



Karmaveer Bhaurao Patil University,

Satara

Syllabi for

B. Sc. II Computer Application

Under

Faculty of Science and Technology

(As per NEP 2020)

With effect from Academic Year 2025-2026

Syllabi for Bachelor of Science (B. Sc.) Part – II Computer Application

PREAMBLE:

The Courses of B.Sc. Part-II Computer Application will be introduced in academic year 2025–2026 of B.Sc. Computer Application Programme. It has been designed to meet the specific needs of B.Sc. Computer Application students in accordance with the NEP 2020 guidelines. The curriculum reflects the rapidly evolving field of computer science and its applications in various domains such as software development, data science, artificial intelligence, and web technologies.

The course emphasizes both theoretical knowledge and practical skills, enabling students to understand modern computing concepts along with their real-world applications. It incorporates updated technologies like Java, Python, Artificial Intelligence, Machine Learning, and Web Development.

This approach will help students to gain industry-relevant knowledge and develop problem-solving abilities. The course also includes practical sessions and project-based learning to provide hands-on experience. Additionally, it aims to motivate students to pursue higher education, become entrepreneurs, and seek employment opportunities in IT industries and related sectors.

GENERAL OBJECTIVES OF THE PROGRAM:

1. To provide students with a strong foundation in mathematics, computer science, and information technology.
2. To develop analytical thinking, logical reasoning, and problem-solving abilities for addressing computing challenges.
3. To equip students with the knowledge and skills required to design, develop, and implement software solutions using modern technologies.
4. To familiarize students with current and emerging technologies, including Artificial Intelligence, Machine Learning, databases, networking, and cloud computing.
5. To promote the effective use of modern computing tools, techniques, and methodologies for software development and system design.
6. To foster research aptitude, innovation, and critical thinking for solving real-world problems.
7. To inculcate professional ethics, social responsibility, and awareness of cyber laws in computing practices.
8. To develop communication, teamwork, leadership, and project management skills for multidisciplinary professional environments.
9. To encourage students to contribute to societal, environmental, and industrial needs through technology-based solutions.
10. To promote lifelong learning, adaptability, and continuous professional development to meet the evolving demands of the IT industry and higher education.

GENERAL OUTCOMES OF THE PROGRAM:

After completing the B.Sc. program, graduates will:

1. Apply mathematics and computing fundamental and domain concepts to find out the solution of defined problems and requirements.
2. Apply computational thinking, analytical reasoning, algorithms, and problem-solving techniques to analyse complex problems and develop appropriate and efficient solutions.

3. Understand to design, analyze and develop solutions and evaluate system components or processes to meet specific need for local, regional and global public health, societal, cultural, and environmental systems.
4. Ability to select modern computing tools, skills and techniques necessary for innovative software solutions.
5. Ability to apply and commit professional ethics and cyber regulations in a global economic environment.
6. Recognize the need for and develop the ability to engage in continuous learning as a Computing professional.
7. Create, select, and apply appropriate techniques, resources, and modern IT tools including database management, networking AI & ML with an understanding of their limitations.
8. Demonstrate knowledge and understanding of the management principles and apply them to one own work, and as a member and a leader in a team, to manage projects in multidisciplinary environments.
9. Design and conduct experiments, review the research-based knowledge, gather and interpret data to provide valid conclusions in the context of computer applications.
10. Recognize the need for, and ability to engage in independent and life-long learning.

PROGRAM SPECIFIC OBJECTIVES:

1. To provide students with comprehensive knowledge of programming concepts, computer applications, and software development methodologies.
2. To develop proficiency in programming languages, web technologies, databases, and modern software development tools.
3. To equip students with the skills to analyze, design, develop, test, and maintain software applications for real-world problems.
4. To enable students to apply algorithms, data structures, system software, and multimedia concepts in developing efficient computing solutions.
5. To prepare students to use data analytics, business intelligence, and information systems for effective decision-making and organizational needs.
6. To develop technical competence in emerging areas such as Artificial Intelligence, Machine Learning, Cloud Computing, and Data Analytics.
7. To inculcate professional ethics, effective communication, teamwork, and leadership qualities required in the IT profession.
8. To encourage lifelong learning and continuous professional development to adapt to rapidly evolving computing technologies and industry requirements.

PROGRAMME SPECIFIC OUTCOMES:

After completing the B.Sc. (Computer Application) program, students will:

1. Demonstrate competence in Programming Technologies.
2. Analyze their abilities in systematic planning, developing, testing and executing complex computing applications in field of social media and Analytics, Web Application Development and Data Interpretations.
3. Apprise in-depth expertise and sustainable learning that contributes to multi-disciplinary creativity, permutation, modernization and study to address global interest.
4. Explore technical comprehension in varied areas of Computer Applications and experience a conducive environment in cultivating skills for thriving career and higher

studies.

5. Comprehend, explore and build up computer programs in the allied areas like Algorithms, System Software, Multimedia, Web Design and Data Analytics for efficient design of computer-based systems of varying complexity.
6. Proficient use of business software such as spreadsheets, databases, and programming languages.
7. Capability to analyze business needs and create information systems that are organized, secure, and aligned with organizational goals.
8. Skillful application of computer tools for analyzing business processes, extracting insights from data, and supporting informed decision-making.

1. **TITLE:** Computer Application

2. **YEAR OF IMPLEMENTATION:** From 2025-26

3. **DURATION:** 01 Year

4. **PATTERN:** Semester

5. **MEDIUM OF INSTRUCTION:** English

6. **STRUCTURE OF COURSE:**
As per the NEP 2020 (2.0)

Sem (Level)	Courses			OE	VSC/SEC	AEC/ VEC/ IKS	OJT/ FP/ CEP/ CC/ RP	Total Credit
	Course I	Course II	Course III					
	Major	Minor	-					
Sem III (5.0)	Major V (2) Major VI (2) Major P III (2)	Minor V (2) Minor VI (2) Minor P III (2)	-	OE III (2)	VSC I (2) (P)(Major Specific) SEC I (2) (P)	AEC I (2) (English) IKS II (2) (Major Specific)	-	22
Sem IV (5.0)	Major VII (2) Major VIII (2) Major P IV (2)	Minor VII (2) Minor VIII (2) Minor P IV (2)	-	OE IV (2)	VSC II (2)(P) (Major Specific) SEC II (2)(P)	AEC II (2) (English) VEC II (2) (EVS)	-	22
Credits	12	12		04	08	08	-	44

OE: Open Elective Course, IKS: Indian Knowledge System, VSC: Vocational Skill Course, SEC: Skill Enhancement Course, AEC: Ability Enhancement Course, VEC: Value Education Course

7. COURSE TITLE

➤ Semester III

Semester III				
Sr. No.	Components	Course Code	Course	Credits
1	Major	BCAT 231	Computer Programming II	02
		BCAT 232	Web Designing	02
2	Major P III	BCAP 233	Major Practical III	02
3	Minor	BCAT 234	Instrumentation Techniques for Computing	02
		BCAT 235	Advanced Microprocessor	02
5	Minor P III	BCAP 236	Minor Practical III	02
6	OE	BCAPOE 3	Defense Studies	02
7	VSC	BCAPVSC I	Web Content Management: WordPress	02
8	SEC	BCAPSEC I	Information Security	02
9	AEC I	BCATAEC I	English I	02
10	IKS II	BCATIKS II	History of Computer Application in India	02
Total				22

➤ Semester IV

Semester IV				
Sr. No.	Components	Course Code	Course	Credits
1	Major	BCAT 241	RDBMS	02
		BCAT 242	Web Development	02
2	Major P IV	BCAP 243	Major Practical IV	02
3	Minor	BCAT 244	Advanced Communication	02
		BCAT 245	Embedded System and Applications	02
5	Minor P IV	BCAP 246	Minor Practical IV	02
6	OE	BCATOE 4	Human Psychology	02
7	VSC	BCAPVSC II	Web Content Management: Joomla	02
8	SEC	BCAPSEC II	Ethical Security	02
9	AEC I	BCATAEC II	English II	02
10	VEC II	BCATVEC II	Environmental Awareness in Computer Application	02
Total				22

