

DAYANANDA SAGAR ACADEMY OF TECHNOLOGY & MANAGEMENT



CURRICULUM

Scheme and Syllabus IV Semester

Outcome Based Education

(Academic Year 2024-2025)

Department of Computer Science and Engineering

(Cyber Security)

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.



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	CSE	3	0	2	0	5	4
3	IPCC-2	CSE	CSE	3	0	2	0	5	4
4	PCC-1	CSE	CSE	3	0	0	0	3	3
5	PCC-2	CSE	CSE	3	0	0	0	3	3
6	PBL	CSE	CSE	0	0	2	2	4	2
7	AEC	CSE	CSE	0	0	2	0	2	1
8	SCR	CSE	CSE	0	0	2	0	2	1
9	NCMC	NSS / YOGA / PED							
10	AICTE Activity Points								
Total									21

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

4th Sem

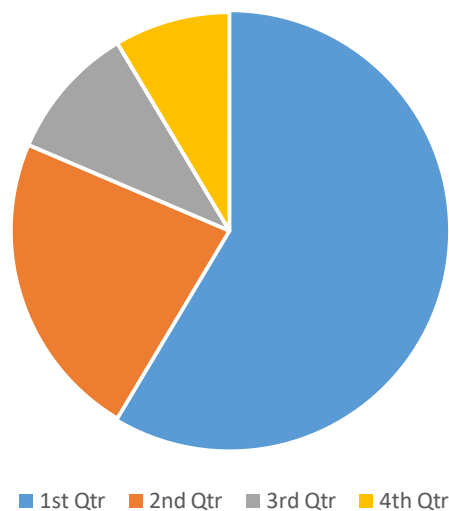
Sl. No	Course Category	Component			
		Theory	Practical	Outreach	YOGA/SPORTS
1	BSC	100%	--	--	--
2	IPCC-1	60%	40%	--	--
3	IPCC-2	60%	40%	--	--
4	PCC-1	100%	--	--	--
5	PCC-2	100%	--	--	--
6	PBL	--	100%	--	--
7	AEC	--	100%	--	--
8	SCR	--	--	100%	--
9	NCMC	--	--	--	100%
Total Percentage		53%	47%	13%	13%

Scheme Distribution

Department of Information Science and Engineering

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)		
Ability Enhancement course (AEC)	1	
Project (PR)	1	
Total		
	21	100

Scheme-Credit Distribution
Plot the pie-chart





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Scheme of Teaching and Examinations – 2024
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from 2024-25)

4th SEMESTER: Information Science & Engineering (ISE)

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
						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-CYB	CSE-CYB	3	0	2	0	5	4	3	50	50	100
3	BCY403	Object Oriented Programming with Java	IPCC-2	CSE-CYB	CSE-CYB	3	0	2	0	5	4	3	50	50	100
4	BCY404	Information and Network Security	PCC-1	CSE-CYB	CSE-CYB	3	0	0	0	3	3	3	50	50	100
5	BCY405	Database Management System	PCC-2	CSE-CYB	CSE-CYB	3	0	0	0	3	3	3	50	50	100
6	BCY406	Full Stack Development	PBL	CSE-CYB	CSE-CYB	0	2	0	2	4	2	2	50	50	100
7	BCY407	Competitive Programming	AEC	CSE-CYB	CSE-CYB	0	0	2	0	2	1	2	50	50	100
8	BUHK408	Universal Human Values and Clean Technology	UHV	BSC	Any Dept.	0	2	0	0	2	1	1	100	-	100
Total						15	2	8	2	27	21				800

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.



4th 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)

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 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

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	:	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	:	40 Theory + 20 Practical = 60 Hours		SEE Duration	:	3 hours
Credits	:	04				

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 2024-25)

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	8

	Text Book : Chapter 6: 6.3,6.4 Chapter 7: 7.2-7.3	
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: Decision Tress, Basic concepts of P, NP and NP-Complete and NP - Hard Classes. Backtracking: N-queen's problem, Sum of subset problem Branch and bound: Assignment problem Text Book : Chapter 11: 11.2, Chapter 12: 12.1-12.2	8
Pedagogy	Case Studies	
	Pedagogical Initiatives (Not limited to): <ul style="list-style-type: none"> • 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
	Design and implement Java Program to :	
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 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 Queen's problem using Backtracking.	CO4
Open ended Programs		
1	Design and implement Java Program to solve discrete Knapsack and continuous Knapsack problems using greedy approximation method.	CO5
2	Design and implement Java Program to solve Dynamic Programming Approach for Matrix Chain Multiplication	CO5
3	Design and implement Java Program to implement Horspool's Algorithm for string matching	CO5
4	Design and implement Java Program to 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.
Reference Books	
1	Computer Algorithms/C++, Ellis Horowitz, SatrajSahni 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)

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 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
CO4	Develop the algorithms for various real time applications using contemporary computing languages.	E	L5
CO5	Design the experiments using the various algorithm techniques	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															
CO2	3														
CO3		3		3											
CO4			3												
CO5					3				3			3	3	3	

Weblinks and Video Lectures (e-Resources)

1	https://nptel.ac.in/courses/106/101/106101060/
2	https://www.youtube.com/watch?v=v0eQ4nXJjsk
3	https://www.youtube.com/watch?v=FSolHhA_gEo

