SHIVAJI UNIVERSITY, KOLHAPUR - 416004,
MAHARASHTRA
PHONE:EPABX-2609000, www.unishivaji.ac.in, bos@unishivaji.ac.in
शिवाजी विद्यापीठ, कोल्हापूर -४१६००४,महाराष्ट्र
दूरध्वनी-ईपीएबीएक्स -२६०९०००, अभ्यासमंडळे विभाग दुरध्वनी ०२३१—२६०९०९४
०२३१—२६०९४८७

Estd. 1962
"A++" Accredited by
NAAC (2021)
With CGPA 3.52

Ref.No.SU/BOS/Science/ 274 **Date: 03/05/2025.**

To,

The Principal,
All Concerned Affiliated Colleges/Institutions
Shivaji University, Kolhapur

The Head/Co-ordinator/Director
All Concerned Department (Science)
Shivaji University, Kolhapur.

Subject: Regarding revised syllabi of degree programme under the Faculty of Science and Technology as per NEP-2020 (2.0).

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the revised syllabi, nature of question paper and equivalence of degree programme under the Faculty of Science and Technology as per NEP-2020 (2.0).

1.	B.C.A. Part II
2.	B.Sc.-M.Sc. Part III Nano Science and Technology
3.	B.A./B.A.B.Ed Part II Geography
4.	B.Sc.-M.Sc. Part II Artificial Intelligence & Machine Learning

This syllabus, nature of question and equivalence shall be implemented from the academic year 2025-2026 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in NEP-2020 (Online Syllabus)

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2025 & March/April 2026. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully,

Dy Registrar
Dr. S. M. Kubal

Encl: As above
for Information and necessary action

Copy to:

1	Dean, Faculty of Science & Technology	6	Appointment Section A & B
2	Director, Board of Examinations and Evaluation	7	I.T.Cell /Computer Centre
3	Chairman, Respective Board of Studies	8	Eligibility Section
4	B.A.,OE-II & B.Sc.-M.Sc. Exam Section	9	Affiliation Section (T.1) (T.2)
5	Internal Quality Assurance Cell (IQAC Cell)	10	P.G. Seminar Section

SHIVAJI UNIVERSITY,KOLHAPUR

NAAC A++ Grade with CGPA 3.52

Multiple Entry and Multiple Exit Option(NEP-2020)

Syllabus for

Bachelor of Computer Application

(Under Faculty of Science and Technology)

PART- II SEMESTER-III & IV

(Syllabus to be implemented from Academic year 2025-26)

Multiple Entry and Multiple Exit Option (NEP-2020)

B.C.A. (Science) Part - II (Level-5.0)

SEMESTER-III (Duration- Six Month)										
Sr. No.	Course Code	Teaching Scheme			Examination Scheme					
		Theory and Practical			University Assessment (UA)			Internal Assessment (IA)		
		Lectures (Per week)	Hours (Per week)	Credit	Maximum Marks	Minimum Marks	Examinutes	Maximum Marks	Minimum Marks	Examinutes
1	Subject I Major V: Basics of C++	2	-	2	40	14	90	10	04	20
2	Subject I Major VI: Fundamentals of Software Engineering	2	-	2	40	14	90	10	04	20
3	Subject I Practical III: Practical Based on Subject I Major V	-	4	2	40	14	90	10	04	-
4	Subject II Minor V: Basics of Statistics	2	-	2	40	14	90	10	04	20
5	Subject II Minor VI: Basics of Excel	2	-	2	40	14	90	10	04	20
6	Subject II Practical III: Practical Based on Subject Minor V Minor VI	-	4	2	40	14	90	10	04	-
7	OE – III (T) : Basics of Networking	2	-	2	40	14	90	10	04	20
8	VSC – I (T) Major specific: Data warehouse concepts	2	-	2	40	14	90	10	04	20
9	SEC-I (P): Core Java	-	4	2	40	14	90	10	04	20

10	AEC-I:Formal Communication	2	-	2	40	14	--	10	04	20
11	CC-I: Yoga	2	-	2	40	14	90	10	04	20
	Total (A)			22	440			110		

SEMESTER-IV (Duration- Six Month)										
Sr. No.	Course Code	**Teaching Scheme**			**Examination Scheme**					
		Theory and Practical			University Assessment (UA)			Internal Assessment (IA)		
		Lectures (Per week)	Hours (Per week)	Credit	Maximum Marks	Minimum Marks	Exam minutes	Maximum Marks	Minimum Marks	Exam. Minutes
1	Subject I Major VII Advanced C++	2	-	2	40	14	90	10	04	20
2	Subject I Major VIII Advanced Software Engineering	2	-	2	40	14	90	10	04	20
3	Subject I Practical based on major VII Advanced C++ Lab	-	4	2	40	14	90	10	04	-
4	Subject II Minor VII Statistical analysis	2	-	2	40	14	90	10	04	20
5	Subject II minor VIII Advanced Excel	2	-	2	40	14	90	10	04	20
6	Subject II Practical Based on Subject II Minor VII and Minor VIII	-	4	2	40	14	90	10	04	-
7	OE – III (T): Advanced Networking	2	-	2	40	14	90	10	04	20
8	SEC-II(T) Advanced Java	2	-	2	40	14	90	10	04	20
9	AEC-II: Soft skills	2		2	40	14	90	10	04	20
10	VEC-II: Environmental Studies	2	-	2	40	14	--	10	04	20

11	CEP-I (P): Field Work	-	4	--	10	4	--	40	14	90
	Total (A)			22	440			110		

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA (Science) PART II SEM III

Course Code : Subject I Major V

Title of Course : Basics of C++

Course Outcomes:

The course will enable students to;

1. Describe OOPs concepts
2. Define constructors and destructors
3. Implement inheritance and their types

UNIT I **(15 HOURS)**

Introduction to Object Oriented Paradigms: Advantages of OOP, Difference between POP and OOP,Basic terminology and features, Skeleton of OOP, Data types, Loops, Function, Inline Function,Class, Constructor and their types, destructor. Constant objects and member functions, Static datamembers and functions, Friend Function, friend class, non-member functions, this pointer, Nested classes.

