Scheme of Teaching and Examinations – 2023
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from 2023-24)

1st SEMESTER: CHEMISTRTY CYCLE (Computer Science Stream) – Artificial Intelligence &Machine Learning (AIML)

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	BMATS101	Engineering Mathematics-1	ASC	MAT	MAT	3	2	0	0	5	4	3	50	50	100
2	BCHES102	Applied Chemistry for Computer Science Stream	ASC	CHE	CHE	2	2	2	0	6	4	3	50	50	100
3	BCECV101	Introduction to Civil Engineering	CEC-1	CED	CED	3	0	0	0	3	3	3	50	50	100
4	BESCS101	Principles of Programming using C	ESC	ISE	AIML	2	0	2	0	4	3	3	50	50	100
5	BESCM102	Computer Aided Engineering Drawing	ESC	MED	MED	2	0	2	0	4	3	3	50	50	100
6	BCENC106	Communicative English	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
7	BSBKC107	Samskruthika Kannada/Balake Kannada	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
8	BIDTC108	Innovation Design andThinking	AEC/SDC	ALD	ALD	1	0	0	0	1	1	2	50	50	100
					Total	**15**	**4**	**6**	**0**	**25**	**20**	**21**	**400**	**400**	**800**

2nd SEMESTER: PHYSICS CYCLE (Computer Science Stream) – Artificial Intelligence &Machine Learning (AIML)

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	BMATS201	Engineering Mathematics-2	ASC	MAT	MAT	3	2	0	0	5	4	3	50	50	100
2	BPHYS202	Applied Physics for Computer Science Stream	ASC	PHY	PHY	2	2	2	0	6	4	3	50	50	100
3	BCECE205	Introduction to Electronics Engineering	CEC-2	ECE	ECE	3	0	0	0	3	3	3	50	50	100
4	BETCS203	Introduction to IOT	ETC	CSE(AI)	AIML	2	0	0	2	4	3	3	50	50	100
5	BPLCS202	Basics of JAVA Programming	PLC	AIML	AIML	2	0	2	0	4	3	3	50	50	100
6	BCENC206	Professional writing skills in English	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
7	BICNC207	Indian Constitution	HSSC	MED	MED	1	0	0	0	1	1	2	50	50	100
8	BEEXC208	Engineering Exploration	AEC/SDC	ALD	ALD	0	0	0	2	2	1	2	50	50	100
					Total	**14**	**4**	**4**	**4**	**26**	**20**	**21**	**400**	**400**	**800**

Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	**2**				
Course Title	:	**Basics of Java Programming**				
Course Code	:	**BPLCS202**				
Course Type (Theory/ Practical/ Integrated)	:	**Integrated**				
Category	:	**PLC**				
Stream	:	**CSE**		**CIE**	:	**50 Marks**
Teaching hours/ week (L:T:P:S)	:	**2:0:2:0**		**SEE**	:	**50 Marks**
Total Hours	:	**28 T + 12 P Hrs**		**SEE Duration**	:	**3 Hours**
Credits	:	**03**				
Pre-requisites	:	**Principles of Programming using C**				

Course Learning Objectives: Students will be taught

Sl. No	Course Objectives
1.	The basics of object oriented language using java
2.	To write simple java program using jdk environment
3.	Analyse the real time problems and provide solutions using java program.
4.	Design java applications
5.	To use modern tools like Eclipse to design applications

Teaching-Learning Process

Pedagogy (General Instructions):

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

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can device innovative pedagogy to improve teaching-learning.

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

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	**An Overview of Java:** Object-Oriented Programming, A First Simple Program, A Second Short Program, Two Control Statements, Using Blocks of Code, The Java Class Libraries, **Data Types, Variables, and Arrays:** Java Is a Strongly Typed Language, The Primitive Types, Integers, Floating-Point Types, Characters, Booleans, Variables, Type Conversion and Casting, Arrays, A Few Words About Strings **Textbook 1**: Ch 2.1 to 2.5,2.7, Ch 3.1 to 3.6,3.8,3.9,3.11,3.13	5
Pedagogy	**Chalk and talk, PPT, Discussion with real-time examples, Demonstration using modern tools**	
2	**Operators:** Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logical Operators, The Assignment Operator, The? Operator, Operator Precedence, Using Parentheses, **Control Statements:** Java's Selection Statements, Iteration Statements, Jump Statements. **Textbook 1:** Ch 4, Ch 5	5
Pedagogy	**Chalk and talk, PPT, Discussion with real-time examples, Demonstration using modern tools**	
3	**Introducing Classes:** Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, A Stack Class, **A Closer Look at Methods and Classes:** Overloading Methods, A Closer Look at Argument Passing, Recursion, Understanding static, Introducing final, Arrays Revisited, Exploring String Class, using command line argument, variable length arguments, **Textbook 1:** Ch 6, Ch 7.1,7.3, 7.5,7.7,7.8, 7.9, 7.11 to 7.13	6
Pedagogy	**Chalk and talk, PPT, Discussion with real-time examples, Demonstration using modern tools**	
4	**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. **Textbook 1:** Ch 8.1 to 8.8	6
Pedagogy	**Chalk and talk, PPT, Discussion with real-time examples, Demonstration using modern tools**	
5	**Packages and Interfaces:** Packages, Packages and member Access, Importing Packages, Interfaces, **Exception Handling:** Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Java's Built-in Exceptions,	6