4	https://www.youtube.com/watch?v=HqPJF2L5h9U
5	https://www.youtube.com/watch?v=4ZIRH0eK-qQ
6	https://www.youtube.com/watch?v=r58oVFCaJRw
7	https://www.youtube.com/watch?v=QJXvnco-Dqk
8	https://www.youtube.com/watch?v=4Oj_ESzSNck
9	https://www.youtube.com/watch?v=MZ0BBHFq27A
10	https://www.youtube.com/watch?v=7ObW28LRITw
11	https://www.youtube.com/watch?v=DKCbsiDBN6c
12	https://www.youtube.com/watch?v=aeO-UYsWW_0
13	https://www.youtube.com/watch?v=3RBNPc0_Q6g
14	https://www.youtube.com/watch?v=jloBUts-BLw

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
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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	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



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Semester	:	III				
Course Title	:	Object Oriented Programming with Java				
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	:	40 Theory + 20 Practical = 60 Hours		SEE Duration	:	3 Hours
Credits	:	4				

Course Learning Objectives: Students will be able to:

Sl. No.	Course Objectives
1	Learn the syntax and semantics of Java programming language
2	Understand Object Oriented Programming Features of JAVA
3	Analyze Inheritance, Packages, String manipulation, Exceptions and identify the appropriate concepts to be used.
4	Design and Develop Solutions to problems using object programming approach.

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 Java.
- Encourage collaborative (Group) Learning for team building.
- Include 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 2024-25)

COURSE CURRICULUM

Module No.	Topics	Hours
1	<p>Evolution and an Overview of Java: The Bytecode, The Java Buzzwords, Object-Oriented Programming (Two Paradigms, Abstraction, The Three OOP Principles), Using Blocks of Code, Lexical Issues (Whitespace, Identifiers, Literals, Comments, Separators, The Java Keywords).</p> <p>Data Types, Variables, and Arrays: The Primitive Types (Integers, Floating-Point Types, Characters, Booleans), Variables, Type Conversion and Casting, Automatic Type Promotion in Expressions, Arrays, Introducing Type Inference with Local Variables.</p> <p>Operators: Arithmetic Operators, Relational Operators, Boolean Logical Operators, The Assignment Operator, The ? Operator, Operator Precedence, Using Parentheses.</p> <p>Control Statements: Java's Selection Statements, Iteration Statements (while, do-while, for, The For-Each Version of the for Loop, Local Variable Type Inference in a for Loop, Nested Loops), Jump Statements.</p> <p>Chapter 1,2, 3, 4, 5</p>	8
Pedagogy	Mind Mapping	
	Introducing Classes: Class Fundamentals, Declaring Objects, Assigning Object	

2	<p>Reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection.</p> <p>Methods and Classes: Overloading Methods, Objects as Parameters, Argument Passing, Returning Objects, Recursion, Access Control, Understanding static, Introducing final, Introducing Nested and Inner Classes.</p> <p>Chapter 6,7</p>	8
Pedagogy	Peer Group Learning	
3	<p>Inheritance: Inheritance Basics, Using super, Creating a Multilevel Hierarchy, When Constructors Are Executed, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using final with Inheritance, Local Variable Type Inference and Inheritance, The Object Class.</p> <p>Interfaces: Interfaces, Default Interface Methods, Use static Methods in an Interface, Private Interface Methods.</p> <p>Chapter 8, 9</p>	8
Pedagogy	Think-Pair-Share	
4	<p>Packages: Packages, Packages and Member Access, Importing Packages.</p> <p>Exceptions: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java's Built-in Exceptions, Creating Your Own Exception Subclasses, Chained Exceptions.</p> <p>Chapter 9,10</p>	8
Pedagogy	Role Play	
5	<p>String Handling: The String Constructors, String Length, Special String Operations, Character Extraction, String Comparison, Searching Strings, Modifying a String, Data Conversion Using valueOf(), Changing the Case of Characters Within a String, joining strings, StringBuffer, StringBuilder.</p> <p>Chapter 18</p>	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	Develop a JAVA program to add TWO matrices of suitable order N (The value of N should be read from command line arguments).	CO4
2	Define a stack class to hold a maximum of 10 integers with suitable methods. Develop a JAVA main method to illustrate Stack operations.	CO4
3	Develop a Java program to create a class called "Rectangle" with width and height attributes. Calculate the area and perimeter of the rectangle. Demonstrate the main method.	CO4
4	Develop a JAVA program to create a class known as Person with methods called getFirstName() and getLastName(). Create a subclass called Employee that adds a new method named getEmployeeId() and overrides the getLastName() method to include the employee's job title. Demonstrate polymorphism concepts by developing suitable methods, defining member data and main program.	CO5
5	Develop a JAVA program to create an interface Resizable with methods resize(int radius) that allow an object to be resized. Create a class Circle that implements the Resizable interface and override the resize method. Display the radius of a circle before and after resize.	CO5
6	a. Develop a JAVA program to create a package named "mypack" and import & implement it in a suitable class. b. Develop a JAVA program to create a package named "balance" containing Account class with displayBalance() method and import this package in another program to access method of Account class.	CO5 CO5
7	Develop a JAVA program to raise a custom exception (user defined exception) for	CO5

	DivisionByZero using try, catch, throw and finally.	
8	Develop a JAVA program for a banking application to throw an exception where a person tries to withdraw the amount even though he/she has lesser than minimum balance (Create a custom exception).	CO5
9	a. Develop a JAVA program to check whether two given strings are anagram. b. Develop a JAVA program to sort the given strings.	CO4 CO4
10	Develop a Java program to search for a pattern in a given string using StringBuffer class.	CO5
Open Ended Programs		
1	Develop a Java 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 JAVA program to reverse the digits of the input integer of unfixed length	CO5
3	Develop a JAVA program to implement Bubble sort technique.	CO5
4	Develop a Java 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 Java program that reads a list of integers from the user and throws an exception if any numbers are duplicates.	CO5