OE: Open Elective Course, VEC: Value Education Course, VSC: Vocational Skill Course, SEC: Skill Enhancement Course, AEC: Ability Enhancement Course, IKS: Indian Knowledge System

8. EVALUATION STRUCTURE:

➤ Semester III

Course	Course Category	Course Code	Internal Evaluation	ESE	Total Marks	Credits
Major	T	BCAT 231	20	30	50	02
	T	BCAT 232	20	30	50	02
	P	BCAP 233	20	30	50	02
Minor	T	BCAT 234	20	30	50	02
	T	BCAT 235	20	30	50	02
	P	BCAP 236	20	30	50	02
OE	P	BCAPOE 3	20	30	50	02
VSC	P	BCAPVSC 1	20	30	50	02
SEC	P	BCAPSEC 1	20	30	50	02
AEC I	T	BCATAEC 1	20	30	50	02
IKS II	T	BCATIKS 2	20	30	50	02
Total					550	22

➤ Semester IV

Course	Course Category	Course Code	Internal Evaluation	ESE	Total Marks	Credits
Major	T	BCAT 241	20	30	50	02
	T	BCAT 242	20	30	50	02
	P	BCAP 243	20	30	50	02
Minor	T	BCAT 244	20	30	50	02
	T	BCAT 245	20	30	50	02
	P	BCAP 246	20	30	50	02
OE	T	BCATOE 4	20	30	50	02
VSC	P	BCAPVSC 2	20	30	50	02
SEC	P	BCAPSEC 2	20	30	50	02
AEC I	T	BCATAEC 2	20	30	50	02
VEC II	T	BCATVEC 2	20	30	50	02
Total					550	22

INTERNAL EVALUATION STRUCTURE

- Internal evaluation of theory papers shall carry a weightage of 40%.
- Activity: For the internal evaluation of theory papers following activities will be adopted for CCE I & CCE II: class test/ open book test/ online course/ Industrial review/ Industrial visit/ e learning video creation/ assignment/seminar/ case study/ fieldwork/ project.
- CCE III shall consist of multiple-choice questions.
- Each CCE will carry 10 marks for 2-credit theory papers and 20 marks for 4-credit theory papers, and the best two scores will be considered for final score.
- Internal evaluation of practical papers shall carry a weightage of 40%.
- For practical examinations, internal evaluation will be based on student performance, attendance, journal records, and viva voce.

CCE: Continuous Comprehensive Examination, ESE: End Semester Examination,
T: Theory, P: Practical

9. OTHER FEATURES:

A. LIBRARY:

Reference books, Textbooks and journals are available in Institute and Departmental Library. (Separate reference lists are attached along with the respective course syllabus)

B. EQUIPMENTS:

- Computers :120
- Smart Boards: 3
- Internet Connection
- Visual Studio Code
- Visual Studio
- Xampp (for web basics if needed)
- V Lab
- WordPress Framework
- Kali Linux



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - III

Type: Major

Marks: 50

Credits: 2

From: A. Y. 2025-26

**Name of the Course & Code: Computer Programming – II
(BCAT 231)**

Course Objectives: Students should be able to ...

- 1) Explain object-oriented programming.
- 2) Apply C++ operators and control structures.
- 3) Analyze constructors and destructors.
- 4) Evaluate inheritance and polymorphism.

Course Outcomes: Students will be able to...

- 1) Describe object-oriented programming and C++ concepts.
- 2) Implement objects, classes, and constructors.
- 3) Examine OOP concepts in C++ programs.
- 4) Develop C++ programs using inheritance and polymorphism.

Module	Title and Contents	Hrs.
Module -1:	Introduction to OOP 1.1 Difference between POP & OOP, Structure of C++ Program . 1.2 Basic Concepts of OOP – Objects, Classes, Data Abstraction and Data Encapsulation, Inheritance, Polymorphism. 1.3 Dynamic Binding, Message Passing, Benefits & Features of OOP . 1.4 Data types, Keywords and Operators, Control Structure – Conditional and Looping.	9
Module -2:	Objects, Classes & Constructor 2.1 Class Definition, Function Definition and Declaration. 2.2 Arguments to a Function - Passing Arguments to a Function, Default Arguments, Calling Functions, Inline Functions, Scope Rules of Functions and Variables. 2.3 Member Function Definition, inside class and outside the class using scope Resolution Operator, Accessing Members from Object(S). 2.4 Static Class Members - Static Data Member, Static Member Function, Declaration and Definition of a Constructor & Destructor.	9
Module -3:	Inheritance 3.1 Concept of Inheritance, Base Class & Derived Class. 3.2 Types of Inheritance – Single, Multiple, Hierarchical, Multilevel, Hybrid Inheritance. 3.3 Dynamic Memory Allocation / Deallocation using New and Delete Operator.	6

Module -4:	Polymorphism and File Handling 4.1 Concept of Polymorphism, Static Polymorphism & Dynamic (Compile time) Polymorphism. 4.2 Runtime Polymorphism: Virtual functions and pure virtual functions. 4.3 this pointer, Pointers to Derived Classes. 4.4 Function overloading, Operator Overloading, String manipulation using operator overloading.	6
Reference Books: - 1) Horton, Ivor. Beginning C++23: From Beginner to Pro. Apress, 2024. 2) Horton, Ivor, and Peter Van Weert. Beginning C++20: From Novice to Professional. 7th ed., Apress, 2022. 3) Gregory, Kate, and Guy Davidson. Beautiful C++: 30 Core Guidelines for Writing Clean, Safe, and Fast Code. Pearson Education (Addison-Wesley Professional), 2021. 4) Grimm, Rainer. C++20: Get the Details. Leanpub, 2021. 5) Roth, Stephan. Clean C++: Sustainable Software Development Patterns and Best Practices with C++ 17. Packt Publishing, 2021.		
Evaluation Pattern:		
Total Marks: 50		
Internal Continuous Evaluation (20 Marks): • CCE - I : 10 Marks: Activity • CCE - II: 10 Marks: Activity • CCE - III: 10 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (30 Marks): • Question -1: Solve the following questions (Five questions of 2 Marks) • Question -2: Attempt any two questions (Three questions of 10 Marks) • Question -3: Attempt any four questions (Five questions of 5 Marks) Note: Conversion of 50 marks of ESE evaluation to 30 Marks	



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - III

Type: Major

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: Web Designing (BCAT 232)

Course Objectives: Students should be able to ...

- 1) Explain HTML, CSS, and JavaScript concepts.
- 2) Select appropriate web development tools.
- 3) Analyze web design principles and applications.
- 4) Evaluate Dreamweaver for web development.

Course Outcomes: Students will be able to ...

- 1) Describe Dreamweaver and HTML concepts.
- 2) Develop web pages using Dreamweaver.
- 3) Construct HTML forms and input elements.
- 4) Assess web development tools and techniques.