UNIT II **(15 HOURS)**

Operator overloading and user defined conversions – function overloading, operator overloading fundamentals, Restrictions, overloading unary & binary operators, Inheritance- defining a class hierarchy, types of inheritance, Base class member access, Base and Derived class constructor, Direct base classes & indirect base classes, Function overriding, Types of inheritance

Reference Books:

1. Object Oriented Programming with C++ by E Balagurusamy
2. The C++ programming language by Bajarne Stroustrup
3. C++: The Complete Reference by Herbert Schildt

Bachelor of Computer Application
Multiple Entry and Multiple Exit Option
(NEP-2020)
BCA (Science) PART II SEM III

Course Code : Subject I Major VI

Title of Course : Fundamentals of Software Engineering

Course Outcomes:

After completion of this course students will be able to;

1. Understand various models of software development.
2. Understand requirement gathering and requirement modelling.
3. Explore concepts and models in software design.
4. Calculate size estimation

UNIT-I (15 HOURS)

Software Engineering: Introduction, Software Processes: Component Software Processes, Software Development Process Models: Waterfall Model, Spiral, V Model, Prototyping, Iterative Development, Rational Unified Process, Timeboxing Model, Extreme Programming and Agile Processes. Software Requirements Analysis and Specification: Value of a Good SRS. Requirement Process, Desirable Characteristics of an SRS, Components of an SRS, Structure of a Requirements Document.

UNIT-II (15 HOURS)

Design Concepts: Overview of design process, Coupling, Cohesion, Function-Oriented Design: Structures Analysis, Basics of ERD, Data Flow Diagrams (DFD's), Context Diagram, Level 1DFD, Structured Design, Detailed Design, Design Review. Object-oriented design using UML: System Context and Interaction, Architectural design, Object Class identification, Interface Specification, Design Patterns, Implementation issues, Open Source development.

Reference Books:

1. An interpreted approach to software engineering by Pankaj Jalote
2. Software Engineering by A Practitioners Approach 5th and 6th edition, Roger Pressman

3. Software engineering concepts by Richard Fairley
4. The Practical guide to Structural design by Miller Paige Jones
5. Software Engineering by Martin Shooman

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA (Science) PART II SEM III

Course Code : Subject I Practical III

Title of Course : Practical based on Subject I Major V

Course Outcomes:

After completion of this course students will be able to;

1. Describe OOPs concepts

2. Understand tokens, expressions, and control structures

3. Describe and use constructors and destructors

There will be around 25-30 programs based on the subject CC-301: Basics of C++

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA (Science) PART II SEM III

Course Code : Subject II Minor V

Title of Course : Basics of Statistics

Course Outcomes:

After completion of this course students will be able to;

1. Acquire knowledge of Meaning and Scope of Statistics, various statistical organizations.

2. Understand the basic knowledge of data collection and various statistical elementary tools.

3. Understand the basic concept of Measures of Central Tendency and Dispersion.

UNIT I **(15 HOURS)**

Introduction to Statistics: Concept, Definition of Statistics and Scope of statistics, Nature of Data: Primary and Secondary data, Qualitative and quantitative data, Discrete and continuous data, frequency, cumulative frequency, frequency distribution..Population and Sample: Statistical population. Finite population, Infinite population, Census method, Sample, sampling method, Advantages of sampling method over census method. SRS, SRSWR and SRSWOR Representation of Data: Discrete frequency distribution, Continuous frequency distribution, Cumulative frequency distribution, Inclusive and Exclusive methods of classification, Open end classes, illustrative examples. Representation of data by graphical method: Histogram, frequency polygon, frequency curve, Ogive curve. Representation of data by diagrammatic Method: Bar diagram (Simple), Pie chart.

UNIT II **(15 HOURS)**

Measures of central Tendency: Meaning of averages, Requirements of good average. Arithmetic mean (A.M.),Geometric mean, Harmonic mean, Combined mean, weighted mean, Median, Quartiles, Mode, Relation between mean, median and mode. Merits and Demerits of Mean, Median and Mode, determination of Median and Mode by Graph. Numerical Examples. Measures of Dispersion: Meaning of dispersion, Absolute and Relative measures

of dispersion Requirements of good dispersion. Range, Q.D, M.D, S.D. Variance and Combined variance, Coefficient of Variation (C.V) Concept of Skewness, Concept of kurtosis, Numerical Examples

Reference Books:

1. Statistical Methods, by Dr. S. P. Gupta, Sultan Chand and Sons Publication.

2. Introduction to Statistics, by C.B. Gupta.

3. Mathematical Statistics, by H.C. Saxena and J.N. Kapur.

4. Business Statistics, by S.S. Desai.

5. Business Statistics, by G.V. Kumbhojkar.

6. Fundamentals of Statistics, by S.C.Gupta.

7. Business Statistics-SIM- Shivaji University, Kolhapur

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA (Science) PART II SEM III

Course Code: Subject II Minor VI

Title of Course : Basics of Excel

Course Outcomes:

