

P. D. E. A's
Prof. Ramkrishna More Arts, Commerce and Science
College Akurdi Pune-411044

Affiliated to



Savitribai Phule Pune University [SPPU]



B.C.A. (Science)

Choice Based Credit System-2023 Pattern
Under
Autonomy and NEP-2020

From Academic
Year 2023-2024

Syllabus
F.Y. B. C.A. (Science)
S.Y. B. C.A. (Science)
T.Y. B. C.A. (Science)

Board of Studies B.C.A. (Science)

Preamble of the syllabus

B.C.A.(Science) program is designed to bridge the gap between IT industries and academic institutes by incorporating the latest development into the curriculum and to give students a complete understanding within a structured framework. This is intended to provide a broad framework within which help to create an academic base that responds to the need of the students to understand the basics of Computer. The curriculum framework is designed and formulated in order to acquire and maintain standards of achievement in terms of knowledge, understanding and skills in Computer Science and their applications, critical thinking and developing skills for problem solving and initiating research which are competitive globally. This program is for candidates who wish to explore new emerging technologies using computer languages.

It will provide the necessary skills to make the successful candidate proficient in software development, paving the way for self-employment. The curriculum is oriented more towards Programming and Software. Ability to apply the algorithmic principles, mathematical foundations and computer science theory for designing computer-based systems.

Goals:

- The Department BCA(Science) degree is to give students the information and skills required for careers in the software business, as well as computer application. To provide high-quality computer education to enhance logical programming and computing skills.
- To prepare students for carriers in software industry understanding and skills related to the use of computers and its applications.

Rules and Regulations:

1. National Credit Framework (NCrF): For creditisation and integration of all higher education qualifications leading to a certificate/ diploma/ degree with multiple entry and exit options, college will refer to National Credit Framework (NCrF) which encompasses the qualification frameworks for higher education, vocational and skill education and school education, namely National Higher Education Qualification Framework (NHEQF), National Skills Qualification Framework (NSQF) and National School Education Qualification Framework (NSEQF) respectively.
2. Structure of Four years multidisciplinary UG Programme and Five Years Integrated Multidisciplinary Master's Degree Programmes with Multiple Entry and Exit Options at Different Levels:
 - i. [Students will have the flexibility to enter four years multidisciplinary Under Graduate](#) Programme in odd semesters and exit a programme after the successful completion of even semesters as per their future career needs.
 - ii. Students will get a Certificate after a One year programme (minimum 40 Credits), a Diploma after two years (minimum 80 Credits), a Bachelor's degree after three years (minimum 120 Credits), and a Bachelor's degree with Research or Honours after Four years (minimum 160 Credits).
3. Qualification Type and Credit Requirements of Four Years Multidisciplinary Degree Programme with Multiple Entry and Exit Options

(i) Details of qualifications, minimum credit requirements, exit credit courses, year and semester are as under:

Levels	Qualification Title	Credit Requirement s		Semester	Year
		Minimum	Maximum		
4.5	UG Certificate	40	44	2	1
5.0	UG Diploma	80	88	4	2
5.5	Three Years Bachelor's degree	120	132	6	3
6.0	Bachelor's degree Honour's with Major	160	176	8	4
	Bachelor's degree Honour's with Major	160	176	8	4
7.0	Master's Degree	200	220	10	5
8.0	Ph. D.	----	-----	-----	----

(ii) An exit 6-credit bridge course(s) lasting two months, including at least 6-credit job specific internship/apprenticeship that will help the graduates acquire job-ready competencies required to enter the workforce will be an additional requirement for the award of the undergraduate Certificate/ Diploma/ three year Bachelor's Degree.

(iii) On exit, the students will have the option to re-enter the programme in the college, or in a different higher education institution. Re-entry at various levels for lateral entrants in academic programmes should be based on the earned and valid credits as deposited and accumulated in the Academic Bank of Credits (ABC) through Registered Higher Education Institutions (RHEI) and proficiency test records.

(iv) Eligibility for admission to the fourth year of four-year Honours with Research Degree Programmes as per UGC guidelines: Minimum CGPA of 7.5 or minimum 75% at three- year degree.

(v) PG curriculum, as illustrated below, have flexibility

- a) One-year Post-Graduate Diploma (PGD), b) Two-year Post-graduate Programme and c) 5 Years Master's degree programmes with multiple Entry and Exit options at different levels.

(a) Post-Graduate Diploma (PGD): Programme duration- One year (2 semesters) after any bachelor's degree, min. 40 credits

(i) UGC: 1-Year (2 semesters) Post-Graduate Diploma (PGD) after 3-years Bachelor's degree: Level 6.0

(ii) UGC: 1-Year (2 semesters) PGD after 4 years Bachelor's degree (Honors/ Research): Level 6.5

(b) Master's Degree:

- (c) UGC: 2-Years (four semesters) Master's Degree after obtaining a 3-years Bachelor's degree, Minimum 40 credits/year, second year devoted entirely to research, PG – 2nd year: Level 6.5 1-Year (two semesters) Master's Degree after obtaining a 4-year Bachelor's degree (Honours/Research): Minimum

40 credits: Level 6.5

(d) Level 8 represents Ph. D. Research Degree.

(e) A 5-year Integrated Bachelor's and Master's programme shall have a minimum of 220 credits.

(f) Master's and doctoral programmes, while providing rigorous research-based specialization, should also provide opportunities for multidisciplinary work, in academia, government, research institutions, and industry.