	Textbook 1: Ch 9.1 to 9.4, Ch 10.1 to 10.5, 10.10	
Pedagogy	**Chalk and talk, PPT, Discussion with real-time examples, Demonstration using modern tools**	

List of Experiments or Programs

Sl.No	Experiments/Programs	COs
1	a. Write a JAVA program that prints all real solutions to the quadratic equation ax2+bx+c=0. Read in a,b, c and use the quadratic formula. b. Write a JAVA program for the multiplication of two arrays.	CO2
2	Create a JAVA class called Student with the following details as variables within it. USN NAME BRANCH PHONE PERCENTAGE Write a JAVA program to create n Student objects and print the USN, Name, Branch, Phone, and percentage of these objects with suitable headings	CO2
3	Design a super class called Staff with details as StaffId, Name, Phone, Salary. Extend this class by writing three subclasses namely Teaching (domain, publications), Technical (skills), and Contract (period). Write a JAVA program to read and display at least 3 staff objects of all three categories.	CO3
4	Create two packages P1 and P2. In package P1, create class A, class B inherited from A, and class C . In package P2, create class D inherited from class A in package P1 and class E. Demonstrate the working of access modifiers (private, public, protected, default) in all these classes using JAVA.	CO3
5	Write a JAVA program to read two integers a and b. Compute a/b and print, when b is not zero. Raise an exception when b is equal to zero. Also, demonstrate the working of Array IndexOutOfBoundException	CO3
6	a. Read and write from a text file, append a text file and write a binary fileb. b. Write a text file using the PrintWriter class in Java	CO3

Text Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	Herbert Schildt, Java The Complete Reference, 12th Edition, Tata McGraw Hill
Reference Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	Java Online Document: https://docs.oracle.com/en/java/javase/20/ Java SE 17 (JDK 17) to be used

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	To Understand the fundamental features of object-oriented language and JAVA	Understand	L1/L2
CO2	To Apply the Java JDK environment to create, debug and run simple Java programs	Apply	L3
CO3	To Analyse the real-world objects and implement using Java concepts.	Analyse	L4

CO4	To Design the applications with object-oriented concepts using Java programming	**Design**	**L5**
CO5	To evaluate real-world problems and develop projects	**Evaluate**	**L5**

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	--	--	--	--	--	--	--	--	--	--	--	--	--	1
CO3	--	3	--	--	1	--	--	--	--	--	--	--	--	--	2
CO4	--	--	3	--	2	--	--	--	2	2	--	--	--	2	2
CO5	--	--	--	3	2	--	--	--	2	2	--	2	--	3	3

Weblinks and Video Lectures (e-Resources)	
1	https://www.youtube.com/watch?v=OjdT2l-EZJA&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho
2	https://www.youtube.com/watch?v=hBh_CC5y8-s

Assessment Pattern (both CIE and SEE)

3 Credits Courses – Theory (if Integrated)

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	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
		CCA-2-Pedagogical Initiatives		50				

								method may be adopted
	Total CIE Theory					**25**	10	Scale down Marks of IAT and CCA to 25
CIE	**Practical**	Conduction of Experiments	Continuous Evaluation of each experiment		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. 15 marks are for conducting the experiment and calculations/observations/output)
			Performance-Continuous Evaluation of each experiment	05	15			
			Record	05				
			Observation book	05				
		Practical Test	Write up	15	50	05	4	One Internal Practical Test after conduction of all Experiments
			Execution	25				
			Viva-voce	10				
		Open Ended Experiment	Write up	05	20	05	2	One experiment for 20marks. 20 marks
			Execution	10				
			Viva-voce	05				
	Total CIE Practical					25	10	Scale down Marks of Experiments, Record, Observation, Practical Test and Open-Ended Experiment