After completion of this course students will be able to;

1. Understand the concepts of spreadsheet, different formatting options in excel.

2. Understand the various functions, inserting charts, data.

UNIT-I **(15 HOURS)**

Introduction to Excel, Spread Sheet & its Applications, Opening Spreadsheet, Menus - main menu, Format Worksheets and Workbooks: Rename a worksheet, Change worksheet order and colour ,Insert and delete columns or rows ,Change workbook themes ,Adjust row height and column width, setting Margins. Customize Options and Views for Worksheets and Workbooks: Hide or unhide worksheets Hide or unhide rows and columns Customize the Quick Access toolbar Modify document properties Display formulas Formula Editing, Formatting: Text ,Row & column ,Number and Additional formatting options, Inserting Data, Insert Cells, Column, rows & sheets, Symbols, Data from external files, Frames, Clipart, Pictures, Files etc,

UNIT-II **(15 HOURS)**

Inserting Functions :Date and Time, Perform calculations by using the SUM , MIN, MAX ,COUNT ,AVERAGE, Log, Antilog, Abs, Aggregate, Round function, Perform logical operations by using the IF, SUMIF and AVERAGEIF functions , Format text by using RIGHT, LEFT, and MID functions, Format text by using UPPER, LOWER, and PROPER and CONCATENATE functions , Chart basics :Resize charts ,Add and modify chart elements ,Apply chart layouts and styles, Move charts to a chart sheet. Insert and Format Objects: Insert text boxes and shapes, Insert images, Format charts, Modify object properties Add alternative text to objects for accessibility

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA (Science) PART II SEM III

Course Code : Subject II Practical III

Title of Course : Practical Based on Subject Minor V Minor VI

Course Outcomes:

After completion of this course students will be able to;

1. Understand the functionalities of MS Excel

2. Use of Measures of Central Tendency and Dispersion.

This laboratory course will consist of 25 to 30 excel exercises with focus on covering the hands-on aspects based on the subject Subject Minor V Minor VI

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA (Science) PART II SEM III

Course Code : OE – III (T)

Title of Course : Basics of Networking

Course Outcomes:

The course will enable students to;

1. Understand the various components of a computer network and its functionality.

2. Become familiar with layered communication architectures (OSI and TCP/IP).

3. Familiar with network basics concepts like protocols, topology etc.

4. Familiar with OSI layered model services.

UNIT I **(15 HOURS)**

Introduction, Network topologies, network classifications, Layered network architecture, LAN,WAN, MAN, The telephone network fundamental of communication theory, Data transmission modes, Network topologies, Transmission Media, Guided media, twisted-pair cable, coaxial cable, fiber-optic cable. Unguided media (wireless), radio waves, microwaves, infrared, Asynchronous and Synchronous transmission.

UNIT II **(15 HOURS)**

Overview of OSI reference model, it's all layer's services. Token passing – Token ring, Token bus, Token passing, (priority systems). Fiber Distributed Data Interface (FDDI). Overview of TCP/IP, Introduction to TCP/IP and internetworking, operations related protocols and sockets, Connection-oriented and connectionless Services, service primitives. OSI protocols, TCP/IP protocols. Physical Layer: Physical Layer Basic Concepts - Bit rate, bit length, base band transmission, Switching Circuit switching, Packet Switching, Message switching.

Reference:

1. Black C “Computer networks protocols, standards and Interface”, prentice hall of India,

2. Stlling W, “Computer communication network” (4th Edition), prentice hall of India,

3. Tanenbaum A.S. “Computer Network”, prentice hall of India, 1981

4. Forouzan, “TCP/IP Protocol Suite”, Tata McGraw Hill.

5. Walrand & Varaiya,“High Performance Communication Networks”, 2/e, Elsevier”, 2003

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA (Science) PART II SEM III

Course Code : VSC – I (T) Major specific

Title of Course : Data Warehouse Concepts

Course Outcomes:

The course will enable students to;

1. To understand fundamental concepts of data warehouse.

2. To learn ETL concepts of data warehouse

UNIT-I **(15 HOURS)**

Data warehousing, history of data warehouse, types of data warehouse, general stages of data warehouse, components of data warehouse, who needs data warehouse, applications of data warehouse, steps to implement data warehouse, advantages and disadvantages, the future of data warehousing, data warehouse tools, difference between database and data warehouse, use and characteristics of data warehouse, data warehouse architecture.

UNIT-II **(15 HOURS)**

ETL process in data warehouse, ETL tools, best practices ETL process, Difference between ETL and ELT, ETL testing tutorial, ETL testing process, types of ETL testing, types of ETL bugs, Responsibilities of ETL tester, ETL developer: role and responsibilities and skills, applications of ETL, OLAP: Cube, analytical operations in data warehouse, types of OLAP systems, advantages and disadvantages of OLAP, MOLAP: MOLAP architecture, advantages and disadvantages of MOLAP,OLTP: characteristics, architecture, OLTP vs OLAP, advantages, disadvantages and challenges of OLTP, difference between OLTP and OLAP.

