
Teaching hours/ week (L:T:P:S)	:	0:0:2:0		SEE	: 50
Total Hours	:	24 Hours		SEE Duration	: 2 Hours
Credits	:	2			

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand Core Salesforce Concepts
2	Master Agentic AI tool Custom Features
3	Improve Customer Interaction and Case Management
4	Leverage Reports and Dashboards for Performance Tracking

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for BE Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Drive AI Within Your Organization	3
Pedagogy		
2	Get Hands On With Prompt Builder Dive into Prompt Builder	4
Pedagogy		
3	Customize and Deploy Your Agents	4
Pedagogy		
4	Sell Smarter with AI agents	4
Pedagogy		
5	Einstein Live Demo	4
Pedagogy		
6	Dive into Data Cloud	4
Text Books		
Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year	
1	Agentic AI: Theories and Practices, by Ken Huang, Springer Cham, 978-3-031-90026-6, June 2025	
2	Agentforce Unleashed: The Unofficial Guide for Business Users and Salesforce Admins, by Jeffrey A. Doornbos PhD, 2024 https://www.salesforce.com/agentforce/use-cases/	

Reference Books

- 1 <https://www.salesforce.com/en-us/wp-content/uploads/sites/4/documents/partners/agentforce-partner-guidebook-technology-partners.pdf>

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand and Explain Core Agent AI and AI Concepts	Apply	L3
CO2	Apply Agent AI Tools to Build a Basic AI Agent	Apply	L3
CO3	Analyze and Present Business Use Cases for AI Agents.	Apply	L3

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	1	0	2	1	2	1	2	1	1	3
CO2	2	2	3	2	3	1	1	1	2	2	2	2	2	3	2
CO3	2	3	3	2	2	2	1	2	2	3	2	3	2	2	3

Teaching Hours/Week (L: T:P: S)	0:0:2:0
Hours of Pedagogy	24 hours Practical
Credits:	01
Programs / Experiments	10
CIE Marks	50
SEE Marks	50
Marks	100
Exam Hours	02
Examination nature (SEE)	Practical



Dayananda Sagar Academy of Technology & Management
(Autonomous Institute under VTU)

Semester	:	IV				
Course Title	:	Technical Writing using LaTeX				
Course Code	:	BCY407B				
Course Type (Theory/ Practical/ Integrated)	:	Theory				
Category	:	AEC				
Stream	:	Cyber Security		CIE	:	50
Teaching hours/ week (L:T:P:S)	:	0:0:2:0		SEE	:	50
Total Hours	:	24 Hours		SEE Duration	:	2 Hours
Credits	:	2				

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To introduce the basic syntax and semantics of the LaTeX scripting language
2	To understand the presentation of tables and figures in the document
3	To illustrate the LaTeX syntax to represent the theorems and mathematical equations
4	To make use of the libraries (Tikz, algorithm) to design the diagram and algorithms in the document

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

Scheme of Teaching and Examinations for BE Programme -2024-25



Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours																									
1	Develop a LaTeX script to create a simple document that consists of 2 sections [Section1, Section2], and a paragraph with dummy text in each section. And also include header [title of document] and footer [institute name, page number] in the document.	3																									
Pedagogy																											
2	Develop a LaTeX script to create a document that displays the sample Abstract/Summary	3																									
Pedagogy																											
3	Develop a LaTeX script to create a simple title page of the VTU project Report [Use suitable Logos and text formatting]	3																									
Pedagogy																											
4	Develop a LaTeX script to create the Certificate Page of the Report [Use suitable commands to leave the blank spaces for user entry]	3																									
Pedagogy																											
5	Develop a LaTeX script to create a document that contains the following table with proper labels <table><tr><th>S.No</th><th>USN</th><th>Student Name</th><th colspan="2">Marks</th></tr><tr><td></td><td></td><td></td><th>Subject1</th><th>Subject2</th></tr><tr><td>1</td><td>4XX22XX001</td><td>Name 1</td><td>89</td><td>60</td></tr><tr><td>2</td><td>4XX22XX002</td><td>Name 2</td><td>78</td><td>45</td></tr><tr><td>3</td><td>4XX22XX003</td><td>Name 3</td><td>67</td><td>55</td></tr></table>	S.No	USN	Student Name	Marks					Subject1	Subject2	1	4XX22XX001	Name 1	89	60	2	4XX22XX002	Name 2	78	45	3	4XX22XX003	Name 3	67	55	3
S.No	USN	Student Name	Marks																								
			Subject1	Subject2																							
1	4XX22XX001	Name 1	89	60																							
2	4XX22XX002	Name 2	78	45																							
3	4XX22XX003	Name 3	67	55																							
Pedagogy																											
	Develop a LaTeX script to include the side-by-side graphics/pictures/figures in the document by using the subgraph concept	3																									