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

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

Note: If few of the 3 Credit Courses are Integrated course type, for such courses the method suggested for 4 Credit IPCC Course shall be followed

3 Credit Course –Integrated

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

Assessment Details (both CIE and SEE)
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).
The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).
A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 Marks out of 100) in the total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

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

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

Continuous Internal Evaluation (CIE):
The CIE Marks for the theory component of the IPCC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IPCC
Internal Assessment Test (IAT):

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

Two Tests each of **50 Marks**

- First test after 6th week of the semester (syllabus completion of 50%)
- Second test after 10th week of semester (syllabus completion of 51% - 100%)

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

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

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

Total score for CCA is **10 Marks**
Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

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

	in the theory component and 10 (40% of maximum Marks) in the practical component. • The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included**.** The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks. The theory component of the IC shall be for both CIE and SEE. **Semester End Examination (SEE):** • Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject • The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.** • The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks**. • There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

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

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	10	-	-	-	-	-	10	20%
CO2	-	10	-	-	-	-	10	20%
CO3	-	-	5	5	-	-	10	20%
CO4	-	-	-	-	10	-	10	20%
CO5	-	-	-	-	-	10	10	20%
Total	10	10	5	5	10	10	50	100%

SEE- Semester End Examination (100 Marks)

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

SEE Course Plan

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

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	**An Overview of Java:** Object-Oriented Programming, A First Simple Program,	1
	A Second Short Program, two Control Statements, Using Blocks of Code, The Java Class Libraries,	1
	Data Types, Variables, and Arrays: Java Is a Strongly Typed Language, The Primitive Types, Integers, Floating-Point Types,	1
	Characters, Booleans, Variables, Type Conversion and Casting,	1
	Arrays, A Few Words About Strings	1
2	**Operators:** Arithmetic Operators, The Bitwise Operators,	1
	Relational Operators, Boolean Logical Operators, The Assignment Operator,	1
	The? Operator, Operator Precedence, Using Parentheses,	1
	Control Statements: Java's Selection Statements,	1
	Iteration Statements, Jump Statements.	1
3	**Introducing Classes:** Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors,	1
	The this Keyword, Garbage Collection, , A Stack Class, **A Closer Look at Methods and Classes:** Overloading Methods,	1
	A Closer Look at Argument Passing, Recursion,	1
	Understanding static, Introducing final,	1
	Arrays Revisited, Exploring String Class,	1
	using command line argument, variable length arguments	1
4	**Inheritance:** Inheritance basics, using Super, creating a Multilevel Hierarchy,	1
	When Constructors Are executed,	1
	Method Overriding,	1
	Dynamic Method Dispatch,	1
	Using Abstract Classes	1
	Using final with Inheritance,	1
5	**Packages and Interfaces:** Packages, Packages and Member Access,	1
	Importing Packages, Interfaces	1
	Exception Handling: Exception-Handling Fundamentals,	1
	Exception Types, Uncaught Exceptions,	1
	Using try and catch, Multiple catch Clauses,	1
	Java's Built-in Exceptions,	1
Lab Program1 **Lab Program2**	Write a JAVA program that prints all real solutions to the quadratic equation ax2+bx+c=0. Read in a, b, c and use the quadratic formula. Write a JAVA program for the multiplication of two arrays.	2
Lab Program3	Create a JAVA class called Student with the following details as variables within it. USN NAME BRANCH PHONE PERCENTAGE Write a JAVA program to create n Student objects and print the USN, Name, Branch, Phone, and percentage of these objects with suitable headings	2
Lab	Design a super class called Staff with details as StaffId, Name, Phone, Salary. Extend this	2

Program4	class by writing three subclasses namely Teaching (domain, publications), Technical (skills), and Contract (period). Write a JAVA program to read and display at least 3 staff objects of all three categories.	
Lab Program5	Create two packages P1 and P2. In package P1, create class A, class B inherited from A, and class C. In package P2, create class D inherited from class A in package P1 and class E. Demonstrate the working of access modifiers (private, public, protected, default) in all these classes using JAVA.	2
Lab Program6	Write a JAVA program to read two integers a and b. Compute a/b and print, when b is not zero. Raise an exception when b is equal to zero. Also, demonstrate the working of ArrayIndexOutOfBoundException	2
Lab Program7 **Lab Program8**	Read and write from a text file, append a text file and write a binary file Write a text file using PrintWriter class in Java	2
Total	**Hrs**	**40**