Module	Title and Contents	Hrs.
Module -1:	Introduction To HTML 1.1 Introduction to HTML Editors. 1.2 Applications of HTML. 1.3 Difference between HTML and XML. 1.4 Basic HTML Elements, Headings HTML, Paragraphs, Image Formatting.	8
Module -2:	Elements of HTML 2.1 HTML Tags, Working with Text . 2.2 Working with Lists, Tables and Frames. 2.3 Working with Hyperlinks. 2.4 Images and Multimedia, Working with Forms and controls.	8
Module -3:	Concept of CSS 3.1 Creating Style Sheet, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts). 3.2 Working with block elements and objects. 3.3 Working with Lists and Tables, CSS Id and Class. 3.4 Box Model (Introduction, Border properties, Padding, Margin properties).	8
Module -4:	CSS Advanced 4.1 Grouping, Dimension. 4.2 Display, Positioning. 4.3 Floating, Align, CSS Color. 4.4 Creating page Layout and Site Designs.	6

Reference Books: -

- 1) Duckett, Jon. HTML and CSS: Design and Build Websites. 2nd ed., John Wiley & Sons, 2025.
- 2) Duckett, Jon. JavaScript and jQuery: Interactive Front-End Web Development. 2nd ed., John Wiley & Sons, 2024.
- 3) Freeman, Eric, and Elisabeth Robson. Head First HTML and CSS: A Learner's Guide to Creating Standards-Based Web Pages. 3rd ed., O'Reilly Media, 2024.
- 4) Robbins, Jennifer Niederst. Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics. 6th ed., O'Reilly Media, 2024.
- 5) Nixon, Robin. Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5. 7th ed., O'Reilly Media, 2021.

Evaluation Pattern:**Total Marks: 50****Internal Continuous Evaluation (20 Marks):**

- CCE - I : 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (30 Marks):

- Question -1: Solve the following questions
(Five questions of 2 Marks)
- Question -2: Attempt any two questions
(Three questions of 10 Marks)
- Question -3: Attempt any four questions
(Five questions of 5 Marks)

Note: Conversion of 50 marks of ESE evaluation to 30 Marks



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester -III

Type: Major Practical

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: Computer Application Major
Practical III (BCAP 233)

Practical Batch: 16 Students / Batch

Course Objectives: Students should be able to ...

- 1) Explain object-oriented programming.
- 2) Apply C++ operators and control structures.
- 3) Evaluate web development tools.
- 4) Create modern web applications.

Course Outcomes: Students will be able to...

- 1) Describe object-oriented programming concepts.
- 2) Implement C++ operators and control structures.
- 3) Assess web development tools.
- 4) Develop modern web applications.

Module	Title and Contents	Module
	1) Write a C++ Program to display Names, Roll No., and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents of the array. 2) Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member. Program involving Method Over-riding, Method Over-loading. 3) Given that an EMPLOYEE class contains following members: data members: Employee number, Employee name, Basic, DA, IT, Net Salary and print data members. 4) Write a C++ program to use scope resolution operator. Display the various values of same. 5) Write a C++ program to create multilevel inheritance. (Hint: Classes A1, A2, A3). 6) Write a C++ program to create an array of pointers. Invoke functions using array objects. Programs to demonstrate methods of string class. 7) Write a C++ program to use pointer for both base and derived classes and call the member function. Use Virtual keyword. 8) Write a C++ program to read the data of N employee and compute Net salary of each employee (DA=52% of Basic and Income Tax (IT) =30% of the gross salary). 9) Practicing basic HTML tags, text tags test styles, paragraph styles, headings, lists.	60

	10) Tables in HTML, Frames in HTML, nested frames, Link and Anchor Tags Including graphics, video and sound in web pages Layers & Image Maps, Creating animated Gifs, Cascading Style sheets. 11) Write an HTML code to illustrate the usage of the following: Ordered List, Unordered List, and Definition List. 12) Write an HTML code to demonstrate the usage of inline, internal and external CSS. 13) Write an HTML code to HTML forms and Fields. 14) Write a Java script to prompt for user's name and display it on the screen. 15) Design HTML form for keeping student record and validate it using Java script.	
Reference Books: - 1) Freeman, Eric, and Elisabeth Robson. Head First HTML and CSS: A Learner's Guide to Creating Standards-Based Web Pages. 3rd ed., O'Reilly Media, 2024. 2) Robbins, Jennifer Niederst. Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics. 6th ed., O'Reilly Media, 2024. 3) Gregory, Kate, and Guy Davidson. Beautiful C++: 30 Core Guidelines for Writing Clean, Safe, and Fast Code. Addison-Wesley Professional, 2021. 4) Roth, Stephan. Clean C++: Sustainable Software Development Patterns and Best Practices with C++17. Packt Publishing, 2021. 5) Horton, Ivor, and Peter Van Weert. Beginning C++20: From Novice to Professional. 7th ed., Apress, 2022.		
Evaluation Pattern:		
Total Marks: 50		
Internal Evaluation (20 Marks): • Journal: 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks	Practical Exam Paper (30 Marks): • Section I: Attempt any TWO questions (10 marks each) • Section II: Attempt any TWO questions (05 marks each)	



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - III

Type: Minor

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: Instrumentation Techniques for Computing (BCAT 234)

Course Objectives: Students should be able to ...

- 1) Explain basic electronics principles.
- 2) Describe communication system fundamentals.
- 3) Apply electronics and communication concepts.
- 4) Analyze electronic circuits and communication systems.

Course Outcomes: Students will be able to...

- 1) Interpret communication protocols.
- 2) Demonstrate electronic component analysis.
- 3) Examine digital logic circuits.
- 4) Integrate electronics and communication systems.

Module	Title and Contents	Hrs.
Module -1:	Fundamentals of Electronic Instrumentation and Signal Measurement 1.1 Introduction to instrumentation systems, Types of electrical signals: analog vs. digital. 1.2 Signal conditioning: amplification, filtering, and noise reduction. 1.3 Measurement systems: accuracy, precision, resolution, and error analysis. 1.4 Introduction to multimeters, oscilloscopes, function generators.	6
Module -2:	Sensors and Transducers: Principles and Applications 2.1 Definition and classification of sensors and transducers. 2.2 Working principles of common sensors: temperature (RTD, thermocouple), pressure, light (LDR, photodiodes). 2.3 Proximity, humidity, displacement Selection criteria and specifications. 2.4 Signal conversion: resistive, capacitive, inductive, optical, piezoelectric, Transducers, Sensor interfacing basics (no programming).	8
Module -3:	Controllers and Industrial Communication Protocols (No Programming) 3.1 Basics of controllers: concept of open-loop and closed-loop systems. 3.2 Types of controllers: analog PID, PLC overview (conceptual). 3.3 Introduction to industrial communication: RS232, RS485, I2C, SPI (overview) CAN, MODBUS, PROFIBUS (conceptual use cases). 3.4 Importance of protocols in sensor and actuator interfacing, Wiring, signal integrity, and protocol limitations.	8
Module -4:	Actuators and Data Acquisition Systems (DAQ) 4.1 Types of actuators: electrical (motors, solenoids), hydraulic, pneumatic, Working principle and control methods (basic level, no coding).	8

	4.2 Introduction to DAQ systems: components and architecture. 4.3 Signal sampling, resolution, and conversion (ADC/DAC). 4.4 Integration of sensors, actuators, and DAQ in a measurement system.	
Reference Books: - 1) Kalsi, H. C. Electronic Instrumentation. 4th ed., McGraw Hill Education, 2023. 2) Rajput, R. K. Electrical and Electronic Measurements and Instrumentation. Revised ed., S. Chand Publishing, 2022. 3) Gayakwad, Ramakant A. OP-AMP and Linear Integrated Circuits. 5th ed., PHI Learning Pvt. Ltd., 2021. 4) Murthy, D. V. S. Transducers and Instrumentation. 3rd ed., PHI Learning Pvt. Ltd., 2020. 5) Proakis, John G., and Masoud Salehi. Digital Communications. 6th ed., McGraw Hill, 2020.		
Evaluation Pattern:		
Total Marks: 50		
Internal Continuous Evaluation (20 Marks): • CCE - I : 10 Marks: Activity • CCE - II: 10 Marks: Activity • CCE - III: 10 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (30 Marks): • Question -1: Solve the following questions (Five questions of 2 Marks) • Question -2: Attempt any two questions (Three questions of 10 Marks) • Question -3: Attempt any four questions (Five questions of 5 Marks) Note: Conversion of 50 marks of ESE evaluation to 30 Marks	



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - V

Type: Minor

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code & Code: Advanced Microprocessor (BCAT 235)

Course Objectives: Students should be able to ...