Pedagogy		
7	Develop a LaTeX script to create a document that consists of the following two mathematical equations $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$= \frac{-2 \pm \sqrt{2^2 - 4 \cdot (1) \cdot (-8)}}{2 \cdot 1}$$= \frac{-2 \pm \sqrt{4 + 32}}{2}$ $\varphi_{\sigma}^{\lambda} A_t = \sum_{\pi \in C_t} \text{sgn}(\pi) \varphi_{\sigma}^{\lambda} \varphi_{\pi}^{\lambda}$$= \sum_{\tau \in C_{\sigma t}} \text{sgn}(\sigma^{-1} \tau \sigma)$$= A_{\sigma t} \varphi_{\sigma}^{\lambda}$	3
Pedagogy		
8	Develop a LaTeX script to demonstrate the presentation of Numbered theorems, definitions, corollaries, and lemmas in the document.	3
Text Books		
Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year	
1	BOOK: A Short Introduction to LaTeX BY FIRUZA KARMALI (AIBARA), A book for beginners, 2019	
2	BOOK: Formatting Information: A Beginner's Introduction to Typesetting with LaTeX, BY PETER FLYNN, Comprehensive TeX Archive Network (2005)	
Reference Books		
1	The LaTeX Companion, 3rd edition (TTCT series), Frank Mittelbach with Ulrike Fischer, 3rd Edition 2023	

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Apply basic LaTeX command to develop simple document	Apply	L3
CO2	Demonstrate LaTeX script to present theorems and mathematical equations in the document	Apply	L3

CO3	Implement programs to generate the complete report with citations and a bibliography	Apply	L3
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Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1		3				1	2			1	2	2
CO2	3	2	2	1	3				1	2			1	2	3
CO3	3	2	2	1	3				2	3			2	3	3



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Experiential Learning - Batch

From,

Date:

Name: & USN:

Name: & USN:

Name: & USN:

Name: & USN:

Semester:

Respected Sir/Madam,

Sub: Regarding Experiential Learning Batch

With respect to the above subject, we are the students mentioned above would like to form the batch
for carrying out the mini project
on.....

Thanking you,

Yours faithfully

Sl. No.	Name of the student	Signature
1.		
2.		
3.		
4.		