4. Lateral Entry/ Re-entry at higher Levels after exit from lower levels of four years multidisciplinary UG degree programme:

(i) The credit points earned and accumulated shall be used to determine the eligibility for taking admission to various programs at multiple levels, subject to fulfilment of the broad principles laid down under NCrF. Students who leave with a Certification, Diploma, or a Basic Bachelor's Degree will be eligible to re-enter the programme at the exit level to complete or progress to the next level through lateral entry mode. Depending upon the academic and physical facilities available, the State Universities/ Autonomous Colleges (Higher Education Institutions or HEI) may earmark specific seats/ intake for lateral entry into the second year/ third year/ fourth year of a four years multidisciplinary UG degree programme as approved by Professional Standard Setting Bodies (PSSB/Govt. of Maharashtra/ statutory council of affiliating University plus any consequential vacancies caused by exits to an ongoing programme (four- year Degree Programme and Integrated Master's or second year Master's). Lateral entry or Re-entry is open to those students if he/she has either –

(a) successfully completed the first year/second year/third year of the particular four years multidisciplinary degree programme in any ABC registered HEI with valid credits in ABC and re-entering into the second year/third year/fourth year, respectively of the same four years degree programme of any ABC registered HEI, within stipulated/ permissible period of years as decided by Statutory Councils of that HEI

OR

- (b) Already successfully completed a multidisciplinary four-year first-degree programme and is desirous of and academically capable of pursuing another multidisciplinary four years first-degree programme in an allied subject.
- (ii) A student will be allowed to enter/re-enter only at the odd semester. Re-entry at various levels for lateral entrants in academic programmes should be based on the earned and valid credits as deposited and accumulated in Academic Bank of Credits (ABC) through Registered Higher Education Institutions (RHEI) and proficiency test records. However, in terms of the admission eligibility requirements, the student shall belong to the same faculty/ discipline in terms of Major Subject i.e., the Major subject of his earlier Programme and the Major subject of the new Programme for which he is seeking admission must be from the same faculty/discipline. Reservation for lateral entry will be executed as per the Government of Maharashtra norms.

5. Distribution of Credits across Multidisciplinary Four Years Degree Programme:

- (i) Four-year multidisciplinary degree programme with Honours/ Specialization Degree will have Internship and Core /Major Courses with a minimum of 22 credits per sem. in the Fourth Year.
- (ii) Four-year multidisciplinary degree programme with Research will have Research Projects, Seminars, Dissertations and Internships with a minimum of 22 credits per Sem.

in the Fourth Year.

(iii) Students shall select a 'Major or Core Subject/ Discipline' and a 'Minor Subject/Discipline' from the lists of various Subject Combinations and Options provided the Colleges. In general, for the four years multidisciplinary bachelor's degree programme, the distribution of credits will be as follows:

- (a) Disciplinary/interdisciplinary Major/ Core Subject (minimum of 68 credits)- Mandatory and Elective Courses
- (b) Disciplinary/interdisciplinary Minor Subject (maximum of 22 credits)
- (c) Skill based/Vocational studies corresponding to the Major/ Core Subject (8 credits)
- (d) Field projects/internship/apprenticeship/community engagement and service corresponding to the Major/ Core Subject (14-22 credits) with a maximum of six credits per Semester
- (e) Generic/ Open Electives through Baskets of Elective Courses (12 credits),
- (f) Ability Enhancement Courses including Languages, Literature and Environmental Studies (12 credits),
- (g) In-built modules on the Indian Knowledge System (IKS) in Major/ Core Subject at Level 4.5 – 2 credits

(h) Value-based Education, Life Skills and Professional Ethics: Co- curricular Courses such as Sports and Culture, NSS/NCC and Fine/ Applied/Visual Arts (8 credits).

Student can earn some credits (SEC/VSC/GE/OE) in the form of online from-

- (i) The National Skills Qualifications Framework (NSQF) organizes qualifications for Vocational and Skill Courses in a series of 8 levels based on professional knowledge, professional skills, core skills and responsibilities, in the increasing order of complexity and competency.
- (ii) University Grants Commission (Credit Framework For Online Learning Courses through Study Webs of Active-Learning for Young Aspiring Minds) Regulations, 2021, permits up to 40 per cent of the total courses being offered in a particular programme in a semester through the Online Learning Courses offered through the Study Webs of Active-Learning for Young Aspiring Minds (SWAYAM) platform.

6. Examination and Assessment Process:

- (i) The basic principle of the credit framework is that credits are a function of the successful completion of a program of study/ vocational education/ training and assessment. No credit can be earned by the student unless the student is assessed for the achievement of the desired competencies and outcome of a program.
- (ii) Exit options are provided with certification, diploma and basic Bachelor's degrees to the students at the end of the second, fourth and sixth semesters of a four years multidisciplinary degree programme. Students will receive a Bachelor's degree

with Honours/ Research on successfully completing of all eight semesters of the UG Program either at a stretch or with opted exits and re-entries.

(iii) For the smooth success of four-year multidisciplinary degree programme with multiple entry and exit systems, the examination mode will be based on the combination of innovative trends in formative (informal and formal tests administered during the learning process) and summative (evaluation of students learning at the end of an instructional unit) examination modes. This is in line with the UGC Report on 'Evaluation Reforms in Higher Educational Institutions (2019)'.

(iv) Evaluation of each students in each course will be done as follows

- a. Each theory or practical course will be of 2 credits = 50 mark
- b. Internal evaluation 30% weightage (15 mark)
- c. External evaluation 70% weightage (35 marks)
- d. Students should secure 40% marks in each type of evaluation for successful completion of a course (student should secure at least 6 marks in internal and 14 marks in external evaluation).