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Java: The Complete Reference, Herbert Schildt , McGraw-Hill, Twelfth Edition, November 2021, ISBN: 9781260463422

Reference Books

1	Programming with Java, E Balagurusamy, McGraw Hill Education,6th Edition,Mar-2019, ISBN: 9789353162337.
2	Introduction to JAVA Programming, Y. Daniel Liang: Pearson Education, 11th Edition, 2018
3	Thinking in Java, Bruce Eckel, Prentice Hall, Fourth Edition, 2006 (https://sd.blackball.lv/library/thinking_in_java_4th_edition.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 the fundamental principles of object-oriented concepts for the construction of robust programs.	U	L2
CO2	Apply the knowledge of Java programming in implementing simple real-world problems.	A	L3
CO3	Analyze OOP concept, inheritance, packages, exception handling and string handling techniques	An	L4
CO4	Develop the effective programs using string manipulation and object-oriented	C	L5
CO5	Create the optimal solution for the given scenario using java concepts.	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															
CO2	3														
CO3		3													
CO4			3		3							3			
CO5				3	3			2	3	3	2	3	3	3	

Cos Matched with POs

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

Weblinks and Video Lectures (e-Resources)

1	https://nptel.ac.in/courses/106/105/106105191/
2	https://nptel.ac.in/courses/106/105/106105225/
3	https://youtu.be/qGMxs-PbFPk
4	Introduction to Programming In Java (by Evan Jones, Adam Marcus and Eugene Wu): https://ocw.mit.edu/courses/6-092-introduction-to-programming-in-java-january-iap-2010/
5	Java Tutorial: https://www.geeksforgeeks.org/java/
6	https://www.w3schools.com/java/
7	https://www.javatpoint.com/java-tutorial
8	https://www.youtube.com/@VeenaRSV
9	https://youtu.be/Bn1-CENDcS8?si=1sdcTsE6OA1oRe4M
10	https://www.youtube.com/watch?v=WQ4aA4-MESE

11	https://www.youtube.com/watch?v=loOxCQL4cJc
12	https://www.youtube.com/watch?v=bxz7cXbDI0&list=PLqleLpAMfxGAEfyXJyF-9UOs9C8dmir_Y
13	https://www.youtube.com/watch?v=dFuVh_Bzy9c
14	https://www.youtube.com/watch?v=A1uqgEz3hB0

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

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) - 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
		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

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 Network 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:

1. Adopt different teaching methods to attain the course outcomes.
2. Include videos to demonstrate various concepts in C.
3. Encourage collaborative (Group) Learning to encourage team building.
4. Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
5. 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.
6. Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
7. Discuss various case studies to map with real-world scenarios and improve the understanding.
8. Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSAT

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

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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		
2	Hash Functions++ What is a Hash Function? The Birthday Problem, Non-cryptographic Hashes, Tiger Hash, HMAC, Uses of Hash Functions, Online Bids, Spam Reduction, Other Crypton Related Topics, Secret Sharing, Key Escrow, Random Numbers, Texas Hold 'em Poker, Generating Random Bits, Information Hiding. Textbook 1: Chapter 5	08
Pedagogy		
3	Entity Authentication Random number generation, Providing freshness, Fundamentals of entity authentication, Passwords, Dynamic password schemes, Zero-knowledge mechanisms Cryptographic Protocols: Protocol basics, from objectives to a protocol,	08

	Analysing a simple protocol, Authentication and key establishment protocols. Textbook 2: Chapter 8 ,9	
Pedagogy		
4	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		
5	Applications Cryptographic Applications Cryptography on the Internet Cryptography for wireless local area networks Cryptography for mobile telecommunications Cryptography for secure payment card transactions Cryptography for video broadcasting Cryptography for identity cards Cryptography for home users. Textbook 2: Chapter 12	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
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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 basic concepts of Cryptography	U	L2
CO2	Apply the use of hash function to it's applications	A	L3

CO3	Demonstrate knowledge of the Passwords, Dynamic password schemes Zero- knowledge mechanisms	A	L3
CO4	Analyse the Digital security lapses	AN	L4
CO5	Implement 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	1														
CO2	3														
CO3	3														
CO4		3													
CO5				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.
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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**.

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- 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(50)			Test-2(50)				
	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	:	Database Management Systems		
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 Hours	SEE	: 3 Hours
Credits	:	3	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 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:

9. Adopt different teaching methods to attain the course outcomes.
10. Include videos to demonstrate various concepts in C.
11. Encourage collaborative (Group) Learning to encourage team building.

12. Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
13. 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.
14. Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
15. Discuss various case studies to map with real-world scenarios and improve the understanding.
16. 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 2024-25)

COURSE CURRICULUM

Module No.	Topics	Hours
1	<p>Introduction to Databases, Database Languages and Architectures: Introduction, Characteristics of database approach, Advantages of using the DBMS approach, Data Models, Schemas, and Instances. Three schema architecture and data independence, database languages, and interfaces, The Database System environment.</p> <p>Data Modelling Using the Entity-Relationship Model: High-Level Conceptual Data Models for Database Design; A Sample Database Application; Entity types, Entity sets and structural constraints, Weak entity types, ER diagrams, Naming Conventions and Design Issues.</p> <p>Mapping Conceptual Design into a Logical Design: Relational Database Design using ER-to-Relational mapping.</p> <p>Textbook 1: Chapter 1: 1.1 - 1.6: Chapter 2: 2.1 - 2.4: Chapter 3: 3.1 - 3.7: Chapter 9: 9.1</p>	8
Pedagogy	Poster Presentation	
2	<p>Relational Model and Relational Algebra concepts: Relational Model Constraints and Relational Database Schemas, Update Operations and Dealing with Constraint Violations, Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from Set Theory, Binary Relational Operations: JOIN and DIVISION, Examples of Queries in Relational Algebra.</p> <p>SQL:SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL.</p> <p>Textbook 1: Chapter 5: 5.1 - 5.3: Chapter 8: 8.1 - 8.5: Chapter 6: 6.1-6.4</p>	8

Pedagogy	Think Pair and Share	
3	<p>SQL: Advanced Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL.</p> <p>Database Design Theory: Introduction to Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation schema, Functional Dependencies – Definition, Inference Rules, Equivalence of sets of FDs, Minimal Set of FD's; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form, Fourth Normal Form, Join Dependencies and Fifth Normal Form.</p> <p>Textbook 1: Chapter 7: 7.1 - 7.4: Chapter 14 :14.1 - 14.7</p>	8
Pedagogy	Query Solving	
4	<p>Transaction Processing: Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions, characterizing schedules based on recoverability, characterizing schedules based on Serializability, Transaction support in SQL.</p> <p>Concurrency Control Techniques: Two phase locking techniques for concurrency control, types of locks and system lock tables, Concurrency control based on Timestamp ordering.</p> <p>Textbook 1: Chapter 20: 20.1 - 20.6, Chapter 21: 21.1.1 - 21.1.3, 21.2.1-21.2.2</p>	8
Pedagogy	Problem Solving	
5	<p>Database Security: Security issues, Access control based on privileges, Role Based access control, SQL Injection, Statistical Database security, Flow control, Encryption and Public Key infrastructures.</p> <p>Introduction to NOSQL Databases: Difference between SQL and NoSQL, The CAP Theorem, Document-Based NOSQL Systems and MongoDB, NOSQL Key-Value Stores, Column-Based or Wide Column NOSQL Systems, NOSQL Graph Databases.</p> <p>Textbook 1: Chapter 30: 30.1- 30.7: Chapter 24: 24.1 - 24.6</p>	8
Pedagogy	Case Studies, Practical Based learning	
	<p>Pedagogical Initiatives (Not limited to):</p> <ul style="list-style-type: none"> 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

Sl. No.	Open ended Programs	COs
1	<p>Create a table called Employee that contain attributes EMPNO, ENAME, JOB, MGR, SALARY, ADDRESS & execute the following.</p> <ol style="list-style-type: none"> 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. 6. Add primary key constraint and not null constraint to the employee table. 	CO3
2	<p>Consider the schema Employee (E_id, E_name, Age, Salary)</p> <ol style="list-style-type: none"> 1. Create Employee table containing all Records E_id, E_name, Age, Salary. 2. Count number of employee names from employeetable 3. Find the Maximum age from employee table. 4. Find the Minimum age from employeetable. 5. Find salaries of employee in Ascending Order. 6. Find grouped salaries of employees. 	CO3
3	<p>Consider the following schema for a Library Database:</p> <p>BOOK(Book_id, Title, Publisher_Name, Pub_Year)</p> <p>BOOK_AUTHORS(Book_id, Author_Name)</p> <p>PUBLISHER(Name, Address, Phone)</p> <p>BOOK_COPIES(Book_id, Programme_id, No-of_Copies)</p> <p>BOOK_LENDING(Book_id, Programme_id, Card_No, Date_Out, Due_Date)</p>	CO3

	<p>LIBRARY_PROGRAMME(Programme_id, Programme_Name, Address)</p> <p>Design SQL queries to</p> <ol style="list-style-type: none"> 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. 	
4	<p>Design the core concepts on table like nested and correlated nesting queries and also EXISTS and NOT EXISTS keywords.</p> <p>Consider the schema for Company Database:</p> <p>EMPLOYEE (SSN, Name, Address, Sex, Salary, SuperSSN, DNo)</p> <p>DEPARTMENT (DNo, DName, MgrSSN, MgrStartDate)</p> <p>DLOCATION(DNo,DLoc)</p> <p>PROJECT (PNo, PName, PLocation, DNo)</p> <p>WORKS_ON (SSN, PNo, Hours)</p> <p>Develop SQL queries to</p> <ol style="list-style-type: none"> 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. 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. 	CO5
5	<p>Develop SQL Triggers for insert, delete, and update operations in a database table</p> <p>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</p>	CO5

	between the old & new Salary. CUSTOMERS (ID, NAME, AGE, ADDRESS, SALARY)	
6	<p>Develop NO SQL for Database and CRUD operations on database table.</p> <p>Install an Open-Source NoSQL Data base MongoDB & perform basic CRUD (Create, Read, Update & Delete) operations. Execute MongoDB basic Queries using CRUD operations.</p>	CO5
7	Develop NoSQL database tools Create Document, column and graph-based data.	CO5
8	<p>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.</p> <p>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:</p> <ol style="list-style-type: none"> 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
9	<p>Consider the following schema:</p> <p>Branch (branch-name: String, branch-city: String, assets: real)</p> <p>BankAccount(accno: int, branch-name: String, balance: real)</p> <p>BankCustomer (customer-name: String, customer-street: String, customer-city: String)</p> <p>Depositer(customer-name: String, accno: int)</p> <p>LOAN (loan-number: int, branch-name: String, amount: real)</p> <p>Design a database to satisfy the above requirements and answer the following queries:</p> <ol style="list-style-type: none"> i. Create the above tables by properly specifying the primary keys and the foreign keys. ii. Enter at least five tuples for each relation. iii. Display the branch name and assets from all branches in lakhs of rupees and rename the assets column to 'assets in lakhs'. vi. Find all the customers who have at least two accounts at the same branch (ex. SBI_ResidencyRoad). 	CO5