Reference Books:

1. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining & OLAP”

2. Pang-Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data Mining”

3. Arun K Pujari, “Data Mining Techniques”, 3rd Edition, Universities Press, 2005

4. PualrajPonnaiah, Wiley, “Data Warehousing Fundamentals”, Student Edition, 2004.

5. Ralph Kimball, Wiley, “The Data warehouse Life Cycle Toolkit”, Student Edition, 2006.

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA (Science) PART II SEM III

Course Code : SEC-I (P)

Title of Course : Core Java

Course Outcomes:

The course will enable students to;

1. Understand the working of java virtual machine
2. Implement Object oriented concepts using java
3. Implement control structures ,operators of java
4. Understand the constructor, garbage collection in java

UNIT I **(15 HOURS)**

Java Language Basics History and features of Java, Java Virtual Machine (JVM), JDK tool, Structure of java program, compilation and execution of java program, Java keywords, Data types, Java variables- declaration and assigning values to variables(using assignment statement and Scanner class object), scope of variables Type casting Implicit and Explicit casting, Operators of java, Control structures of java –Branching statements and switch statement , Iterative statements- for loop, do-while, while loop, jumping statements-break and continue statement.

UNIT II **(15 HOURS)**

Introducing classes and objects Introduction : Classes, Objects and methods, Defining a class, field declaration, method declaration, Accessing class members, access specifiers in java, Static variables and methods .Method overloading, Constructor- types of constructor,

constructor overloading. Use of this keyword, Garbage collection-finalize (), wrapper classes, Array, types of array: one dimensional , multi dimensional array.

Reference Books:

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI.

2. Herbert Schildt, The Complete Reference Java 2.0, Fifth edition

3. Debasish Jana, Java and Object-Oriented programming Paradigm, PHI

4. Java and Object Oriented Programming Paradigm, PHI (2007)

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA (Science) PART II SEM III

Course Code : AEC-I

Title of Course : Formal Communication

Course Outcomes:

The course will enable students to;

1. Introduce communication techniques

2. Have professional correspondence techniques

3. Enhance writing skills

UNIT I **(15 HOURS)**

Communication: Nature and Importance of Communication, Objectives of Communication, Importance of Communication, Process and barriers to Communication, Elements of Communication, Forms of Communication Verbal Communication Techniques: Art of Speaking, Speech Styles. Oral Presentation- Preparation of Formal Speech, Meetings, Interviews, Group Discussion, Debate, Elocution, Extempore.

UNIT II **(15 HOURS)**

Non-verbal Communication-Meaning, Characteristics & classification of Non-verbal Communication, Body Language, Gestures, Postures. Listening & observation skills. Rapid review of Grammar:- Corrections of common errors, Verb and its subject, forms of verb, Use of phrases and idioms, Use of infinitive Gerund and Participle, Errors & Use of Adjective and adverb, Punctuation and capitalisation.

Reference Books:

1. R.K. Chaddha Communication Techniques and skills – DhanpalRai Publication, NewDelhi.

2. Pravil S. R. Bhatia, Professional Communication Skills- S. Chand and Co.,NewDelhi.

3. J.D.O'Connor, Better English pronounciation.

4. Wren and Martin, Highschool English Grammer and Composition – Chand and Co.,New Delhi.

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA(Science) PART II SEM III

Course Code : CC-I

Title of Course : Yoga

Course Outcomes:

The course will enable students to;

1. To understand the importance of Yoga

2. To understand various Asans

UNIT I **(15 HOURS)**

Yoga Definition, Objectives of yoga Education Difference between Yoga Asana, and physical exercises, Importance of Yoga in daily life, Methods and benefits of Asanas, Pranayama and Concentration, Knowledge of five yama with more emphasis on 'Asteya', Knowledge of five Niyama with emphasis on 'Santosh', Knowledge of Aahar-Vihar, Methods and benefits of Sukshma,Vyayama, Asanas and prayers. Types of Yoga: Jnana Yoga, Bhakti Yoga, Karma Yoga, Hatha Yoga,Raja Yoga.

UNIT II **(15 HOURS)**

Role of yoga in character building, Therapeutic values of yoga, Introduction of yoga literature, Life history of Arvindo, Vivekanand and other yogis, Knowledge of Bandha, Mudra and Chakras,Methods and benefits of Asans, Pranayama and Concentration Effects of Asanas and Pranayama on physiology of human body, Concept of Nishkama Karma Yoga,

Role of Yoga practices in developing concentration, will power and discipline, Techniques of stress management, Methods and benefits of Asanas, Pranayama and concentration.

References:

1. Light on Yoga by B.K.S. Iyengar

2. The Yamas & Niyamas: Exploring Yoga's Ethical Practice by Deborah Adele

Bachelor of Computer Application
Multiple Entry and Multiple Exit Option
(NEP-2020)
BCA(Science) PART II SEM IV
Title of course: Advanced C++

Course Code : Subject I Major VII

Title of Course : Advanced C++

Course Outcomes:

After completion of this course students will be able to;

1. Implement polymorphism
2. Demonstrate how to control errors with exception handling.

UNIT I **(15 Hours)**

Virtual functions and Polymorphism, early and late binding, virtual table, virtual pointer, pure virtual functions, virtual base class, virtual inheritance, Run Time Type Identification, working with files, File Management, Manipulating Strings.