(v) Evaluation Pattern.

- a. Internal evaluation - Two written test, each of 20 marks will be conducted i. e. two tests on two modules. 1st assignment after completing 6 weeks of teaching and 2nd on completion of 13th week of teaching. Question paper should be designed so that evaluation of CO, PO, PSO can be performed. 10 marks out of 15 will be assigned from these written tests. Remaining 5 marks will be assigned from other types of evaluation such as seminars, orals, poster presentation, open book challenging tests, surprise test, objective test on whole syllabus of the course (at least 40 questions of objective type must be designed), etc. for 5 marks at least two different types technique must be utilized.
- b. External Evaluation - External evaluation will be done at the end of semester. For theory, 35 marks written examination will be conducted and time of examination will be 2-hours.

7. Declaration of Results:

(i) Declaration of result is based on the Semester Grade Point Average (SGPA) earned towards the end of each semester or the Cumulative Grade Point Average (CGPA) earned at the completion of all eight semesters of the programme and the corresponding overall alpha-sign or letter grades as given in Table 2. If some candidates exit at the completion of the first, second or third year of the four years Undergraduate Programmes, with Certificate, Diploma or Basic Degree, respectively, then the results of successful candidates at the end of the second, fourth or sixth semesters shall also be classified on the basis of the CGPA obtained in the two, four, six or eight semesters, respectively. Successful candidates at the end of the tenth semester of the integrated Master's Degree Programmes shall also be classified on the basis of CGPA obtained in the ten semesters of the Programmes. Likewise, the successful candidates of one year or two semesters Master's Degree Programme are also classified on the basis of the CGPA of two semesters of the Master's Degree Programme.

Table-2: Grades on degree certificate/mark sheet will be assigned to the students as per the following table

Semester GPA/ Program CGPA Semester/Program	% of Marks	Alpha-Sign / Letter Grade Result
9.00-10.00	90-100	O (outstanding)
8.00 - <9.00	80.00 – <90.00	A+ (Excellent)
7.00 - <8.00	70.00-<80.00	A (Very Good)
6.00 - <7.00	60.00-<70.00	B+ (Good)
5.50 - <6.00	55.00-<60.00	B (Above Average)
5.00 - <5.50	50.00-<55.00	C (Average)
4.00 - <5.00	40.00-<50.00	P (Pass)
Below 4.00	< 40	F (Fail)
Ab	-----	Absent

- (ii) A student obtaining Grade F shall be considered failed and will be required to reappear in the examination. For non-credit courses ‘Satisfactory’ or ‘Unsatisfactory’ shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

8. Award of Major and Minor Degree:

- (i) A student pursuing four-year multidisciplinary UG programme will be awarded an appropriate Honours/ Research degree in Major/ Core Subject on completion of VIII Semester with the minimum of 176 credits if he secures in that Subject at least 50% of the total credits for that programme. He shall thus study the specific number of Mandatory Core Courses, Core Electives, Vocational and Skill Courses and Field projects/ Internships connected to Core Subjects in eight semesters so as to cover at least 50% of the total credits.

- (ii) In case of Research Degree, a student shall pursue research project and write dissertation in that Major in the VII and VIII semesters. On the basis of above rules and regulations under NEP-2020 following course frame work is adopted by the Prof. Ramkrishna More Arts, Commerce and Science College, Akurdi, Pune-411044 for the completing of four years honours degree in Major and Minor subjects.

9. Distribution of Credits across Four Years Degree Programmes: In general, for the four years’ bachelor’s degree programme, the distribution of credits will be as follows:

- (a) Major (Core) Subject comprising Mandatory and Elective Courses:
- Minimum 50% of total credits corresponding to Three/Four - year UG Degree- Mandatory Courses offered in all Four years;
 - 2 credit course on Major Specific IKS shall be included under Major;
 - Elective courses of Major will be offered in the third and/or final year.
 - Vocational Skill Courses, Internship/ Apprenticeship, Field Projects, Research Projects connected to Major first to fourth year.
- (b) Minor Subject: 18-20 Credits
- The Minor subjects may be from the different disciplines of the same faculty of DSC Major (Core) or they can be from different faculty altogether.

- ii. The credits of Minor subjects shall be completed in the first three years of UG Programme.
- (c) Generic/ Open Elective Courses (OE): 10-12 credits
 - i. It is to be offered in I and/or II year
 - ii. Faculty-wise baskets of OE shall be prepared by University/ Autonomous Colleges.
 - iii. OE is to be chosen compulsorily from faculty other than that of the Major.
- (d) Vocational and Skill Enhancement Courses (VSEC): 14-16 credits

Vocational Skill Courses (VSC): 8-10 credits, including Hands on Training corresponding to the Major and/or Minor Subject:

- i. To be offered in first to three years;
- ii. Wherever applicable vocational courses will include skills based on advanced laboratory practicals of Major

Skill Enhancement Courses (SEC): 06 credits

- i. To be offered in I and II year;
- ii. To be selected from the basket of Skill Courses approved by University/ Autonomous Colleges

(e) Ability Enhancement Courses (AEC), Indian Knowledge System (IKS) and Value Education Courses (VEC): 14 Credits