	v. Create A View Which Gives Each Branch The Sum Of The Amount Of All The Loans At The Branch.	
10	<p>Consider the following schema:</p> <p>SUPPLIERS (Sid: integer, sname: string, address: string)</p> <p>PARTS (PID: integer, pname: string,color: string)</p> <p>CATALOG (Sid: integer, PID: integer, cost: real)</p> <p>Design a database to satisfy the above requirements and answer the following queries:</p> <p>a. Find the names of parts for which there is some supplier.</p> <p>b. Find the names of suppliers who supply every part.</p> <p>c. Find the id's of suppliers who supply only red parts.</p>	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.
Reference Books	
1	Data base 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	Program Outcomes	Program Specific Outcomes
CO1	-	-
CO2	PO1, PO2	-
CO3	PO2, PO3, PO4	-
CO4	PO2, PO3	-
CO5	PO3, PO5, PO8, PO9, PO10, PO11, PO12	PSO1, PSO2

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	5	-	-	-	-
Understand	5	5	10	-	10
Apply	20	25	20	-	10
Analyse	10	10	20	15	10
Evaluate	10	10		15	10
Create	-	-	-	20	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	-	3	-	2	15	15%
CO2	5	5	5	10	10	10	45	45%
CO3	2	3	2	3	5	5	20	20%
CO4	-	5	3	2	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 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	2	-	-	5	5	10	10%
CO2	5	5	5	10	10	5	40	40%
CO3	-	5	3	-	5	-	10	10%
CO4	-	4	6	5	5	-	20	20%
CO5	2	-	2	2	2	2	10	10%
Total	12	16	16	17	27	12	100	10%

**PROJECT BASED
LEARNING (PBL)**

PBL- Project Based Learning

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			
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.

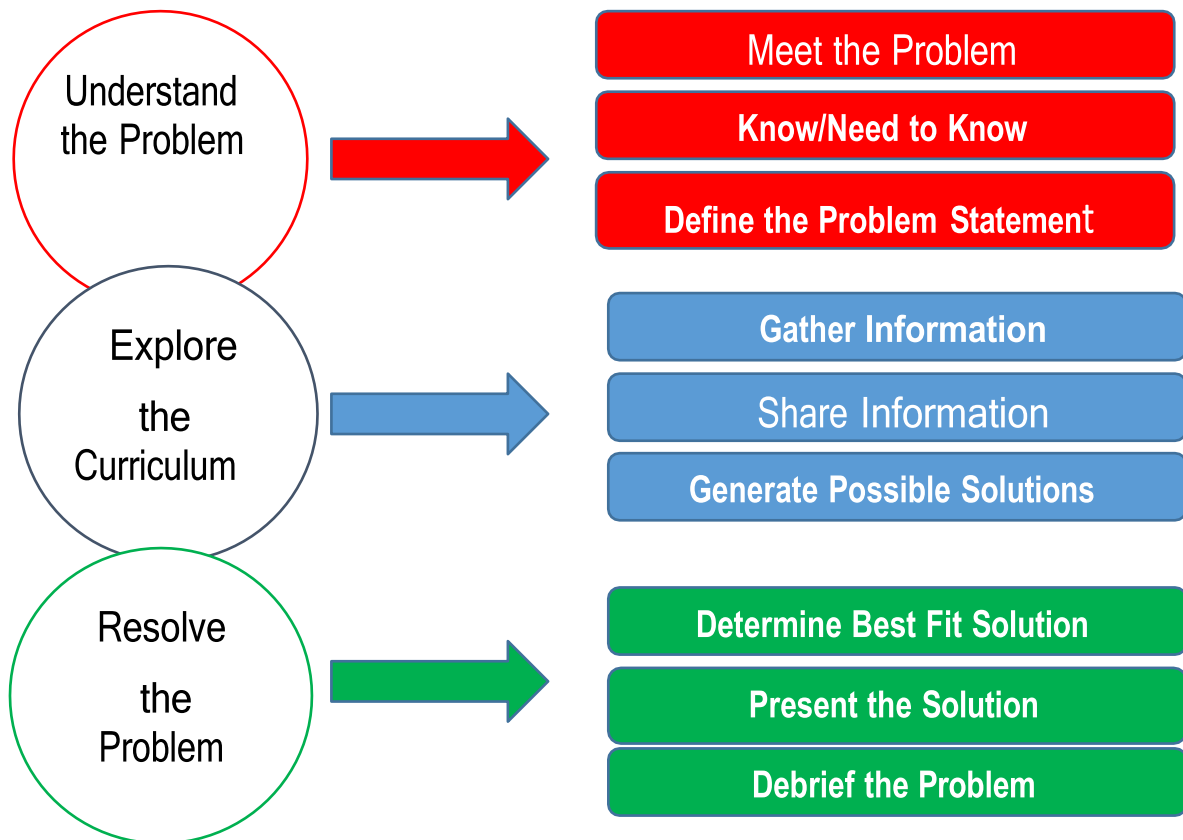
Phase 2:

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.