- 1) Explain microprocessor fundamentals.
- 2) Apply assembly language programming.
- 3) Analyze microprocessor applications.
- 4) Evaluate microprocessor interfacing techniques.

Course Outcomes: Students will be able to...

- 1) Describe microprocessor architecture and operations.
- 2) Develop assembly language programs.
- 3) Examine microprocessor-based applications.
- 4) Design microprocessor interfacing solutions.

Module	Title and Contents	Hrs.
Module -1:	Introduction to Microprocessor 1.1 Introduction to Microprocessors: Evolution of Microprocessors (From 4-bit to 64-bit Systems), Applications. 1.2 Basic Components: CPU, Memory (RAM and ROM), Input/ Output Devices, Buses. 1.3 Overview of the 8085 Microprocessor: Features of the 8085 Microprocessor. 1.4 Microprocessor, Introduction to modern microprocessor like Intel 8086 / 8088, Intel 80386 (386).	7
Module -2:	Architecture and Operations of the 8085 Microprocessor 2.1 Pin Configuration and Their Functions. 2.2 Architecture of the 8085 Microprocessor: Registers, ALU (Arithmetic and Logical unit). 2.3 Flag registers, timing and Control unit, Interrupt control, Address and data bus. 2.4 Features of 8085 microprocessor.	8
Module -3:	Instruction Cycles and Timing Diagrams 3.1 Instruction Cycle and Machine Cycle: Instruction Cycle, Machine Cycle. 3.2 Understanding the Concept of Fetch, Decode, and Execute Cycles. 3.3 Timing Diagram for Opcode Fetch. 3.4 Timing Diagram for Memory Read and Write.	8

Module -4:	Assembly Programming and Applications 4.1 Addressing Modes in 8085: Immediate, Direct, Register, Indirect. 4.2 Implicit Addressing Modes, Examples of Addressing Modes. 4.3 Instruction Set of the 8085, Classification of Instructions: Data Transfer, Arithmetic, Logical, Branching, and Control Instructions. 4.4 Basics of Assembly Language Programming: Introduction to Assembly Language Programming (ALP), Structure of an Assembly Language Program.	7
Reference Books: - 1) Mazidi, Muhammad Ali, Janice Gillispie Mazidi, and Rolin D. McKinlay. The 8051 Microcontroller and Embedded Systems: Using Assembly and C. 3rd ed., Pearson Education, 2024. 2) Yerriswamy. Microprocessors and Microcontrollers. 2nd ed., Wiley India, 2023. 3) Senthil Kumar, B., G. Saravanan, and S. Jeevananthan. Microprocessors and Microcontrollers. Revised ed., Oxford University Press, 2022. 4) Gaonkar, Ramesh S. Microprocessor Architecture, Programming, and Applications with the 8085. 7th ed., Penram International Publishing, 2021. 5) Udaya Kumar, K., and B. S. Uma Shankar. The 8085 Microprocessor: Architecture, Programming, and Interfacing. Revised ed., Pearson Education India, 2020.		
Evaluation Pattern:		
Total Marks: 50		
Internal Continuous Evaluation (20 Marks): • CCE - I : 10 Marks: Activity • CCE - II: 10 Marks: Activity • CCE - III: 10 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)		End Semester Examination (30 Marks): • Question -1: Solve the following questions (Five questions of 2 Marks) • Question -2: Attempt any two questions (Three questions of 10 Marks) • Question -3: Attempt any four questions (Five questions of 5 Marks) Note: Conversion of 50 marks of ESE evaluation to 30 Marks



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester -III

Type: Minor Practical

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: Computer Application Minor
Practical III (BCAP 236)

Practical Batch: 16 Students / Batch

Course Objectives: Students should be able to ...

- 1) Explain electrical signal fundamentals.
- 2) Design hardware circuits.
- 3) Describe operational amplifier (Op-Amp) concepts.
- 4) Apply Op-Amp arithmetic operations.

Course Outcomes: Students will be able to...

- 1) Interpret electrical signal characteristics.
- 2) Construct hardware circuits.
- 3) Examine operational amplifier configurations.
- 4) Implement Op-Amp arithmetic operations.

Module	Title and Contents	Module
	1) Signal Conditioning Circuit for RTD (Resistance Temperature Detector). 2) Pressure Sensors: Types and Applications. 3) Introduction to Multimeters. 4) Familiarization with Oscilloscope and Function Generator. 5) Function Generators: Signal Generation and Analysis. 6) Controllers: Open-Loop and Closed-Loop Systems. 7) Analog to Digital and Digital to Analog Conversion. 8) Exploring the Pin Configuration of 8085 9) Addition operation using 8085 microprocessors 10) Multiplication operation using 8085 microprocessors. 11) Write assembly language code in 8085 microprocessors. To find factorial of a given number 12) To find largest number from given series in 8085 microprocessors. 13) To find smallest number from given series in 8085 microprocessors 14) Subtraction operation using 8085 microprocessors 15) Division operation using 8085 microprocessors	60

Reference Books: -

- 1) Mazidi, Muhammad Ali, Janice Gillispie Mazidi, and Rolin D. McKinlay. The 8051 Microcontroller and Embedded Systems: Using Assembly and C. 3rd ed., Pearson Education, 2024.
- 2) Kalsi, H. C. Electronic Instrumentation. 4th ed., McGraw Hill Education, 2023.

- 3) Rajput, R. K. Electrical and Electronic Measurements and Instrumentation. Revised ed., S. Chand Publishing, 2022.
- 4) Gayakwad, Ramakant A. OP-AMP and Linear Integrated Circuits. 5th ed., PHI Learning Pvt. Ltd., 2021.
- 5) Udaya Kumar, K., and B. S. Uma Shankar. The 8085 Microprocessor: Architecture, Programming, and Interfacing. Revised ed., Pearson Education India, 2020.

Evaluation Pattern:

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal : 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

- Section I: Attempt any TWO questions (10 marks each)
- Section II: Attempt any TWO questions (05 marks each)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester: III

Type: VSC

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: Web Content Management:

WordPress (BCAPVSC 1)

Practical Batch: 16 Students / Batch

Course Objectives: Students should be able to ...

- 1) Explain WordPress fundamentals.
- 2) Design WordPress websites.
- 3) Apply WordPress plugins.
- 4) Evaluate WordPress themes and customization.

Course Outcomes: Students will be able to...

- 1) Describe WordPress features and architecture.
- 2) Develop WordPress websites.
- 3) Implement WordPress plugins.
- 4) Customize WordPress themes for website development.

Module	Title and Contents	Module
	1) WordPress – OVERVIEW 2) Installation of WordPress 3) WordPress – DASHBOARD 4) WordPress – GENERAL SETTINGS 5) WordPress – WRITING SETTINGS 6) WordPress – READING SETTINGS 7) WordPress – DISCUSSION SETTINGS 8) WordPress themes 9) Introduction of wordpress plugins 10) Adding plugin, Upload the plugin, Installing a WordPress Plugin 11) Add a page to wordpress 12) Apply customization to pages 13) Adding custom CSS 14) Add a Site Title and Tagline 15) Create a Webpage using wordpress	60

Reference Books: -

- 1) Sabin-Wilson, Lisa. WordPress All-in-One For Dummies. 2nd ed., For Dummies, 2024.
- 2) Green, Michael. WordPress 6 Complete: The Complete Beginner's Guide to WordPress. Apress, 2023.
- 3) Williams, Brad, David Damstra, and Hal Stern. Professional WordPress: Design and Development. 3rd ed., Wrox, 2020.
- 4) Sabin-Wilson, Lisa. WordPress All-in-One For Dummies. For Dummies, 2019.

5) Smith, Bud E. Creating a Website with WordPress: The Only Book You Need. Que Publishing, 2019.