- AEC: 08 credits
 - i. To be offered in I and II year
 - ii. English: 04 Credits
 - iii. Modern Indian Language: 04 credits
 - iv. To be offered from the Basket approved by the College;
- The focus for both languages should be on linguistic and communication skills.
- IKS: 2 Credits
 - i. To be offered in I Year
 - ii. Courses on IKS to be selected from the basket of IKS courses approved by the Colleges
- VEC: 04 Credits
 - i. To be offered in I year
 - ii. Value Education Courses (VEC) Environmental Science Education (Compulsory), Understanding India, and Digital and Technological Solutions.
- (f) Field Projects/ Internship/ Apprenticeship/ Community Engagement and Service corresponding to the Major (Core) Subject, Co-curricular Courses (CC) and Research Project
 - Internship/Apprenticeship corresponding to the Major (Core) Subject: 8 Credits

- Field Projects/Community Engagement and Service corresponding to the Major (Core) Subject: minimum 4-6 credits To be offered in II, and III years of UG Degree Programmes.
- Co-curricular Courses (CC) such as Health and Wellness, Yoga education sports, and fitness, Cultural Activities, NSS/NCC and Fine/ Applied/ Visual/ Performing Arts: 8 credits. To be offered in I and/or II year
- Research Projects: 12 credits

To be offered in the final year for 4-year Honours with Research UG Degree The UGC Regulations, 2021 permit up to 40% of the total courses being offered in a particular programme in a semester through the Online Learning Courses offered through the SWAYAM platform and/or other State Level Common Platforms which can be developed in due course with the participation of different Universities/ HEIs.

Abbreviations: Generic/ Open Electives: GE/OE; Vocational Skill and Skill Enhancement Courses: VSEC; Vocational Skill Courses: VSC; Skill Enhancement Courses: SEC; Ability Enhancement Courses: AEC; Indian Knowledge System: IKS; Value Education Courses: VEC; OJT: On Job Training: Internship/ Apprenticeship; Field projects: FP; Community engagement and service: CEP; Co- curricular Courses: CC; Research Methodology-RM; Research Project: RP Note: The Credit Distribution Table given above is illustrative only. The Universities/ Autonomous Colleges may suitably modify within the broader framework of credit distribution across six verticals.

Prof. Ramkrishna More College, Akurdi, Pune 411044

Graduate and Honors Degree Course Framework under Autonomy as per NEP-2020
With Major B.C.A. (Science)

Sem.	Major Courses	Major Courses	Elective Courses	Minor Courses	VSC	IKS	FP/OJT/CEP	GE/OE	SEC	AEC	VEC	CC	Total Credits
First Year Certificate Course													
I	BCMAT-111 BCMAT-112 BCMAP-113	0		0	BCVST-111	BCIKT-111	0	2 theory From Basket	1 theory From Basket	Marathi/Hindi	Environment Awareness	2 Credit From Basket	22
II	BSMAT-121 BSMAT-122 BSMAP-113	0		1 Theory Other than BCA (Sci.)	BSVSP-121	0	0	2 theory From Basket	1 theory From Basket	Marathi/Hindi	1 theory From Basket	2 Credit From Basket	22
Second Year Graduate Diploma													
III	BSMAT-231 BSMAT-232 BSMAP-233 BSMAP-234	0		1 Theory + 1 Practical Other than BCA (Sci.)	BSVST-231	0	Field Project (2 Credit)	1 theory From Basket	0	English		2 Credit From Basket	22
IV	BSMAT-241 BSMAT-242 BSMAP-243 BSMAP-244	0		1 Theory + 1 Practical Other than BCA (Sci.)	0	0	Community Engagement and Service (2 Credit)	1 theory From Basket	1 theory From Basket	English		2 Credit From Basket	22
Third Year Graduate Degree													
V	BSMAT-351 BSMAT-352 BSMAT-353 BSMAP-354 BSMAP-355	BSMET-356-A BSMEP-357-A Or BSMET-356-B BSMEP-357-B		1 Theory + 1 Practical Other than BCA (Sci.)	BSVST-351	0	Field Project or Community Engagement and Service (2 Credit)	0	0	0	0	0	22
VI	BSMAT-361 BSMAT-362 BSMAT-363 BSMAP-364 BSMAP-365	BSMET-366-A BSMEP-367-A Or BSMET-366-B BSMEP-367-B		1 Theory + 1 Practical Other than BCA (Sci.)	0	0	OJT (4 Credit)	0	0	0	0	0	22
VII and VIII Semester honours degree with major													
VII	BSMAT-471 BSMAT-472 BSMAT-473 BSMAT-474	BSMET-478-A BSMEP-479-A Or BSMET-478-B		Research methodology	0	0	0		0	0	0	0	22

	BSMAT-475 BSMAP-476 BSMAP-477	BSMEP-479-B	(4 Credits course)									
Sem.	Major Courses	Major Elective Courses	Minor Courses	VSC	IKS	FP/OJT/CEP	GE/OE	SEC	AEC	VEC	CC	Total Credits
VIII	BSMAT-481 BSMAT-482 BSMAT-483 BSMAT-484 BSMAT-485 BSMAP-486 BSMAP-487	BSMET-488-A BSMEP-489-A Or BSMET-488-B BSMEP-489-B	0	0	0	On Job Training (4 Credit)	0	0	0	0	0	22
VII and VIII Semester honours degree with research												
VII	BSMAT-471 BSMAT-472 BSMAT-473 BSMAT-474 BSMAP-476	BSMET-478-A BSMEP-479-A Or BSMET-478-B BSMEP-479-B	RM 4 Credits	0	0	Research Project (4 Credit)	0	0	0	0	0	22
VIII	BSMAT-481 BSMAT-482 BSMAT-483 BSMAT-484 BSMAP-486	BSMET-488-A BSMEP-489-A Or BSMET-488-B BSMEP-489-B	0	0	0	Research Project (8 Credit)	0	0	0	0	0	22

Program Outcomes (POs):

PO1: Problem Analysis and Design:

- Graduates will be able to identify, analyze, and define computing problems and apply appropriate methods, algorithms, and solutions to solve them effectively.