Signature of the Guide

Name of the Guide

Designation

Department of Cyber Security Engineering



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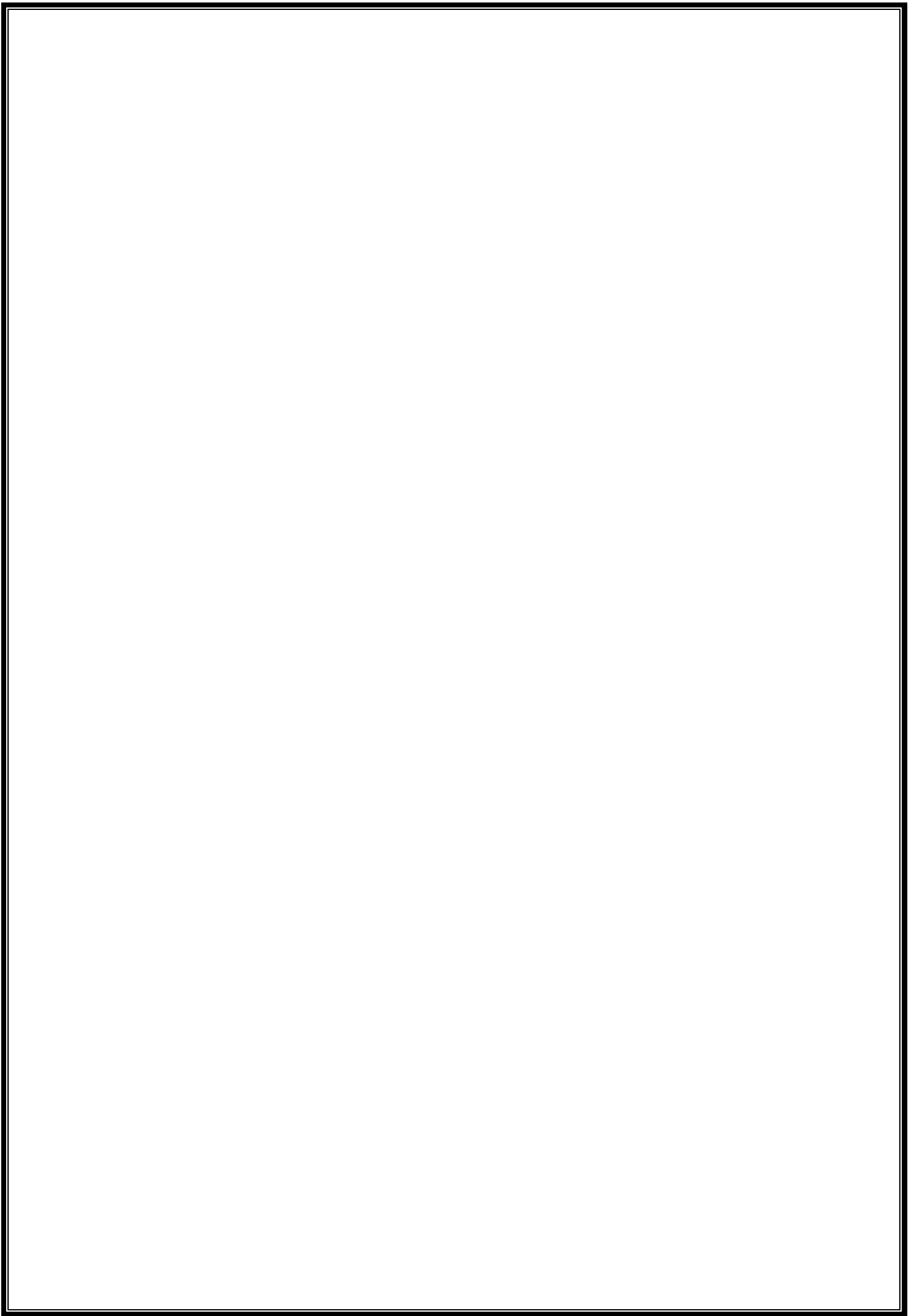
Experiential Learning (EL) – Student(s) – Guide – Interaction

Date		
EL Batch No.		
Title of the project		
Week No.		
Content of the Discussion		
Suggestion by the guide		
Name of Signature of students		

Signature of the Guide

Signature of EL Coordinator

Signature of HOD



Assessment

Rubrics for Project-Based Learning Assessment

Sl. No	Name of the Student	USN	Criteria	Exemplary (4)	Proficient (3)	Developing (2)	Beginning (1)	Total
			Project Understanding	Demonstrates deep understanding of project goals and requirements; identifies key issues and objectives.	Shows good understanding of project goals and requirements; recognizes most key issues and objectives.	Displays basic understanding of project goals and requirements; some key issues and objectives are unclear.	Lacks clear understanding of project goals and requirements; key issues and objectives are misunderstood.	
			Technical Competence	Mastery of technical skills required for the project; applies skills effectively and efficiently.	Good technical skills; applies skills competently with few errors.	Basic technical skills; occasionally makes errors in application.	Limited technical skills; frequently makes errors in application.	