Evaluation Pattern:

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal: 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

- Section I: Attempt any TWO questions (10 marks each)
- Section II: Attempt any TWO questions (05 marks each)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - III

Type: SEC

Marks: 50

Credits:2

From: A. Y. 2025-26

**Name of the Course & Code: Information Security
(BCAPSEC 1)**

Practical Batch: 16 Students / Batch

Course Objectives: Students should be able to ...

- 1) Explain system hacking concepts.
- 2) Apply security services.
- 3) Analyze cybersecurity threats.
- 4) Evaluate cryptographic techniques.

Course Outcomes: Students will be able to...

- 1) Describe system hacking techniques and methodologies.
- 2) Implement security services in computing environments.
- 3) Examine cybersecurity threats and vulnerabilities.
- 4) Assess cryptographic techniques for secure communication.

Module	Title and Contents	Hrs.
	1) Introduction to Information Security. 2) Install & Configure Antivirus System (Any). 3) Set up operating system updates. 4) Perform Backup and restore of the system. 5) Set up passwords to operating system and applications. 6) Apply security to file folder or application using access permissions and verify. 7) Write a program to implement Caesar & Vernam Cipher. 8) Create and verify Hash Code for given message. 9) Write a program to implement Rail fence technique. 10) Write a program to implement Simple Columnar Transposition technique. 11) Create and verify digital signature using tool (e.g. Cryptool). 12) Use Steganography to encode and decode the message using any. 13) Install firewall on any operating system. 14) Configure firewall settings on any operating system. 15) Create and verify Digital Certificate using tool (e.g. Cryptool).	60

Reference Books: -

- 1) Whitman, Michael E., and Herbert J. Mattord. Principles of Information Security. 7th ed., Cengage Learning, 2022.
- 2) Easttom, Chuck. Computer Security Fundamentals. 5th ed., Pearson IT Certification, 2022.
- 3) Stallings, William. Network Security Essentials: Applications and Standards. 7th ed., Pearson Education, 2021.
- 4) Stallings, William. Cryptography and Network Security: Principles and Practice. 8th ed., Pearson Education, 2020.

5) Ciampa, Mark. Security+ Guide to Network Security Fundamentals. 7th ed., Cengage Learning, 2020.

Evaluation Pattern:

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal : 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

- Section I: Attempt any TWO questions (10 marks each)
- Section II: Attempt any TWO questions (05 marks each)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan institute of science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - III

Type: IKS

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: History of Computer Application in India (BCATIKS 2)

Course Objectives: Students should be able to ...

- 1) Describe computer applications in India.
- 2) Illustrate the evolution of computers.
- 3) Explain the impact of computer applications.
- 4) Evaluate key technological milestones.

Course Outcomes: Students will be able to...

- 1) Identify computer applications in various sectors.
- 2) Trace the evolution of computer technology.
- 3) Examine the role of computer applications in society.
- 4) Assess significant technological milestones.

Module	Title and Contents	Hrs
Module -1:	History of Computers & Early Developments in India 1.1 Need of computers and what is computer application, Evolution of computers. 1.2 Early use of computers globally (ENIAC, UNIVAC, IBM, etc.), Journey computers came to India (1950s–1970s). 1.3 Development of early Indian computers: TIFRAC, ISIJU, and PARAM. 1.4 Establishment of computer research centers (TIFR, IISc).	8
Module -2:	Growth of Computer Applications in India 2.1 Use of computers in Indian government and public sector (1970s–1990s), Computers in schools and colleges. 2.2 Programming languages and software tools used in computers. 2.3 Role of CDAC, NIC, DOEACC (now NIELIT) in emerging India. 2.4 Launch of IT policies and software technology parks.	8
Module -3:	Computers in Indian Industry and Daily Life 3.1 Growth of IT companies in India (TCS, Infosys, Wipro, HCL). 3.2 Application of computers in banking, railways, communication, and healthcare, Rise of IT-enabled services (ITES), outsourcing, and BPOs. 3.3 Computer applications in agriculture, manufacturing, and retail, Increasing computer literacy and penetration into rural areas. 3.4 Case study of computer application in India.	7
Module -4:	India's Digital Revolution and the Future of Computer Applications 4.1 Digital India Mission and impact on governance and citizens. 4.2 Use of computers in online education, e-commerce, and mobile apps. 4.3 Cyber security and digital awareness.	7

	4.4 Emerging fields: Cloud computing, IoT, automation, Ai, ML, Robotics Future trends in computer applications in India.	
Reference Books: - 1) Sinha, P. K., and Priti Sinha. Computer Fundamentals. 8th ed., BPB Publications, 2024. 2) Rajaraman, V. Fundamentals of Computers. 8th ed., PHI Learning Pvt. Ltd., 2023. 3) Goel, Anita. Computer Fundamentals. Pearson Education India, 2022. 4) Morley, Deborah, and Charles S. Parker. Understanding Computers: Today and Tomorrow. Cengage Learning, 2021. 5) Campbell-Kelly, Martin, Nathan Ensmenger, Jeffrey R. Yost, and William Aspray. Computer: A History of the Information Machine. 4th ed., Routledge, 2020.		
Evaluation Pattern:		
Total Marks: 50		
Internal Continuous Evaluation (20 Marks): • CCE - I : 10 Marks: Activity • CCE - II: 10 Marks: Activity • CCE - III: 10 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)		End Semester Examination (30 Marks): • Question -1: Solve the following questions (Five questions of 2 Marks) • Question -2: Attempt any two questions (Three questions of 10 Marks) • Question -3: Attempt any four questions (Five questions of 5 Marks) Note: Conversion of 50 marks of ESE evaluation to 30 Marks



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan institute of science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - IV

Type: Major

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: RDBMS (BCAT 241)

Course Objectives: Students should be able to ...

- 1) Explain database concepts.
- 2) Apply RDBMS commands.
- 3) Analyze database joins.
- 4) Develop PL/SQL programs.

Course Outcomes: Students will be able to...

- 1) Describe database concepts and models.
- 2) Implement RDBMS commands.
- 3) Examine database joins.
- 4) Construct PL/SQL programs.

Module	Title and Contents	Hrs
Module -1:	Introduction to RDBMS 1.1 Concept of RDBMS, Difference between DBMS and RDBMS, Features of RDBMS. 1.2 Terminologies: Relation, attribute, domain, Tuple, Entities, Degree, Codd's Rules. 1.3 Relational Model: Structure of Relational Database, Concept of Relational Algebra. 1.4 Role and Responsibilities of DBA.	8
Module -2:	Basics of SQL 2.1 Features of SQL, Data types, Difference between various platforms for SQL 2.2 Integrity Constraints- (Primary key, foreign key, unique key, not null, default, check) DDL, DML, DCL, TCL Commands. 2.3 Select Statement with Clauses Where, Having, Order by, Group by. 2.4 SQL Operators-Arithmetic, Relational, Logical, Like, Between Functions in SQL (Aggregate functions, String Functions).	8
Module -3:	Joins and Sub queries in SQL 3.1 Join types - Inner Join, Outer Join, Cross Join and self-Join. 3.2 Sub-queries, Multiple sub queries, nesting of sub queries. 3.3 Sub queries in DML commands. 3.4 Correlated sub queries, Create Indexes, Sequences, Views.	6
Module -4:	PL/SQL control statements and stored procedures 4.1 Introduction to PL/SQL Block Structure Control Structures-Branching statements, Iterative Control statements. 4.2 Stored procedures-Creating and executing procedures with and without Parameters.	8

	4.3 Cursors –Concept, Types Implicit, Explicit, Procedure to create explicit cursors. 4.4 TRIGGERS: Concept and types.	
Reference Books: - 1) Elmasri, Ramez, and Shamkant B. Navathe. Fundamentals of Database Systems. 8th ed., Pearson Education, 2024. 2) Coronel, Carlos, and Steven Morris. Database Systems: Design, Implementation, & Management. 14th ed., Cengage Learning, 2023. 3) Silberschatz, Abraham, Henry F. Korth, and S. Sudarshan. Database System Concepts. 7th ed., McGraw-Hill Education, 2020. 4) Kale, Pravin S. Relational Database Management Systems. Nirali Prakashan, 2019. 5) Oppel, Andy. Databases: A Beginner's Guide. 2nd ed., McGraw Hill Education, 2019.		
Evaluation Pattern:		
Total Marks: 50		
Internal Continuous Evaluation (20 Marks): • CCE - I : 10 Marks: Activity • CCE - II: 10 Marks: Activity • CCE - III: 10 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (30 Marks): • Question -1: Solve the following questions (Five questions of 2 Marks) • Question -2: Attempt any two questions (Three questions of 10 Marks) • Question -3: Attempt any four questions (Five questions of 5 Marks) Note: Conversion of 50 marks of ESE evaluation to 30 Marks	



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan institute of science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - IV

Type: Major

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: Web Development (BCAT 242)

Course Objectives: Students should be able to...