PO2: Software Development:

- Graduates will demonstrate the ability to design, implement, test, and maintain software systems. They should be proficient in various programming languages and software development tools.

PO3: Mathematical and Computing Foundations:

- Graduates will have a strong foundation in mathematics, computer science principles, and theory, which they can apply in solving computing problems.

PO4: Professional Ethics and Responsibility:

- Graduates will recognize the importance of professional ethics, legal, and societal responsibilities related to the practice of computer science.

PO5: Communication Skills:

- Graduates will possess effective communication skills to present technical information and interact with colleagues, stakeholders, and clients clearly and professionally.

PO6: Teamwork and Leadership:

- Graduates will be capable of working effectively in teams, as well as demonstrating leadership and project management skills when required.

PO7: Lifelong Learning:

- Graduates will have the ability to engage in continuous learning, staying updated with emerging technologies and advancements in the field of computer science.

PO8: Problem-Solving and Decision-Making:

- Graduates will have the ability to think critically, analyze data, and make informed decisions to solve complex computing problems.

PO9: Technological Competency:

- Graduates will be familiar with modern computing technologies, tools, and frameworks, and will be able to apply them to practical problems in various domains.

PO10: Global and Societal Impact:

- Graduates will understand the global, economic, environmental, and societal context of computer science and computing systems and will strive to contribute positively to society.

PO11: Project Management:

- Graduates will be able to manage projects, including the ability to plan, design, implement, and evaluate projects in computer applications, considering time, resources, and quality.

Program Specific Outcomes(PSOs):

PSO1: Proficiency in Programming and Software Development:

- Graduates will demonstrate the ability to design, develop, and implement software solutions using various programming languages (e.g., C, Java, Python) and frameworks. They will be skilled in writing efficient and optimized code to address real-world problems.

PSO2: Database Management and Data Handling:

- Graduates will possess knowledge in database design, management, and optimization using relational database management systems (RDBMS) such as MySQL, SQL Server, and Postgres. They will be able to develop, query, and manage databases for handling large datasets efficiently.

PSO3: Web Technologies and Development:

- Graduates will be proficient in web development technologies, including HTML, CSS, JavaScript, and server-side technologies (e.g., PHP). They will be capable of designing and developing dynamic, responsive, and user-friendly web applications.

PSO4: Mobile Application Development:

- Graduates will have the ability to design, develop, and deploy mobile applications for platforms like Android. They will understand the mobile app development lifecycle and use tools like Android Studio.

**F. Y. B.C.A. (Science) Syllabus
CBCS Semester Pattern
Under Autonomy and NEP-2020
To Be Implemented from Academic
Year 2023-2024**

Courses Offered by B.C.A(Science) Department at First year of Graduation Year 2023-24

Major B.C.A.(Science) Courses			
Semester	Course code	Title of the paper	Credit
I	BCMAT-111	Problem Solving and Programming in 'C'	2
	BCMAT-112	Database Management System	2
	BCMAP-113	C Programming and DBMS Laboratory	2
II	BSMAT -121	Advanced 'C' Programming	2
	BSMAT -122	Relational Database Management System	2
	BSMAP-113	Advanced 'C' and RDBMS	2
Minor BCA (Science)			
II	ELCMIT-121	Fundamentals of Analogue and Digital Electronics	2
IKS Related to BCA (Science) Major			
I	BCIKT-111	Vedic Mathematics	2
Vocational Skill Courses (VSC) Related to Major			
I	BCVST-111	Computer Hardware and Networking	2
II	BSVSP-121	Programming foundation with HTML and CSS	2
SEC for science faculty students from BCA (Science) discipline			
I	STSET-111	Fundamentals of Statistics	2
II	STSEP-121	Basic Statistics using MS-EXCEL	2
VEC			
I	VEEAT-111	Environmental Awareness	2
II	VEEAT-121	Democracy and Indian Constitution	2
CC			
I	CCHWT-111	Health & Wellness-I	2
II	CCPEP-121	Physical Education	2
AEC			
I	MAAET-111/ HIAET-111	Marathi-I/Hindi-I	2
II	MAAET-121/ HIAET-121	Marathi-II/Hindi-II	2
OE/GE Sem-I			
2 OE/GE Subjects From Arts and Commerce Basket			
OE/GE Sem-II			
2 OE/GE Subjects From Arts and Commerce Basket			

Detailed syllabus of each course is given below:**Semester-I****NEP-2020: First Year UG Major BCA(Science)****Course Code: BCMAT-111****Course Type: Theory****Course Name: Problem Solving and Programming in 'C'****Credits allotted:2 credits****Lectures allotted:30 Lectures**

Chapter No	Name of the Chapter	Lectures Assigned
1	Problem solving, algorithms and flowcharts	4L
2	C Fundamentals	3L
3	Input Output Statements	3L
4	Control and Iterative Structure	5L
5	Functions	8L
6	Arrays	7L

Module-1**[12L+3T]****Chapter-1: Problem solving, algorithms and flowcharts****[4L]**

Problem solving aspects, Types of Problems, Problem solving using computer; Definition & Characteristics of algorithm, Examples of algorithms, Flow charts with examples, Top-down design; Problem solving using Arithmetic Statements, Conditional Statement & Iterative Statements such as Addition/Multiplication, check number is positive/negative, Maximum of 2 numbers & 3 numbers, sum of first n numbers, sum of given n numbers, reverse digits of a number, check whether the number is palindrome, check number is prime, factorial of number, factors of number, GCD, LCM of numbers etc.