UNIT II **(15 Hours)**

Generic Programming- overview, Function templates, Class templates, member templates, introduction to Namespace, overview of Standard Template Library, Exception handling- keywords, basics of C++ exceptions, catching an exception, re-throwing an exception

Reference Books:

1. Object Oriented Programming with C++ by E Balagurusamy

2. The C++ programming language by Bjarne Stroustrup

3. C++: The Complete Reference by Herbert Schild

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA(Science) PART II SEM IV

Title of course: Advanced Software Engineering

Course Code : Subject I Major VIII

Title of Course : Advanced Software Engineering

Course Outcomes:

The course will enable students to;

1. Apply design principles for various types of software
2. Design object oriented software using UML tools.
3. Implement testing strategies thoroughly using testing tools
4. Calculate the cost estimations

UNIT-I **(15 HOURS)**

Planning a Software Project: Effort Estimation, Top-Down Estimation Approach, Bottom-Up Estimation Approach, COCOMO & its types, Project Schedule and Staffing, Quality Planning, Risk Management Planning: Risk Management Concepts, Risk Assessment, Risk Control.Project Monitoring Plan: Measurements, Project Monitoring and Tracking. Scheduling: Work Breakdown Structure, GANTT charts, PERT charts**.**

UNIT-II **(15 HOURS)**

Coding and Unit Testing: Programming Principles and Guidelines, Code Review, Software Testing: Development Testing: Unit Testing, Choosing Unit Test Cases, Component Testing, System Testing, Test Driven Development, Release Testing: Requirements Based Testing, Scenario Testing, Performance Testing, User Testing. Black Box Testing, White-Box Testing, a Demo of Selenium. Quality Management: Introduction, Software quality, Software standards:The ISO 9001 standard framework, Reviews and inspection. Configuration management: Introduction to Change management, Version management, System building, Release management.

Reference Books:

1. An interpreted approach to software engineering by Pankaj Jalote
2. Software Engineering by A Practitioners Approach 5th and 6th edition, Roger Pressman
3. Software engineering concepts by Richard Fairley
4. The Practical guide to Structural design by Miller Paige Jones

Bachelor of Computer Application
Multiple Entry and Multiple Exit Option
(NEP-2020)
BCA(Science) PART II SEM IV
Title of course: Practical based on major VII

Course Code : Subject I Practical IV

Title of Course : Practical based on major VII

Course Outcomes:

After completion of this course students will be able to;

1. Describe OOPs concepts
2. Understand tokens, expressions, and control structures
3. Describe and use constructors and destructors

There will be around 25-30 programs based on the subject CC-401: Advanced C++

Bachelor of Computer Application
Multiple Entry and Multiple Exit Option
(NEP-2020)
BCA(Science) PART II SEM IV
Title of course: Statistical Analysis

Course Code : Subject II Minor VII

Title of Course : Statistical Analysis

Course Outcomes:

After completion of this course students will be able to;

1. Acquire knowledge of concept and Meaning of bivariate data in statistics.
2. Understand the basic knowledge of Time series analysis

UNIT I **(15 Hours)**

Analysis of Bivariate Data: Correlation and Regression, Concept of correlation, Types of correlation., Methods of studying correlation: Scatter plot, Karl Pearson's correlation coefficient(r),Spearman's Rank correlation coefficient (R), Interpretation of r (with special cases r = −1, 0, and 1), Numerical problems on the computation of r and R (with and without ties) for ungrouped, data. Concept of regression, Lines of regression. Regression equations, regression coefficients, and the relation between correlation coefficients and regression coefficient. Numerical problems on ungrouped data.

UNIT II **(15 Hours)**

Time Series, Definition and uses of time series., Components of time series., Methods of measuring trend: progressive averages method, moving averages method and least squares method, Seasonal variation using simple average method. Numerical problems.

Reference Books:

1. Statistical Methods, by Dr. S. P. Gupta, Sultan Chand and Sons Publication.
2. Introduction to Statistics, by C.B. Gupta.
3. Mathematical Statistics, by H.C. Saxena and J.N. Kapur.
4. Business Statistics, by S.S. Desai.
5. Business Statistics, by G.V. Kumbhojkar.
6. Fundamentals of Statistics, by S.C.Gupta.
7. Business Statistics-SIM- Shivaji University, Kolhapur.

Bachelor of Computer Application
Multiple Entry and Multiple Exit Option
(NEP-2020)
BCA(Science) PART II SEM IV
Title of course: Advanced Excel

Course Code : Subject II minor VIII

Title of Course : Advanced Excel

Course Outcomes:

After completion of this course students will be able to;

1. Understand the functionalities of MS Excel
2. Improve writing skills in different format

UNIT I **(15 Hours)**

Overview of screen, navigation, various selection techniques, shortcut keys, Personalising Excel, Understanding and Using Basic Functions, Text Functions, Arithmetic Functions Proofing and Formatting, Protecting Excel- Excel Security ,Printing Workbooks, Advance Paste Special Techniques, Time and Date Functions, Filtering and Sorting, Printing Workbooks.

UNIT II **(15 Hours)**

What-If Analysis, Data Validation, Logical Analysis, Lookup Functions, Arrays Functions,Pivot Tables, Excel Dashboard, Slicers and Charts, VBA Macro, Introduction to VBA, Variables in VBA, Inputbox and Message Box Functions, If and select statements, Looping in VBA, Worksheet / Workbook Operations, Mail Functions – VBA

Reference Books:

1. Excel 2016 Bible, by John Walkenbach
2. Excel: Quick Start Guide from Beginner to Expert, by William Fischer
3. Mastering Advanced Excel Paperback – 21 July 2023 by Ritu Arora

Bachelor of Computer Application
Multiple Entry and Multiple Exit Option
(NEP-2020)
BCA(Science) PART II SEM IV
Title of course: Practical Based on Subject II Minor VII and VIII

Course Code : Subject II Practical IV

Title of course : Practical Based on Subject II Minor VII and VIII

Course Outcomes:

After completion of this course students will be able to;

1. Learn the use of Arithmetic Functions in Excel
2. Learn Worksheet / Workbook Operations.

This laboratory course will consist of 25 to 30 excel exercises with focus on covering the hands-on aspects covered in theory course.