- 1) Explain PHP fundamentals.
- 2) Apply PHP functions and arrays.
- 3) Apply MySQL concepts.
- 4) Analyze database design principles.

Course Outcomes: Students will be able to...

- 1) Describe PHP programming concepts.
- 2) Develop PHP programs using functions and arrays.
- 3) Implement MySQL database operations.
- 4) Examine database design principles.

Module	Title and Contents	Hrs
Module -1:	Introduction to PHP 1.1 Introduction to PHP: Setting up a PHP development environment, Basics of web development. 1.2 PHP Syntax and Variables: PHP tags and delimiters, PHP data types and variables, Variable scope, Constants and Magic constants. 1.3 Operators and Expressions: Arithmetic, assignment, comparison and logical operators, String and array operators. 1.4 Precedence and associativity of operators, Type juggling and type casting.	9
Module -2:	Control Structures and Functions and Arrays 2.1 Control Structures: Conditional statements: if, else, elseif, switch. 2.2 Looping statements: for, while, do-while, foreach Break and continue Statements. Error handling and exceptions. 2.3 Functions and Arrays: Defining and calling functions Passing arguments to functions, returning values from functions. 2.4 Working with arrays: indexed, associative, and multidimensional arrays, Array functions and sorting.	9
Module -3:	Working with Forms and Database-MySQL 3.1 Working with Forms and User Input: HTML forms and form elements, retrieving user input with \$_GET, \$_POST. 3.2 Form validation and sanitization, Handling file uploads. 3.3 Working with Database-MySQL: Introduction to databases and MySQL, connecting to a MySQL database, SQL queries: SELECT, INSERT, UPDATE, DELETE. 3.4 Prepared statements and preventing SQL injection, Retrieving and displaying data from a database.	6

Module -4:	Session Management and Cookies 4.1 Session Management and Cookies: Understanding sessions and cookies, Creating & destroying sessions, storing session data. 4.2 Managing user authentication & authorization. 4.3 File Handling and Directory Operations: Working with files and directories, reading from and writing to files. 4.4 File uploads and file permissions, File and directory manipulation functions.	6
-------------------	--	----------

Reference Books: -

- 1) Nixon, Robin. Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5. 6th ed., O'Reilly Media, 2024.
- 2) Lerdorf, Rasmus, Kevin Tatroe, and Peter MacIntyre. Programming PHP. 4th ed., O'Reilly Media, 2020.
- 3) Sklar, David. PHP Cookbook: Modern PHP Recipes for Common Web Development Tasks. O'Reilly Media, 2020.
- 4) Ullman, Larry. PHP and MySQL for Dynamic Web Sites: Visual QuickPro Guide. 6th ed., Peachpit Press, 2019.
- 5) Nixon, Robin. PHP, MySQL, JavaScript & HTML5 All-in-One For Dummies. For Dummies, 2019.

Evaluation Pattern:

Total Marks:50

Internal Continuous Evaluation (20 Marks):

- CCE - I : 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (30 Marks):

- Question -1: Solve the following questions
(Five questions of 2 Marks)
- Question -2: Attempt any two questions
(Three questions of 10 Marks)
- Question -3: Attempt any four questions
(Five questions of 5 Marks)

Note: Conversion of 50 marks of ESE evaluation to 30 Marks



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan institute of science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - IV

Type: Major Practical

Marks: 50

Credits: 2

From: A. Y. 2025-26

**Name of the Course & Code: Computer Application Major Practical
IV (BCAP 243)**

Practical Batch: 16 Students / Batch

Course Objectives: Students should be able to ...

- 1) Apply SQL commands.
- 2) Construct PL/SQL programs.
- 3) Develop PHP programs.
- 4) Design web applications.

Course Outcomes: Students will be able to...

- 1) Implement SQL operations.
- 2) Demonstrate PL/SQL programming.
- 3) Create PHP applications.
- 4) Build web applications.

Module	Title and Contents	Hrs
	1) Perform the following: • Creating a Database Viewing all Tables in a Database • Creating Tables (With and Without Constraints) • Inserting/Updating/Deleting Records in a Table • Saving (Commit) and Undoing(rollback) 2) Perform the following: • Altering a Table • Dropping/Truncating/Renaming Tables 3) Perform the following: • Simple Queries with Aggregate functions • Queries with Aggregate functions (group by and having clause) 4) Queries in volving • Date Functions • String Functions • Math Functions 5) Creating queries on Joins 6) PL-SQL block on branching statement. 7) PL-SQL block on looping statement. 8) Write a PHP program to find the factorial of a number. 9) Write a PHP program to count the total number of words in a string. 10) Write a PHP program to replace a word in a string. 11) Write a Program for finding the smallest number in an array.	60

	12) Design a simple web page to generate multiplication table for a given number using PHP. 13) Design a web page that should compute one's age on a given date using PHP. 14) Write a PHP program read Student information (Roll_No, Name, Class, Contact_No, email_id) using HTML form and display this information using GET/POST method. 15) Write a PHP program to read student marks for semester subjects with other required details (prn, name, rollno, class, etc.) and display semester mark list.	
--	---	--

Reference Books:-

- 1) Elmasri, Ramez, and Shamkant B. Navathe. Fundamentals of Database Systems. 8th ed., Pearson Education, 2024.
- 2) Coronel, Carlos, and Steven Morris. Database Systems: Design, Implementation, & Management. 14th ed., Cengage Learning, 2023.
- 3) Silberschatz, Abraham, Henry F. Korth, and S. Sudarshan. Database System Concepts. 7th ed., McGraw-Hill Education, 2020.
- 4) Ullman, Larry. PHP and MySQL for Dynamic Web Sites: Visual QuickPro Guide. 6th ed., Peachpit Press, 2019.
- 5) Sklar, David. PHP Cookbook: Modern PHP Recipes for Common Web Development Tasks. O'Reilly Media, 2019.

Evaluation Pattern:

Total Marks: 50

Internal Evaluation (20 Marks): • Journal : 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks	Practical Exam Paper (30 Marks): • Section I: Attempt any TWO questions (10 marks each) • Section II: Attempt any TWO questions (05 marks each)
---	--



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan institute of science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - IV

Type: Minor

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: Advanced Communication (BCAT 244)

Course Objectives: Students should be able to ...

- 1) Explain electronic communication concepts.
- 2) Apply modulation techniques.
- 3) Analyze communication media.
- 4) Evaluate mobile and wireless technologies.

Course Outcomes: Students will be able to...

- 1) Describe electronic communication systems.
- 2) Implement modulation techniques.
- 3) Examine communication media.
- 4) Assess mobile and wireless technologies.