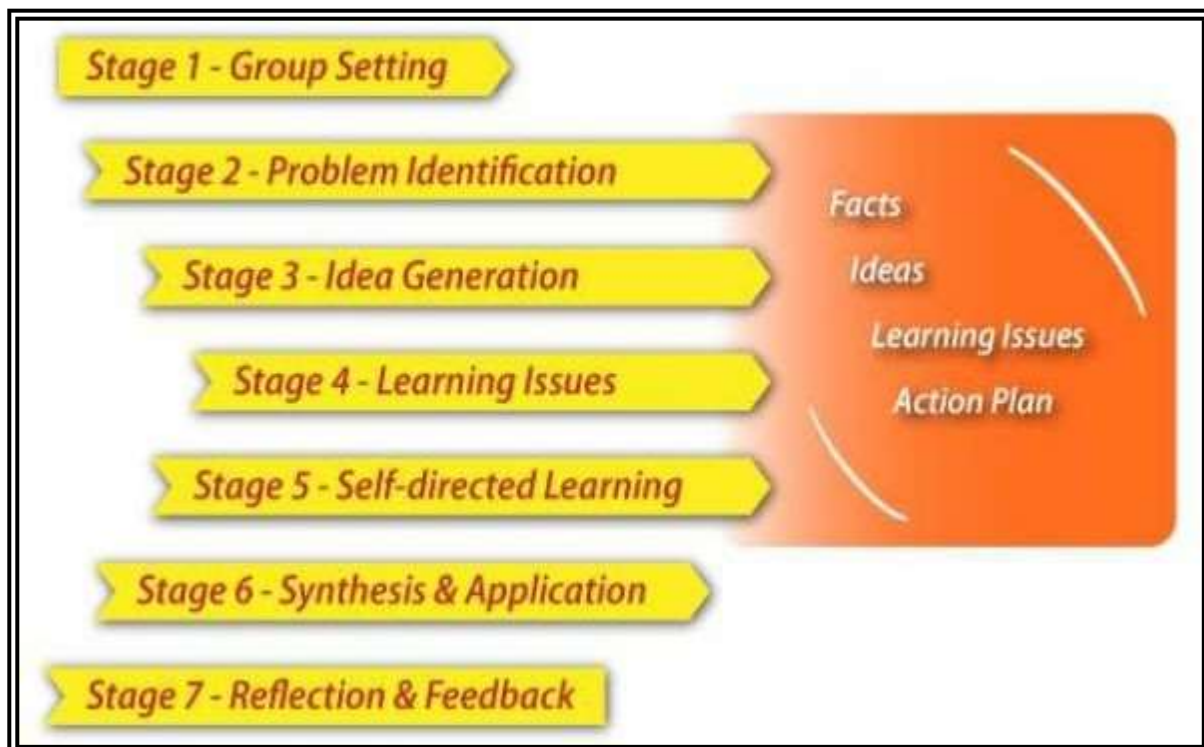
10. Obstacles/Gaps

- 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	<ul style="list-style-type: none"> ▪ 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 	<ul style="list-style-type: none"> ▪ No spelling, grammatical, or punctuation errors ▪ High-level use of vocabulary and word choice 	<ul style="list-style-type: none"> ▪ Information is clearly focused in an organized and thoughtful manner. ▪ Information is constructed in a logical pattern to support the solution. 	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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 	<ul style="list-style-type: none"> ▪ Few (1 to 3) spelling, grammatical, or punctuation errors ▪ Good use of vocabulary and word choice 	<ul style="list-style-type: none"> ▪ Information supports the solution to the challenge or question. 	<ul style="list-style-type: none"> ▪ Multimedia is used to illustrate the main points. ▪ Format is appropriate for the content. ▪ Presentation captures audience attention. ▪ Presentation is well organized.
3	<ul style="list-style-type: none"> ▪ 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 	<ul style="list-style-type: none"> ▪ Minimal (3 to 5) spelling, grammatical, or punctuation errors ▪ Low-level use of vocabulary and word choice 	<ul style="list-style-type: none"> ▪ 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. 	<ul style="list-style-type: none"> ▪ Multimedia loosely illustrates the main points. ▪ Format does not suit the content. ▪ Presentation does not capture audience attention. Presentation is loosely

2	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ More than 5 spelling, grammatical, or punctuation errors▪ Poor use of vocabulary and word choice	<ul style="list-style-type: none">▪ Content is unfocused and haphazard.▪ Information does not support the solution to the challenge or question.▪ Information has no apparent pattern.	<ul style="list-style-type: none">▪ 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	<ol style="list-style-type: none"> 1. Develop comprehensive skillset by learning frontend and backend development. 2. Prepare students for roles as fullstack 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	<ol style="list-style-type: none"> 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. Realtime 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)	:	0:0:0:2	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 2024-25)

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	
	Pedagogical Initiatives (Not limited to): <ul style="list-style-type: none">• 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

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												3		
CO3		3													
CO4					3			3	3	3	3	3		3	

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



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)

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.....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

**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	12
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Practical (Internal Examiners only)



Dayananda Sagar Academy of Technology & Management
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ABILITY ENHANCEMENT COURSE

EXPERIENTIAL LEARNING

1. (a) Define Objectives

Identify Goals: Determine what skills and knowledge you want students to acquire through Experiential Learning.	
Learning Goal (LG)-1	Understand advanced data structures and algorithms needed for competitive programming.
Learning Goal (LG) -2	Apply advanced data structures and dynamic programming techniques to design efficient algorithms to solve complex problems.
Learning Goal (LG) -3	Analyze different algorithms to efficiently determine the most appropriate for solving a given problem.
Learning Goal (LG)-4	Evaluate the performance of the designed solution and optimize the code for better performance and lower complexity.
Learning Goal (LG)-5	Design compact and efficient solutions to problems in a time-efficient manner.