Bachelor of Computer Application
Multiple Entry and Multiple Exit Option
(NEP-2020)
BCA(Science) PART II SEM IV
Title of course: Advanced Networking

Course Code : OE-III(T)

Title of Course : Advanced Networking

Course Outcomes:

The course will enable students to;

1. Understand with switching and routing concepts in networking technologies.
2. This course will help a student understand the various network protocols
3. Familiar with IPV4 and IPV6 address.

UNIT I **(15 Hours)**

Introduction, Link-Layer Addressing, DLC Services, Data-Link Layer Protocols, HDLC, PPP, Media Access Control, Wired LANs: Ethernet, Wireless LANs, Introduction, IEEE 802.11, Bluetooth, Connecting Devices. Network Layer Services, Packet switching, Performance, IPV4 Addresses, Forwarding of IP Packets, Network Layer Protocols: IP, ICMP v4, Unicast Routing Algorithms, Protocols, Multicasting Basics, IPV6 Addressing, IPV6 Protocol

UNIT II **(15 Hours)**

Transport Layer, Process to process delivery, TCP-UDP, Operation and uses, Three-way Handshake, for connection establishment and termination. Application Layer, Domain Name Space, Remote Logging, Electronic Mail - File Transfer- Email, FTP.WWW and HTTP-HTTP.

Reference Books:

1. Black C “Computer networks protocols, standards and Interface”, prentice hall of India, 1996
2. stlling W, “Computer communication network” (4th Edition), prentice hall of India, 1993
3. Tanenbaum A.S. “Computer Network”, prentice hall of India, 1981
4. Forouzan, “TCP/IP Protocol Suite”, Tata McGraw Hill.
5. Walrand&Varaiya,“High Performance Communication Networks”, 2/e, Elsevier”, 2003

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA(Science) PART II SEM IV

Title of course: Advanced Java

Course Code : SEC-II(T)

Title of Course : Advanced Java

Course Outcomes:

The course will enable students to;

1. Develop programs using the concepts of inheritance, interfaces and packages
2. Understand the multithreading concepts
3. Handle exceptions while executing programs
4. Understand the JDBC connectivity

UNIT I **(15 Hours)**

Inheritance, packages and interfaces Inheritance- definition, syntax, types of inheritance, Method overriding, use of super keyword, difference between method overloading and overriding , Abstract class and method, use of final keyword, Interface- defining and implementing interface, implementation of multiple inheritance using interface, difference between abstract class and interface. Packages- Java API package, Defining and accessing user defined package

UNIT II **(15 Hours)**

Exception Handling and Multithreading Concept of exception, difference between error and exception, Types of exceptions-checked and unchecked, Exception handling using try and catch block, Multiple catch block, finally block, throws keyword, User defined exception, Concept of multithreading in java, Difference between process and thread Creating thread by extending Thread class and by implementing Runnable interface Life cycle of thread, Thread

class methods- start(), run(),yield(), suspend(), resume(), sleep(), wait(), notify(), stop() Thread synchronization.Introduction to JDBC: Architecture, JDBC Drivers, JDBC Connectivity, Inserting, Retrieving, deleting, updating data in database.

Reference Books:

1. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
2. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.
3. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI.
4. Introduction to Java programming, By Y.DanielLiang,Pearson Publication.

Bachelor of Computer Application
Multiple Entry and Multiple Exit Option
(NEP-2020)
BCA(Science) PART II SEM IV
Title of course: Soft Skills

Course Code : AEC-II

Title of Course : Soft Skills

Course Outcomes:

The course will enable students to;

1. To empower the students towards general and technical writing, oral communications
2. To empower listening skills: letter writing, technical report writing, and business communication.

UNIT I **(15 Hours)**

Expression: Practical communication skill development, business presentation with multimedia, speaking skill, prepared speech, extempore speech.

UNIT II **(15 Hours)**

Writing: Technical/business letter, Resume Preparation, organization of writing material, poster presentation, writing technical document, preparing software user manual, preparing project documentation.

Reference Books:

1. Business Correspondence & Report Writing, Sharma, TMH
2. Business Communication Strategies, Monipally, TMH

3. English for Technical communication,Laxminarayanan,Scitech
4. Business Communication, Kaul,PHI
5. Communication Skill for Effective Mgmt., Ghanekar,EPH

Bachelor of Computer Application
Multiple Entry and Multiple Exit Option
(NEP-2020)
BCA(Science) PART II SEM IV
Title of course: Environmental Studies

Course Code : VEC-II

Title of Course : Environmental Studies

- To be taken from Environmental Science BoS

Bachelor of Computer Application

Multiple Entry and Multiple Exit Option

(NEP-2020)

BCA(Science) PART II SEM IV

Title of course: CEP-I: Field work

- **Field work as per NEP 2.0 (CEP, CC), University circular enclosed**

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दूरध्वनी - इपीबीएक्स - २०६०९०००, अभ्यासमंडळे विभाग : ०२३१- २६०९०९४, २६०९४८७
वेबसाईट : www.unishivaji.ac.in ईमेल : bos@unishivaji.ac.in
Estd. 1962
"A++" Accredited by NAAC (2021)
With CGPA 3.52

संदर्भ क्र. : शिवाजी वि./अ.म./400 दिनांक : 15/07/2024

प्रति,

1. मा. प्राचार्य/संचालक,
   सर्व संलग्नित महाविद्यालये/मान्यताप्राप्त संस्था,
   शिवाजी विद्यापीठ, कोल्हापूर

2. मा. अधिविभाग प्रमुख,
   सर्व अधिविभाग,
   शिवाजी विद्यापीठ, कोल्हापूर

विषय : राष्ट्रीय शैक्षणिक धोरण, 2020 (NEP 2.0) नुसार CEP, CC अभ्यासक्रमाबाबत.