Reference Book 3: Page No 5-10 and 15-27

Chapter-2: C Fundamentals**[3 L]**

Introduction to C, Features of C, Structure of C Program, C Character Set, Identifiers and Keywords, Variables and constants; Data types- Basic data types, Enumerated types, Type casting, Declarations, Expressions; Operators and Expressions; Operators in C-Unary and Binary arithmetic operators, Increment Decrement operators; relational and logical operators, Bit wise operators, Assignment operators, Comma operator; size of operator, Ternary conditional operator, Precedence and associativity.

Reference Book 2: Page No 35-52

Chapter-3: Input Output Statements**[3 L]**

printf, scanf functions, getchar, putchar, getch functions, gets, puts functions; Escape sequence

character; format specifiers.

Reference Book 1: Page No 401-418

Chapter-4: Control and Iterative Structure

[5 L]

If, If-Else Statements, Nested If Statements, Conditional Branching-Switch Statement, Loop(while, do—while, for),break,continue,goto statements.

Reference Book 1: Page No 45-75 and 95-122

Module-2

[12L+3T]

Chapter-5: Functions

[8 L]

Introduction to Functions; Function Arguments; Library & User defined functions; Methods for parameter passing, Recursion, Storage Classes – Auto, Static, Global and Register.

Reference Book 1: Page No 153-197

Reference Book 2: Page No 67-88

Chapter-6: Arrays

[7 L]

Introduction; Array Declarations; Bounds Checking; Single dimension Arrays; Two dimension Arrays; Arrays & Function.

Reference Book 1: Page No 273-309

Reference Books:

Reference Book 1: Y. S. Kanetkar, “Let Us C”, BPB Publications

Reference Book 2: Brian W. Kernighan, Dennis M. Ritchie , “The C Programming Language”, ISBN:9788120305960, PHI Learning

Reference Book 3: Cormen, Leiserson, Rivest, Stein, “Introduction to algorithms”

Course Outcome

At the end of course, student will able -

CO-1: define the concept of Problem and problem solving techniques, Algorithms and its steps, and Flow Charts;

CO-2: explain fundamentals of C language, program development life cycle and various Operators of C language;

CO-3: understand the Console based I/O functions;

CO-4: interpret the importance of using conditional and looping statements;

CO-5: describe function definition and declaration with its types;

CO-6: define Array with its types and Bounds Checking.

NEP-2020: First Year UG Major BCA(Science)

Course Code: BCMAT-112

Course Type: Theory

Course Name: Database Management System

Credits allotted:2 credits

Lectures allotted:30 Lectures

Chapter No	Name of the Chapter	Lectures Assigned
1	File Organization	5L
2	Introduction of DBMS	4L
3	Conceptual Design (E-R model)	6L
4	Structure of Relational Databases	5L
5	SQL	5L
6	Relational Database Design	5L

Module-1

[12L+3T]

Chapter-1: File Organization

[5L]

Introduction; Physical / logical files; Record organization (fixed, variable length); Types of file organization (heap, sorted, indexed, hashed).

Reference Book 3: Page No 41-73,75-97

Chapter-2: Introduction of DBMS

[4L]

Overview; File system Vs. DBMS; Describing & storing data (Data models - relational, hierarchical, network); Levels of abstraction; Data independence, Structure of DBMS; Users of DBMS; Advantages of DBMS.

Reference Book 3: Page No 99-116

Chapter-3: Conceptual Design (E-R model)

[6L]

Overview of DB design; ER data model (entities, attributes, entity sets, relations, relationship sets); Additional constraints (key constraints, participation constraints, weak entities, aggregation / generalization).

Reference Book 3: Page No 195-234

Module-2

[12L+3T]

Chapter-4: Structure of Relational Databases

[5 L]

Concepts of a table, a row, a relation, a tuple and a key in a relational database Conversion of ER to Relational model; Integrity constraints (primary key, referential integrity, Null constraint, unique constraint, check constraint)

Reference Book 2: Page No 57-83

Chapter-5: SQL

[5 L]

Introduction; DDL commands (create, drop, alter) with examples; Basic structure of SQL query; Set operations; Aggregate functions; Null values; Nested Sub-queries; Modifications to Database (insert, delete, update); SQL mechanisms for joining relations (inner joins, outer joins and their types) examples on SQL (case studies)

Reference Book 2: Page No 130-165

Chapter-6: Relational Database Design

[5 L]

Pitfalls in Relational-Database Design (undesirable properties of a RDB design like repetition, inability to represent certain information); Functional dependencies (Basic concepts, Closure of set of functional dependencies, Closure of an Attribute set); Concept of a Super Key and a primary key (Algorithm to derive a Primary Key for a relation); Concept of Decomposition, Desirable Properties of Decomposition (Lossless join and Dependency preservation); Concept of Normalization - Normal forms (only definitions) 1NF, 2NF, 3NF, BCNF, Examples on Normalization.