(b) Course Outcomes

Identify Goals: Determine what skills and knowledge you want students to acquire through Experiential Learning.	
Course Outcomes (CO)-1	Understand and explain advanced programming concepts and algorithms necessary for competitive programming.
Course Outcomes (CO)-2	Apply a variety of algorithms including sorting, searching, dynamic programming, greedy algorithms, and divide-and-conquer strategies to solve specific problems.
Course Outcomes (CO)-3	Analyze complex problems, break them into manageable components, and devise effective solutions.
Course Outcomes (CO)-4	Evaluate the performance of the solution and make necessary optimizations to improve efficiency.
Course Outcomes (CO)-5	Develop efficient solutions to given problems using different approaches and achieving desirable results.

(c) Alignment

Align with Curriculum: Ensure these goals align with the overall educational objectives of the engineering program.

Sl.No	Learning Goals	Course Outcomes	Assessment	In-Class Activity	Out-of-Class Activity	Weightage
1.	LO-1	CO1	Exam(CIE, SEE)	Debugging Activity	MOOC Course	10
2.	LO-2	CO2	Exam(CIE, SEE)	Think-Pair and Share	Coding Exercises	20
3.	LO-3	CO3	Exam(CIE, SEE)	Problem-Solving	Coding Exercises	25
4.	LO-4	CO4	Exam(CIE, SEE)	Problem-Solving	Online Competitions	20
5.	LO-5	CO5	Project Reviews	Problem-Solving	Projects	25

2. Curriculum Design

(a) Course integration

Course Integration: Identify which courses can incorporate experiential learning activities. This can include project-based courses, labs, internships, and workshops.

Sl.No	Course Name	Course Code	Justification for selecting the Course for Experiential Learning
1	Competitive Programming		Competitive Programming helps students achieve proficiency in Programming Languages and gain In-Depth Understanding of Data Structures and algorithms. Students can quickly identify and apply suitable algorithms and data structures for different types of problems, and optimize code for both time and space complexity to meet competitive programming constraints. Students will be well-prepared to participate in competitive programming contests and tackle various algorithmic challenges effectively. It improves mathematical, and analytical skills, error debugging and Soft Skills.

(b) Develop Modules

Develop Modules: Create specific modules within these courses that focus on hands-on experiences.

Module No	Lecture No.	Session Topics	RBT Levels	Activities Planned	Course Outcome Mapping	Mode of Delivery	Planned Date	Actual Date
1		<p>Searching and Sorting: Counting Sort, Radix Sort, Shell Sort, Bucket sort</p> <p>Advanced Data Structures: Single and double ended Priority Queues, Leftist Trees, Optimal Binary Search Trees, B-Trees, B + trees, n-ary trees, Segment Trees, Fenwick Trees (Binary Indexed Trees), Tries, Disjoint Set Union (Union-Find), Sparse Tables</p> <p>Graph Algorithms:</p> <p>Strongly Connected Components (Kosaraju, Tarjan), Advanced Graphs, Euler Tour, Bipartite Graph Checking Maximum Flow (Ford-Fulkerson, Edmonds-Karp)</p>	L2, L3, L5	<p>Coding activity using appropriate techniques and algorithms to solve coding problems on geeksforgeeks and hackerrank platform</p> <p>https://www.geeksforgeeks.org/top-50-searching-coding-problems-for-interviews/?ref=ml_lbp</p> <p>https://www.geeksforgeeks.org/top-50-string-coding-problems-for-interviews/?ref=ml_lbp</p> <p>https://www.geeksforgeeks.org/top-50-graph-coding-problems-for-interviews/?ref=ml_lbp</p>	CO1, CO2, CO4	Chalk and Talk, PPTs, Case-studies, Hands-on coding exercises		

2	<p>Dynamic Programming: Longest Common Subsequence (LCS), Longest Increasing Subsequence (LIS), Matrix Chain Multiplication, Coin Change Problem</p> <p>String Algorithms: String Matching (Knuth-Morris-Pratt (KMP), Rabin-Karp, Z Algorithm), Aho-Corasick Algorithm for Pattern Searching, Boyer Moore Algorithm, Manacher's Algorithm, Suffix Arrays and Suffix Trees, Trie, Longest Common Prefix (LCP) Array</p>	L3, L4, L6	<p>https://www.geeksforgeeks.org/top-50-dynamic-programming-coding-problems-for-interviews/</p> <p>https://www.geeksforgeeks.org/top-50-string-coding-problems-for-interviews/?ref=ml_lbp</p>	CO2, CO3, CO5	Chalk and Talk, PPTs, Case-studies, Hands-on coding exercises		
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Reference Books/ Materials

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein (CLRS), MIT press, 2022.
2. Algorithms, Robert Sedgwick and Kevin Wayne, Addison-wesley professional, 2011.
3. Competitive Programming 3: The New Lower Bound of Programming Contests., Steven, Halim, and Halim Felix. (2013).
4. Guide to competitive programming, Laaksonen, Antti. Cham: Springer, 2020.