महोदय/महोदया,

उपरोक्त संदर्भिय विषयास अनुसरुन आपणास आदेशान्वये कळविण्यात येते की, राष्ट्रीय शैक्षणिक धोरण २०२० (NEP 2.0) नुसार शैक्षणिक वर्ष २०२४–२५ पासून लागू करण्यात आलेल्या सर्व पदवी कोर्सला लागू असणा–या **Community Engagement Programme (CEP), Co-Curricular Courses (CC)** अभ्यासक्रम/त्याची नियमावली सोबत पाठवित आहे.

सदर **Community Engagement Programme (CEP), Co-Curricular Courses (CC)** अभ्यासक्रमाच्या प्रती जोडल्या आहेत. तसेच विद्यापीठाच्या www.unishivaji.ac.in,NEP-2020@suk (Online Syllabus) या संकेतस्थळावर ठेवण्यात आल्या आहेत.

सदर अभ्यासक्रम/त्याची नियमावलीची सर्व संबंधित विद्यार्थी व शिक्षकांच्या निदर्शनास आणून द्यावेत ही विनंती.

कळावे,

आपला विश्वासू,

(डॉ. एस. एम. कुबल)
उपकुलसचिव

सोबत : अभ्यासक्रमाची प्रत.

प्रत : माहितीसाठी व पुढील योग्यत्या कार्यवाहीसाठी.

अधिष्ठाता, सर्व विद्याशाखा	पात्रता विभागास
अध्यक्ष, सर्व अभ्यास व अस्थायी मंडळे	पी.जी. सेमिनार विभागास
संचालक, परीक्षा व मुल्यमापन मंडळ कार्यालयास	पी.जी. प्रवेश विभागास
परिक्षक नियुक्ती ए व बी विभागास	संलग्नता टी. १ व टी २ विभागास
दूरस्थ व ऑनलाईन शिक्षण विभागास	नॅक विभागास
संगणक केंद्र/आय. टी. सेल विभागास	सर्व ऑन परीक्षा विभागास

SHIVAJI UNIVERSITY, KOLHAPUR

Established: 1962

A^{++} Accredited by NAAC (2021) With CGPA 3.52

New Syllabus For

Community Engagement Programme (CEP)

All Bachelor Degree Programme

STRUCTURE AND SYLLABUS IN ACCORDANCE WITH

NATIONAL EDUCATION POLICY - 2020

HAVING CHOICE BASED CREDIT SYSTEM

WITH MULTIPLE ENTRY AND MULTIPLE EXIT OPTIONS

(TO BE IMPLEMENTED FROM ACADEMIC YEAR 2024-25 ONWARDS)

Community Engagement Programme (CEP):

1. INTRODUCTION:

New generation of students are increasingly unaware of local rural and peri-urban realities surrounding their HEIs, as rapid urbanization has been occurring in India. A large percentage of Indian population continues to live and work in rural and peri-urban areas of the country. While various schemes and programs of community service have been undertaken by HEIs, there is no singular provision of a well- designed community engagement course that provides opportunities for immersion in rural realities. Such a course will enable students to learn about challenges faced by vulnerable households and develop an understanding of local wisdom and lifestyle in a respectful manner

2. OBJECTIVES:

- To promote a respect for rural culture, lifestyle, and wisdom among students.
- To learn about the present status of agricultural and development initiatives.
- Identify and address the root causes of distress and poverty among vulnerable households.
- Improve learning outcomes by applying classroom knowledge to real-world situations.

To achieve the objectives of the socio-economic development of New India, HEIs can play an important role through active community engagement. This approach will also contribute to improve the quality of both teaching and research in HEIs in India. India is a signatory to the global commitment for achieving Sustainable Development Goals (SDGs) by 2030. Achieving these 17 SDG goals requires generating locally appropriate solutions. Community engagement should not be limited to a few social science disciplines alone. It should be practiced across all disciplines and faculties of HEIs. These can take the forms of enumerations, surveys, awareness camps and campaigns, training, learning manuals/films, maps, study reports, public hearings, policy briefs, cleanliness and hygiene teachings, legal aid clinics, etc. For example, students of chemistry can conduct water and soil testing in local areas and share the results with the local community. Students of science and engineering can undertake research in partnership with the community on solid and liquid waste disposal Therefore, students are being encouraged to foster social responsibility and community engagement in their teaching and research.

3. LEARNING OUTCOMES:

After completing this course, students will be able to

- Gain an understanding of rural life, Indian culture, and social realities.
- Develop empathy and bonds of mutuality with the local community.
- Appreciate the significant contributions of local communities to Indian society and economy.
- Learn to Value local knowledge and wisdom.
- Identify opportunities to contribute to the community's socioeconomic improvement.