Reference Book 3: Page No 241-248

Reference Books:

Reference Book 1: Henry F. Korth, Abraham Silberschatz, S. Sudarshan, "Database System Concepts", Tata McGraw-Hill Education

Reference Book 2: Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", McGraw-Hill

Reference Book 3: Alexis Leon, Mathews Leon, "Database Management Systems", Leon Vikas

Course Outcome:

At the end of course, student will able -

CO-1: explain the concept of file;

CO-2: describe the fundamental concepts of database management systems;

CO-3: design ER-models to represent simple database application scenarios;

CO-4: convert the ER-model to relational tables, populate relational database and formulate SQL queries on data;

CO-5: explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL;

CO-6: improve the database design by normalization.

NEP-2020: First Year UG Major BCA(Science)**Course Code: BCMAP-113****Course Type: Practical****Course Name: C Programming and DBMS Laboratory****Credits allotted: 2 credits****Lectures allotted: 60 Lectures****Section A: 'C' Programming**

Sr. No.	Assignment	No of Sessions
1.	Use of data types, simple operators (expressions)	01
2.	Use of decision making statements (if and if-else, nested structures)	01
3.	Use of decision making statements (switch case)	01
4.	Use of while loops, for loops	01
5.	Use of nested loops	02
6.	Use of standard library functions and menu driven programs	01
7.	Use of user defined functions	02
8.	Use of recursive functions	02
9.	Use of arrays (1-D array) and functions	02
10.	Use of multidimensional array (2-D arrays) and functions	02
Total 15		

Section B: Database Management System

Sr. No.	Assignment	No of Sessions
1.	Case study – ER diagram	01
2.	Case study – ER diagram (with generalization)	01
3.	Case study – ER diagram (with aggregation)	01
4.	Using PostgreSQL (demo of PostgreSQL)	01
5.	Data Definition queries (Create with constraints)	02
6.	Data Definition queries (Alter)	01
7.	Data Definition queries (Drop)	01
8.	SQL DML Select queries	01
9.	Queries using joins	02
10.	Aggregate Functions and Group by and Having Clauses	01
11.	Data Manipulation queries (Insert)	01
12.	Data Manipulation queries (Delete)	01
13.	Data Manipulation queries (Update)	01
Total=15		

Course Outcome**At the end of course, student will able -****CO-1:** use of data types and operators in programs;**CO-2:** solve the problem using decision making statements and loops;**CO-3:** solve problems using arrays and functions;**CO-4:** design E-R Model for given requirements and convert the same into database tables;**CO-5:** apply database using DDL and DML statements;

CO-6: design database queries using SQL with appropriate normal form.

NEP-2020: First Year UG Indian knowledge system BCA (Science)
Course Code: BCIKT-111 **Course Type: Theory**
Course Name: Vedic Mathematics
Credits allotted: 2 credits **Lectures allotted: 30 Lectures**

Chapter No	Name of the Chapter	Lectures Assigned
1	Introduction to Vedic Mathematics	6L
2	Multiplication, Squaring, Cube root and Square root	9L
3	Base Methods and Application of Vedic Mathematics	10L
4	Square root and Cube	5L

Module-1

[12L+3T]

Unit 1- Introduction to Vedic Mathematics

(6 Lecture)

- 1.1 How to predict a person's Date of Birth
- 1.2 How to Predict a Person's pocket money
- 1.3 How to Find the answer without knowing the equation

Unit 2-Multiplication, Squaring, Cube root and Square root

(9 lecture)

- 2.1 Miscellaneous Simple Method
- 2.2 Criss-cross system of Multiplication
- 2.3 Squaring Numbers
- 2.4 Cube roots of Perfect Cubes
- 2.5 Square root of perfect Squares

Module-2

[12L+3T]

Unit 3 - Base Methods and Application of Vedic Mathematics

(10 Lecture)

- 3.1 Base Method of Multiplication
- 3.2 Base method of Division
- 3.3 Base Method of Squaring
- 3.4 Magic Squares
- 3.5 Dates and Calendars
- 3.6 Simultaneous Linear Equation

Unit 4 - Square root and Cube

(5 Lecture)

- 4.1 Square Roots of Imperfect Squares
- 4.2 Cubing Numbers

Text Books

1. Vedic Mathematics Made Easy Published by Dhaval Batia

Reference Books:

1. Vedic Mathematics by Jagadguru Swami sri Bharati Krishna Tirthaji Maharaj
2. Speed Mathematics by Bill Hanley

Course Outcome:**At the end of course, student will able -****CO1:** State different methods in Mathematics in ancient India.**CO2:** State the method of predicting a person's Date of Birth**CO3:** Explain Criss-cross system of Multiplication of any two numbers**CO4:** Solve Magic Squares using techniques of Vedic Mathematics**CO5:** Apply tricks of Vedic Mathematics to find Square Roots of Imperfect Squares**CO6:** Find connections between methods in ancient Indian Mathematics to Modern Mathematics**NEP-2020: First Year UG Vocational BCA (Science)****Course Code: BCVST-111****Course Type: Theory****Course Name: Computer Hardware and Networking****Credits allotted: 2 credits****Lectures allotted: 30 Lectures**

Chapter No	Name of the Chapter	Lectures Assigned
1	Introduction to Computer Hardware and Networking	6L
2	Computer Hardware Fundamentals	5L
3	Operating Systems (Lab Session-I)	4L
4	Network Devices and Technologies	4L
5	Network Configuration and Troubleshooting	4L
6	Network Security	3L
7	Unix Networking Commands (Lab Session-II)	4L

Module-1**[12L+3T]****Chapter-1: Introduction to Computer Hardware and Networking****[6L]**

Overview of computer hardware components; Basic networking concepts and terminologies; Introduction to computer networks; Network topologies and architectures; Network protocols and standards; Local Area Networks (LANs) and Wide Area Networks (WANs).