			Innovation	Highly creative and original ideas; shows significant innovation and out-of-the-box thinking.	Somewhat creative and original ideas; demonstrates innovation in some aspects.	Limited creativity and originality; shows minimal innovation.	Lacks creativity and originality; no evidence of innovative thinking.	
			Problem Solving	Identifies problems accurately and develops effective, comprehensive solutions.	Identifies problems correctly and develops good solutions.	Identifies problems but solutions are somewhat effective or incomplete.	Struggles to identify problems and develop effective solutions.	
			Project Management	Manages project timelines, resources, and tasks exceptionally well; meets all deadlines.	Manages project timelines, resources, and tasks effectively; meets most deadlines.	Manages project timelines, resources, and tasks with some difficulty; misses some deadlines.	Poor management of project timelines, resources, and tasks; frequently misses deadlines.	

			Documentation	Thorough, clear, and well-organized documentation; all necessary details included.	Clear and organized documentation; most necessary details included.	Basic documentation; some necessary details are missing or unclear.	Poor documentation; lacks necessary details and organization.	
			Presentation Skills	Engaging and well-organized presentation; communicates ideas clearly and effectively.	Good presentation; communicates ideas clearly but lacks some engagement or organization.	Basic presentation; some ideas are unclear or poorly organized.	Ineffective presentation; ideas are unclear and poorly organized.	
			Collaboration	Works exceptionally well with team members; shows strong teamwork and leadership skills.	Works well with team members; demonstrates good teamwork.	Works with team members but has some difficulties in collaboration.	Struggles to work with team members; lacks teamwork and collaboration skills.	

			Faculty Assessment	Meets or exceeds faculty expectations in all areas; shows exceptional performance.	Meets faculty expectations in most areas; shows good performance.	Meets some faculty expectations; shows average performance.	Does not meet faculty expectations; shows poor performance.	
			Reflection	Provides deep insights and critical analysis of own work; demonstrates significant learning and growth.	Provides good insights and analysis of own work; demonstrates learning and growth.	Provides basic insights and analysis of own work; shows some learning and growth.	Provides minimal or no insights and analysis of own work; shows little to no learning and growth.	
			Overall Assessment	Exceptional overall performance; exceeds expectations in most or all areas.	Good overall performance; meets expectations in most areas.	Average overall performance; meets expectations in some areas.	Poor overall performance; does not meet expectations in most areas.	

Skills Assessment

Course : Web Programming

[illegible]

**SOCIAL CONNECT
&
RESPONSIBILITY (SCR)/
UNIVERSAL HUMAN
VALUES & CLEAN
TECHNOLOGY (UHV-CT)**

SCR- Social Connect & Responsibility

Teaching Hours/Week (L: T: P: S)	0:0:0:2
Total Hours of Pedagogy	40 hour Practical Session + 15 hours Planning
Credits:	01
Programs / Experiments	12
CIE Marks	100
SEE Marks	-----
Total Marks	100
Exam Hours	3
Examination nature (SEE)	No SEE only CIE For CIE Assessment - Activities Report Evaluation by College NSS Officer / HOD / Sports Dept / Any Dept.



Dayananda Sagar Academy of Technology & Management

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Semester	:	IV			
Course Title	:	Universal Human Values (UHV) and Clean Technology			
Course Code	:	BUHK408			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Category	:	UHV			
Stream	:	Cyber Security	CIE	:	100
Teaching hours/ week (L:T:P:S)	:	0:2:0:0	SEE	:	50
Total Hours	:	15 hours	CIE	:	1 Hour
Credits	:	1	Duration	:	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the need for developing a holistic perspective of life.
2	Analyse the scope of life – individual, family, society and nature/existence.
3	Develop more confidence and commitment to understand, learn and act accordingly.
4	Promote sustainability, resource efficiency, and environmental protection while maintaining economic growth and human well-being.

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. The methodology of this course is exploration and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.
2. The course is in the form of 30 lectures (discussions)
3. It is free from any dogma or value prescriptions.
4. It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation – the whole existence is the lab and every activity is a source of reflection.
5. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student in every activity, leading to continuous self-evolution.
6. This self-exploration also enables them to critically evaluate their pre-conditionings and present beliefs.