Module	Title and Contents	Hrs
Module -1:	Electronic Communication 1.1 Types of communication: Serial, parallel, simplex, duplex. 1.2 Modulation, significance, Need of modulation. 1.3 Types of modulation: Analog Modulation-Amplitude Modulation (AM), Frequency Modulation (FM), and Phase Modulation (PM). 1.4 Digital Modulation-Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), and Phase Shift Keying (PSK).	8
Module -2:	Analog Modulation 2.1 Amplitude Modulation: modulating signal, modulated signal. 2.2 Envelope modulation detection. 2.3 Over and under modulation. 2.4 Frequency and phase modulation: modulating signal, modulated signal, 2.5 envelope modulation detection, over and under modulation.	8
Module -3:	Digital modulation and keying Techniques 3.1 PAM (Pulse Amplitude Modulation). 3.2 PWM (Pulse Width Modulation), PPM (Pulse Position Modulation). 3.3 PCM (Pulse Code Modulation). 3.4 TDM, FDM, frequency shift keying, amplitude shift keying.	8
Module -4:	Communication Medium 4.1 Twisted pair, coaxial cable. 4.2 cat 5, cat 6. 4.3 Wireless communication. 4.4 2G, 3G, 4G, 5G, Bluetooth, Wi Fi, Zigbee, Ethernet.	6

Reference Books: -

- 1) Stallings, William. Data and Computer Communications. 11th ed., Pearson Education, 2024.
- 2) Forouzan, Behrouz A. Data Communications and Networking. 6th ed., McGraw-Hill Education, 2023.
- 3) Haykin, Simon, and Michael Moher. Communication Systems. 6th ed., John Wiley & Sons, 2021.
- 4) Lathi, B. P., and Zhi Ding. Modern Digital and Analog Communication Systems. 5th ed., Oxford University Press, 2020.
- 5) Proakis, John G., and Masoud Salehi. Digital Communications. 6th ed., McGraw-Hill Education, 2019.

Evaluation Pattern:**Total Marks: 50****Internal Continuous Evaluation (20 Marks):**

- CCE - I : 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (30 Marks):

- Question -1: Solve the following questions
(Five questions of 2 Marks)
- Question -2: Attempt any two questions
(Three questions of 10 Marks)
- Question -3: Attempt any four questions
(Five questions of 5 Marks)

Note: Conversion of 50 marks of ESE evaluation to 30 Marks



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan institute of science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - IV

Type: Minor

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: Embedded System and Applications (BCAT 245)

Course Objectives: Students should be able to ...

- 1) Explain microcomputer organization and the 8051 family.
- 2) Apply the 8051 architecture.
- 3) Analyze the 8051 instruction set.
- 4) Evaluate 8051 interfacing techniques.

Course Outcomes: Students will be able to...

- 1) Describe microcomputer organization and the 8051 family.
- 2) Implement the 8051 architecture.
- 3) Examine the 8051 instruction set.
- 4) Design 8051 interfacing techniques.

Module	Title and Contents	Hrs
Module -1:	Introduction to Microcontrollers 1.1 Introduction: Features, Advantages and Applications, Difference between Microprocessor and Microcontroller. 1.2 Architecture of 8051 Microcontroller. 1.3 Pin Configuration and Functional Details of 8051, Reset and clock circuit. 1.4 Introduction to modern microcontrollers PIC (PIC16 / PIC18 / PIC32 (Microchip)), AVR, ARM.	8
Module -2:	Instruction set 2.1 Instructions, addressing modes (Immediate, Register, Direct, Indirect). 2.2 Instruction set (Data transfer, Arithmetic, Logic, Branching). 2.3 Stack and stack pointer. 2.4 Memory organization of 8051 (internal/external memory).	8
Module -3:	Facilities in 8051 3.1 Special Function Registers (SFRs), PSW register. 3.2 Time delay generation using registers. 3.3 Timer/Counter operation and modes (TMOD, TCON). 3.4 Serial ports, time delay generation using timers	8
Module -4:	Interfacing of Microcontroller 4.1 Interfacing LED, Interfacing LCD. 4.2 Interfacing Keyboard, Interfacing Relay. 4.3 Interfacing Optocoupler. 4.4 Case studies on 7 segment display, thumbwheel switch.	6

Reference Books: -

- 1) Mazidi, Muhammad Ali, Sarmad Naimi, Sepehr Naimi, and Shujen Chen. The AVR Microcontroller and Embedded Systems: Using Assembly and C. Pearson Education, 2024.
- 2) Valvano, Jonathan W. Embedded Systems: Real-Time Interfacing to ARM Cortex-M Microcontrollers. 4th ed., CreateSpace Independent Publishing Platform, 2022.
- 3) Yiu, Joseph. The Definitive Guide to Arm Cortex-M3 and Cortex-M4 Processors. 4th ed., Newnes (Elsevier), 2021.
- 4) Mazidi, Muhammad Ali, Janice Gillispie Mazidi, and Rolin D. McKinlay. The 8051 Microcontroller and Embedded Systems Using Assembly and C. 3rd ed., Pearson Education India, 2020.
- 5) Gaonkar, Ramesh S. Microprocessor Architecture, Programming, and Applications with the 8085. Revised ed., Penram International Publishing, 2019.

Evaluation Pattern:**Total Marks: 50****Internal Continuous Evaluation (20 Marks):**

- CCE - I : 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (30 Marks):

- Question -1: Solve the following questions
(Five questions of 2 Marks)
- Question -2: Attempt any two questions
(Three questions of 10 Marks)
- Question -3: Attempt any four questions
(Five questions of 5 Marks)

Note: Conversion of 50 marks of ESE evaluation to 30 Marks



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan institute of science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - IV

Type: Minor Practical

Marks: 50

Credits: 2

From: A. Y. 2025-26

**Name of the Course: Computer Application Minor Practical IV
(BCAP 246)**

Practical Batch: 16 Students / Batch

Course Objectives: Students should be able to ...

- 1) Explain assembly programming fundamentals.
- 2) Analyze the 8051 architecture.
- 3) Apply arithmetic and logical operations.
- 4) Describe sensor and transducer principles.

Course Outcomes: Students will be able to...

- 1) Demonstrate assembly language programming.
- 2) Examine the 8051 architecture.
- 3) Implement arithmetic and logical operations.
- 4) Interpret sensor and transducer principles.

Module	Title and Contents	Hrs
	1) Amplitude Modulation (AM) using Transistor Circuit. 2) Demodulation of AM Signal using Diode Detector. 3) Frequency Modulation (FM) using IC 566 or Function Generator. 4) Study of Serial and Parallel Communication. 5) Simplex, Half-Duplex, and Full-Duplex Communication. 6) IR Transmitter and Receiver for Wireless Communication. 7) Simple ASK (Amplitude Shift Keying) Modulation and Demodulation using 555 Timer. 8) LED Blinking. 9) Logical Shifting of Port Data. 10) Addition and subtraction operation using 8051 Microcontroller. 11) Multiplication and division operation using 8051 Microcontroller. 12) Study the architecture of 8051 microcontroller. 13) Time delay generation using timers 8051. 14) Interfacing of LED using 8051 microcontrollers. 15) Explore the use of timers as counters in 8051.	60

Reference Books: -

- 1) Mazidi, Muhammad Ali, Sarmad Naimi, Sepehr Naimi, and Shujen Chen. The AVR Microcontroller and Embedded Systems: Using Assembly and C. Pearson Education, 2024.
- 2) Valvano, Jonathan W. Embedded Systems: Real-Time Interfacing to ARM Cortex-M Microcontrollers. 4th ed., CreateSpace Independent Publishing Platform, 2022.
- 3) Yiu, Joseph. The Definitive Guide to Arm Cortex-M3 and Cortex-M4 Processors. 4th ed., Newnes (Elsevier), 2021.

- 4) Lathi, B. P., and Zhi Ding. Modern Digital and Analog Communication Systems. 5th ed., Oxford University Press, 2020.
- 5) Mazidi, Muhammad Ali, Janice Gillispie Mazidi, and Rolin D. McKinlay. The 8051 Microcontroller and Embedded Systems Using Assembly and C. 3rd ed., Pearson Education India, 2020.