MOOC Courses

1. <https://www.coursera.org/learn/algorithms-greedy>
2. <https://www.coursera.org/specializations/algorithms>
3. <https://www.coursera.org/specializations/data-structures-algorithms>
4. <https://www.udemy.com/courses/search/?src=ukw&q=The+Bible+of+Competitive+Programming+%26+Coding+Interviews>
5. <https://www.udemy.com/course/the-bible-of-competitive-programming-part-2/?couponCode=IND21PM>
6. <https://online.codingblocks.com/courses/competitive-programming-course-online>
7. <https://www.geeksforgeeks.org/courses/competitive-programming-cp>

Top 15 websites for Coding Challenges and Competitions

1. GeeksForGeeks
2. The ACM-ICPC International Collegiate Programming Competitions
3. Google Kick Start
4. Google Code Jam
5. Google Hash Code
6. The ICFP Programming Competitions
7. Facebook Hacker Cup
8. Microsoft Imagine Cup
9. Codeforces Coding Competitions
10. Codechef Coding Competitions
11. Topcoder Coding Competitions
12. Atcoder Coding Competitions
13. HackerEarth
14. HackerRank
15. Leetcode

3. Mapping of Learning objectives with Learning Outcomes

Course/Modules	Learning Objective	Learning Outcome	Assessment Method
Module 1:	LO-1, LO-2, LO-4	CO-1, CO-2, CO-4	Problem-solving
Module 2:	LO-2, LO-3, LO-5	CO-2, CO-3, CO-5	Problem-solving

4. Partnerships and Resources

Industry Collaboration: Establish partnerships with local industries and organizations to provide real-world projects, internships, and site visits.

Sl.No	Name of the Industry Collaboration	Projects undertaken / Industrial Visit	Domain	Project Outcomes
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Implement Experiential Activities

PBL Component	Details
Project Title	Sorting visualizer, Graph traversal simulator, Web Development Projects, Graph-based projects, Dynamic Programming based projects
Real-World Problem	<p>The following projects can be considered as real-world problems. [Not Limited to]</p> <ul style="list-style-type: none"> Real-Time Contest Simulator with Automated Judging Algorithm Visualizer: Interactive Tool for Understanding Algorithmic Concepts Pathfinding Visualizer Route Optimization for Delivery Services Graph Database for Recommendations Game Level Generation Graph-based Search Engine Knapsack Problem Solver Matrix Chain Multiplication Optimizer Sequence Alignment Tool

Learning Objectives	<p>Subject Areas: Data Structures, Dynamic Programming, Graphs,</p> <p>Skills Developed: Programming languages like Java, C++, Python</p>
Timeline	<p>Start Date: First day of the semester</p> <p>Milestones/Checkpoints:</p> <ol style="list-style-type: none"> 1. Understand the SDLC process of the project: 1-3weeks 2. Design and Implement the project: 4-8 weeks 3. Evaluate the working of the project: 9-10 weeks 4. Demonstrate and report submission: 11-12 weeks <p>End Date: Last day of the semester</p>
Resources Needed	<p>Materials: [List materials]</p> <p>Technology: [List technology]</p> <p>Guest Speakers/Experts: [List experts]</p>
Team Formation	<p>Group Size: 4members</p> <p>Team Roles: Analysis, Design, Develop and Test</p>
Background Information	Basic programming skills, basic Data Structures and algorithms, Strings
Research Methods	<p>Primary Sources: [List methods such as interviews, surveys]</p> <p>Secondary Sources: [List methods such as articles, books, videos]</p>
Team Meetings	<p>Frequency: Once in a Month</p> <p>Structure: Based on their SDLC stage the review for the progress and suggestions given</p>

Collaboration Tools	<p>Digital Platforms: Google, Competitive Platforms.</p> <p>Communication Methods: In-Person meetings, presentations, demonstrations.</p>
Project Deliverables	<p>Reports, Presentations, Prototypes, Project</p>
Presentation Format	<p>Options: PowerPoint, Team Demonstration</p> <p>Audience: classmates</p> <p>Schedule: Presentation schedule: 11th week</p>
Project Exhibition	<p>Defining the Purpose and Theme</p> <p>Setting Goals</p> <p>Form an Organizing Committee: Invite Participants</p> <p>Choose a Venue</p> <p>Set a Budget for the exhibition</p> <p>Create a Timeline to host</p>

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.....Engineering

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 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.	
				Thorough, clear, and well-organized documentation; all	Clear and organized documentation; most necessary details	Basic documentation; some necessary details are missing or unclear.	Poor documentation; lacks necessary	

			Documentation	necessary details included.	included.		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	Meets faculty expectations in most areas; shows good performance.	Meets some faculty expectations; shows average performance.	Does not meet faculty expectations; shows poor performance.	

				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.	



**SOCIAL CONNECT
&
RESPONSIBILITY (SCR)
/**

**UNIVERSAL HUMAN
VALUES & CLEAN
TECHNOLOGY (UHV-**

SCR- Social Connect & Responsibility

Teaching Hours/Week (L: T: P: S)	0:0:0:2
Total Hours of Pedagogy	40 hour Practical Session +15 hour 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.



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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	: 50
Teaching hours/ week (L:T:P:S)	:	0:2:0:0	SEE	: 50
Total Hours	:	15 Hours	SEE	: 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 2024-25)

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 being 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. 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	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

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
6.	https://archive.nptel.ac.in/courses/103/107/103107157/
7.	https://www.youtube.com/watch?v=uCuLBaNONW0

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(50)			Test-2(50)				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	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						5		
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%