4. **Credits:** Two credit Course; Students are expected to complete 60 hours of participation

5. COURSE STRUCTURE:

Sr.	Module Title	Module Content	Teaching/Learning/Methodology
1	Appreciation of Rural Society	Rural lifestyle, rural society, joint family, caste and gender relations, rural values with respect to community, rural culture nature and public resources, ponds and fisheries, elaboration of soul of India lies in villages' rural infrastructure,	Classroom discussionsField visit Individual /Group conference Report/journal submission & VIVA
2	Understanding rural and local economy and livelihood	Agriculture, farming, land ownership, water management, animal husbandry, non-farm livelihood and artisan's rural entrepreneurs, rural markets, migrant labour, social innovation projects	Classroom discussionsField visit Individual /Group conference Report/journal submission & VIVA
3	Rural and local Institution	Traditional rural and community organization, self-help groups, decentralized planning, panchayat raj institutions Gram panchayat, Nagarpalika and Municipalities, local Civil Society, Local administration, National rural, Livelihood Mission [NRLM], Mahatma Gandhi National Rural Employment. Guarantee [MGNREGA].	Classroom discussionsField visit Individual /Group conference Report/journal submission & VIVA
4	Rural and National development programmers	History of rural development and current National Programms in India: Sarva shiksha Abhiyan, Beti Bachao-Beti Padhao, Ayushman Bharat, eShram Swachh Bharat, PM Awas yojana, Skill India, Digital India, Start-Up India, Stand-Up India, Scheme of Fund for Regeneration of Traditional Industries (SFURTI), Jal Jeevan Mission, Mission Antyodaya, ATMANIRBHAR Bharat, etc..	Classroom discussionsField visit Individual /Group conference Report/journal submission & VIVA

Note: Faculty can make addition in the list of activities as per domain content:

Recommended field-based activities (Tentative):

- Participate in Gram Sabha meetings, and study community participation;
- Visit to Swachh Bharat Mission project sites, conduct analysis and initiate problem solvingmeasures;
- Interaction with Self Help Groups (SHGs) women members, and study their functions and challenges; planning for their skill-building and livelihood activities;
- Visit Mahatma Gandhi National. Rural Employment Guarantee Act 2005 (MGNREGS) project sites, interact with beneficiaries and interview functionaries at the work site;
- surveys on Mission Antyodaya to support under Gram Panchayat Development Plan
- Visit Rural Schools/mid-day meal centres, study academic and infrastructural resources, digital divide and gaps;
- Associate with Social audit exercises at the Gram Panchayat level, and interact with programme beneficiaries;
- Visit to local Nagarpalika office and review schemes for urban informal workers and migrants;
- Attend Parent Teacher Association meetings, and interview school drop outs;
- Visit local Anganwadi and observe the services being provided;
- Visit local NGOs, civil society organisations and interact with their staff and beneficiaries;
- Organize awareness programmes, health camps, Disability camps and cleanliness camps;
- Conduct soil health test, drinking water analysis, energy use and fuel efficiency surveys and building solar powered village;
- Understanding of people's impacts of climate change, building up community's disaster preparedness;
    - Organise orientation programmes for farmers regarding organic cultivation, rational use of irrigation and fertilizers, promotion of traditional species of crops and plants and awareness against stubble burning;
    - Formation of committees for common property resource management, village pond maintenance and fishing;
    - Identifying the small business ideas (handloom, handicaraft, khadi, food products, etc.) for rural areas to make the people self-reliant.
    - Interactive with local leaders, panchayat functionaries, grass-root officials and local institutions regarding village development plan preparation and resource mobilization;

- Financial Literacy Awareness Programme
- Digital Literacy Awareness Programme
- Education Loan Awareness Programme
- Entrepreneurship Awareness Programme
- Awareness Programmes on Government Schemes
- Products Market Awareness
- Services Market Awareness
- Consumer Awareness Programme
- Accounting Awareness Programme for Farmers
- Accounting Awareness Programme for Street Vendors etc.

6. IMPORTANT RULES AND REGULATIONS FOR CEP:

Concurrent Fieldwork:

Students must conduct comprehensive studies on various challenges that they face in their chosen field. Every work relevant to the subject matter should be compiled and documented.

Students should keep separate fieldwork diary or maintain journal in order to record their fieldwork experiences i.e. reading, e- contents, tasks, planning and work hours have to be recorded in the diary. Detailed work records report on students' fieldwork experiences and activities to be submitted and should be presented. The fieldwork conference is part of the timetable and is mandatory. Faculty should hold a fieldwork conference FOREIGHTNIGHTLY for all students.

In addition to the principal curriculum, the students engage in a variety of community development- related activities. They are encouraged to plan and carry out programs, processions, and events for social causes. These activities seek to enhance students' personal and professional skills as well as foster self- development. "Rural Camp" should be embedded in the curriculum for first-year students to be held in the backward and neglected areas of District's

Concurrent Fieldwork is the core curriculum activity in the CEP course. Hence, 100% attendance of the students is mandatory in case of absence on any student, supplementary fieldwork must be arranged and accomplished with the approval of the faculty supervisor.

7. EVALUATION/ASSESSMENT SCHEME:

Students should keep a Field Diary / journal to record, content, readings and field visit planning. The assessment pattern is internal and external i.e. 40+10.

Internal continuous Assessment: Participation in concurrent field visits 40%; individual/group field project conference, report/journal submission 40%.

External Assessment: Presentation of field project findings (VIVA) should be assigned 20%.