Evaluation Pattern:

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal : 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

- Section I: Attempt any TWO questions (10 marks each)
- Section II: Attempt any TWO questions (05 marks each)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan institute of science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - IV

Type: VSC

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: Web Content Management: Joomla (BCAPVSC 2)

Practical Batch: 16 Students / Batch

Course Objectives: Students should be able to ...

- 1) Explain Joomla fundamentals.
- 2) Design Joomla websites.
- 3) Apply Joomla plugins.
- 4) Evaluate Joomla themes.

Course Outcomes: Students will be able to...

- 1) Describe Joomla features.
- 2) Develop Joomla websites.
- 3) Implement Joomla plugins.
- 4) Customize Joomla themes.

Module	Title and Contents	Hrs
	1) Install Joomla on a local server (XAMPP/WAMP) or a web hosting server. 2) Configure basic settings and customize the global configuration options. 3) Create different categories and articles and assign them to appropriate categories. 4) Upload, organize, and use media files (images, videos) within Joomla's Media Manager. 5) Create a main navigation menu with menu items linking to articles, categories, or external links. 6) Install and configure a plugin, module, and component. 7) Add new users, assign roles, and set permissions. 8) Install a Joomla template and modify its layout and styling. 9) Create a "Contact Us" page using the default contact form. 10) Add and position modules (e.g., search, latest articles, or custom HTML). 11) Enable multilingual support and create translated versions of articles. 12) Configure SEO-friendly URLs and metadata for articles and categories. 13) Set up a blog section with article publishing, tags, and commenting. 14) Install and configure a popular extension (e.g., JEvents or VirtueMart). 15) Use a backup tool (e.g., Akeeba Backup) to create a backup and restore the site.	60

Reference Books: -

- 1) Sabin-Wilson, Lisa. WordPress All-in-One For Dummies. 2nd ed., For Dummies, 2024.
- 2) Williams, Brad, David Damstra, and Hal Stern. Professional WordPress: Design and Development. 4th ed., Wrox, 2023.

- 3) Williams, Andy. WordPress for Beginners 2023: A Visual Step-by-Step Guide to Mastering WordPress. Independently Published, 2023.
- 4) Karol, Kacper. WordPress 6 Cookbook: Over 80 Recipes to Help You Build and Manage Modern WordPress Websites. Packt Publishing, 2022.
- 5) Severdia, Ron, and Jennifer Gress. Using Joomla!. Revised ed., Pearson Education, 2019.

Evaluation Pattern:

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal: 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

- Section I: Attempt any TWO questions (10 marks each)
- Section II: Attempt any TWO questions (05 marks each)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan institute of science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - IV

Type: SEC

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: Ethical Security (BCAPSEC 1)

Practical Batch: 16 Students / Batch

Course Objectives: Students should be able to ...

- 1) Explain ethical hacking concepts.
- 2) Analyze hacking techniques.
- 3) Describe malware concepts.
- 4) Evaluate penetration testing methods.

Course Outcomes: Students will be able to...

- 1) Identify ethical hacking techniques.
- 2) Examine hacking methods.
- 3) Interpret malware behavior.
- 4) Assess penetration testing methods.

Module	Title and Contents	Hrs
	1) Introduction of footprinting. 2) Performing footprinting using google hacking. 3) To trace any received email. 4) To fetch DNS information. 5) Port scanning, Network scanning. 6) Ids (intrusion detection systems) tool. 7) Using cryptool to encrypt and decrypt password using rc4 algorithm. 8) Use cain and abel for cracking windows account password using dictionary attack and to decode wireless network passwords. 9) Using traceroute, ping, ifconfig, netstat command. 10) Creating a virus, creating a trojan, Creating the dns payload. 11) File inclusion attack simulation using dvwa, lamp stack in Debian. 12) Disguise as google bot to view hidden content of a website. 13) Kaspersky lifetime validity. 14) SQL injection. 15) SQL injection for website hacking.	60

Reference Books: -

- 1) Thirumalesh. The Complete Ethical Hacking Book: A Comprehensive Beginner's Guide to Learn and Master Ethical Hacking. OrangeBooks Publication, 2022.
- 2) Hickey, Matthew, and Jennifer Arcuri. Hands-On Hacking: Become an Expert at Next Gen Penetration Testing and Purple Teaming. Wiley, 2020.
- 3) Harper, Allen, Daniel Regalado, Ryan Linn, Stephen Sims, and Branko Spasojevic. Gray Hat Hacking: The Ethical Hacker's Handbook. 6th ed., McGraw-Hill Education, 2020.
- 4) Weidman, Georgia. Penetration Testing: A Hands-On Introduction to Hacking. No Starch

Press, 2019.

- 5) Conrad, Eric. The CISSP Study Guide: The Cybersecurity Professional's Guide to Passing the CISSP Exam. 4th ed., Sybex, 2019.

Evaluation Pattern:

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal : 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

- Section I: Attempt any TWO questions (10 marks each)
- Section II: Attempt any TWO questions (05 marks each)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan institute of science, Satara

Board of Studies in Computer Application

Programme: B.Sc.

Semester - IV

Type: VEC

Marks: 50

Credits: 2

From: A. Y. 2025-26

Name of the Course & Code: Environmental Awareness in Computer Application (BCATVEC 2)

Course Objectives: Students should be able to ...

- 1) Describe computer applications in India.
- 2) Illustrate computer evolution.
- 3) Explain the impact of computer applications.
- 4) Evaluate key technological milestones.

Course Outcomes: Students will be able to...

- 1) Identify computer applications in India.
- 2) Trace computer evolution.
- 3) Examine the impact of computer applications.
- 4) Assess key technological milestones.

Module	Title and Contents	Hrs
Module -1:	Introduction to Environmental Studies 1.1 Multidisciplinary nature of Environmental Studies. 1.2 Scope & Importance. 1.3 Environmental ethics. 1.4 Concept of sustainability and sustainable development.	6
Module -2:	Environmental laws and ethics 2.1 Types of Resources-Exhaustible & Inexhaustible, Renewable & Non-Renewable-Forest-Mineral Water-Land. 2.2 Energy Resources, Usage, Reasons for Their Degradation. 2.3 Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity 04 and tribal populations. 2.4 Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).	9
Module -3:	Ecosystem 3.1 Structure & Function, Energy Flow. 3.2 Food Chain & Food Web. 3.3 Pyramids of Ecosystem, Ecological Succession. 3.4 Types of Ecosystems- Terrestrial (Forest, Grassland, Desert), Aquatic ((ponds, streams, lakes, rivers, oceans, estuaries).	7
Module -4:	Human Communities and the Environment 4.1 Human population growth: Impacts on environment . 4.2 Human health and welfare. 4.3 Concept of Disaster management: floods, earthquake, cyclones and landslides. 4.4 Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.	8

Reference Books: -

- 1) Agrahari, Ravi P. Environmental Ecology, Biodiversity, Climate Change & Disaster Management. New Delhi: McGraw Hill Education, 2023.
- 2) Bharucha, Erach. Textbook of Environmental Studies for Undergraduate Courses. 3rd ed., Hyderabad: Universities Press, 2019.
- 3) Botkin, Daniel B., and Edward A. Keller. Environmental Science: Earth as a Living Planet. 10th ed., Wiley, 2021.
- 4) Cunningham, William P., and Mary Ann Cunningham. Environmental Science: A Global Concern. 15th ed., McGraw Hill Education, 2020.
- 5) Miller, G. Tyler, and Scott E. Spoolman. Living in the Environment. 20th ed., Cengage Learning, 2019.

Evaluation Pattern:**Total Marks: 50****Internal Continuous Evaluation (20 Marks):**

- CCE - I : 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (30 Marks):

- Question -1: Solve the following questions
(Five questions of 2 Marks)
- Question -2: Attempt any two questions
(Three questions of 10 Marks)
- Question -3: Attempt any four questions
(Five questions of 5 Marks)

Note: Conversion of 50 marks of ESE evaluation to 30 Marks