DSATM

Scheme of Teaching and Examinations for BE Programme -2024-25

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction to Value Education: Understanding Value Education , Self-exploration as the Process for Value Education, The Basic Human Aspirations- Continuous Happiness and Prosperity, Method to Fulfil the Basic Human Aspirations. Text Book 1:Chapter 1 - Chapter 4	3
Pedagogy	Think Pair and Share	
2	Understanding the Harmony at Various Levels: Understanding Human beings as the Co-existence of the Self ('I') and the Body. Harmony in the Self (I) – Understanding Myself, Harmony with the Body – Understanding Sanyama and Svāsthya Text Book 1: Chapter 5 : Chapter 7	3
Pedagogy	Poster presentation	
3	Understanding the Harmony in Family and Society: Harmony in the Family – Understanding Values in Human Relationships, Harmony in the Society – From Family Order to World Family Order. Text Book 1: Chapter 8 : Chapter 9	3
Pedagogy	Presentation	
4	Implications of Right Understanding: Providing the Basis for Universal Human Values and Ethical Human Conduct, Professional Ethics in the Light of Right Understanding. Text Book 1: Chapter 12 : Chapter 14	3
Pedagogy	Case study	
5	Clean Technology: Introduction to sustainable energy and environment: Energy and development, energy reserves and resources, classification of energy resources, concept of sustainability. Energy Conservation: Energy management strategy, energy conservation.	3

	Data Centre Overview: Data centre infrastructure, main substance, data centre Archetypes Text Book 2: Chapter 1: 1.1-1.3: Chapter 12: 12.2 ,12.5 Text Book 3: Chapter 1:1.1- 1.3	
Pedagogy	Demonstration	

Text Books	
Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	The Textbook A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, Excel Books, 2 nd Revised Edition, New Delhi, 2019.
2.	Sustainable Energy and the Environment:A Clean Technology Approach,N.D.Kaushika et.al., Springer publisher,2016
3.	Advanced Concepts for Renewable Energy Supply of Data Centers,Jaume Salom, et.al.,River Publishers,2017
Reference Books	
1	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004
2	Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantik, 1999.
3.	The Teacher"s Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G ,3 rd revised edition ,2023

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the significance of value inputs in a classroom and start applying them in their life and profession	U	L2
CO2	Identify the role of harmony in family, society and universal order.	A	L3
CO3	Analyse between values and skills, happiness and accumulation of Physical facilities, the Self and the Body, Intention and Competence of an individual, etc.	An	L4
CO4	Evaluate the role of human being in the abatement of pollution	E	L5

CO5	Create awareness in understanding the types of renewable energy benefits of harvesting renewable energy	C	L6
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Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2						3									
CO3						3									
CO4							3			3					
CO5						3	3	3		3			3		

COs Mapped to POs and PSOs:

Course Outcomes	Program Outcomes	Program Specific Outcomes
CO1	-	-
CO2	PO6	-
CO3	PO6	-
CO4	PO7, PO10	-
CO5	PO6, PO7, PO8, PO10	PSO1

Weblinks and Video Lectures (e-Resources)

1	https://nptel.ac.in/courses/109104068
2	https://www.youtube.com/watch?v=FbC9ZhaVc3Y
3	https://www.youtube.com/watch?v=N6foRtAwVyU&list=PLWDeKF97v9SMKcx1CKpONmPxLZYgjKVG8
4	https://www.youtube.com/watch?v=0tdgOzp5VWs&list=PLWDeKF97v9SMKcx1CKpONmPxLZYgjKVG8&index=3
5	https://www.youtube.com/watch?v=XS-eXqppf_w&t=4s

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	5%
Understand	15%
Apply	40%
Analyse	20%
Evaluate	10%
Create	10%

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	5		5	5	10	10%
CO2	5	10	10	10	5	40	10%
CO3		5		5		10	40%
CO4		10	5	5		20	10%
CO5	2	2	2	2	2	10	20%
Total	12	32	17	27	12	100	100%