Reference Book2: Page No 159 to 184

Chapter-2: Computer Hardware Fundamentals**[5 L]**

CPU, memory, and storage devices; Input and output devices; Motherboards and expansion cards; Power supply and cooling systems.

Reference Book2: Chapter 4: Page No.129 to 158 and Chapter 1 Page No:1 to 8(Microprocessor)

Chapter-3: Operating Systems (Lab Session-I) [4 L]

Overview of different operating systems; Installation and configuration of operating systems.

Reference Book 2: Chapter 9 Page No:238 to 274

Module-2

[12L+3T]

Chapter-4: Network Devices and Technologies [4 L]

Routers, switches, and hubs; Network cables and connectors; Wireless networks and Wi-Fi technologies.

Reference Book 1: Chapter 6; Understand Network Devices Page No.67 to 76

Chapter-5: Network Configuration and Troubleshooting [4 L]

IP addressing and subnetting; Network configuration and setup; Network troubleshooting techniques.

Reference Book1: Page No. 94 to 105

Chapter-6: Network Security [3 L]

Introduction to network security; Firewalls and intrusion detection systems; Basic security protocols and practices.

Reference Book1:Chapter11 Page No 143 to 153

Chapter-7: Unix Networking Commands (Lab Session-II) [4 L]

Unix networking commands; Use ping command to check connectivity of any website; Use ping command to check connectivity of your departmental server by using ip address; Write a command to get name of your computer; Use traceroute command to trace the route of ant packet; See the output of netstat command; Write a command to display information of user; Use nmap command to display information of any website using website name or ip address of site; Use nslookup command to display ip address or DNS of website.

Reference Books:

Reference Book 1: Networking A Beginner's Guide (Fourth Edition) by Bruce Hallberg

Reference Book 2: Computer Fundamentals by Dr. Pankaj Nagar and Manish Soni.

Course Outcome:

At the end of course, student will able -

CO1: Students will be able to use and differentiate between basic concepts of computer hardware and networking;

CO2: Understand Computer Hardware Fundamentals

CO3: understand the basic concepts of operating System;

CO4: interpret the importance of Computer Networks;

CO5: describe Network Devices and Technologies;

CO6: Understand Network Configuration and Troubleshooting and Network Security.

Skill Enhancement Course (SEC) - SEM -I

Course Code: STSET-111

Course Title: Fundamentals of Statistics

No. of Credits: 2

Lectures: 30 Hrs.

Pre-requisites: None

TOPICS/CONTENTS

Chapter 1: Descriptive Statistics

[15 L]

1.1 Data Condensation: Types of data (Primary and secondary), Attributes and variables, discrete and Continuous variables, terms related to frequency distribution, less than and more than cumulative frequency distribution

1.2 Measures of Central Tendency: Concept of central tendency and requirements of a good measure of central tendency

1.3 Arithmetic mean: Definition, computation for ungrouped and grouped data, combined mean, merits and demerits

1.4 Median and Mode: Definition, formula for computation for ungrouped and grouped data, merits and demerits. Empirical relation between mean, median and mode

1.5 Partition Values: Quartiles (for grouped data), Box Plot.

1.6 Concept of dispersion, Measures of dispersion: Range and coefficient of range, definition of Variance and Standard deviation for ungrouped and grouped data, coefficient of variation (C.V), uses of C.V.

1.7 Concept of skewness, types, Karl Pearson's coefficient of skewness, Bowley's coefficient of skewness, Kurtosis

1.8. Numerical problems related to real life situations.

Chapter 2: Theory of Probability

[15 L]

2.1 Review of Counting principles, Permutation and Combination.

2.2 Deterministic and non-determination models.

2.3 Random Experiment, Sample Spaces (Discrete and continuous)

2.4 Events: Types of events, Operations on events.

2.5 Probability - classical definition, axioms of probability

2.6 Theorems of probability (without proof)

- i) $0 \leq P(A) \leq 1$ ii) $P(A) + P(A') = 1$ iii) $P(\Phi) = 0$ iv) $P(A) \leq P(B)$ when $A \subseteq B$
iv) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

2.7 Numerical problems related to real life situations

2.8 Concept of Conditional Probability, multiplication theorem, partition of sample space, Bayes theorem (without proof), independence of two events,

2.9 Numerical problems.

References:

1. Sheldon Ross, A First course in Probability, Pearson Education Inc. [Chapter 2]
2. J. Medhi.(1992), Statistical Methods (An Introductory Text), New Age International [chapters 1&2]
3. George W. Snedecor, William G, Cochran, Statistical Methods, John Wiley &sons
4. B.L.Agarwal,, Programmed Statistics, New Age International Publishers
5. Madhav Kulkarni, Surendra Ghatpande (2007), Introduction to discrete probability and probability distributions, SIPF Academy, Nashik [Chapter 2]

Course Outcomes:

After completion of this course, the student will be able to

CO1: Understand types of data and interpret frequency distributions and cumulative frequency distributions.

CO2: Compute various descriptive statistics like measures of central tendency, dispersion, skewness and kurtosis.

CO3: Understand basics of Probability

CO4: Understand the concept of conditional probability and Baye's theorem.

CO5: Understand the concept of Independence of two events.

CO6: Understand real life applications of computing probabilities of events.

NEP-2020 First Year UG Environment Science (Value Education Course)

Course Code – VEEAT-111

Course Type-Theory

Course Name: Environmental Awareness

No. of Credits: 02

No. of Periods: 30

MODULE-1

[12 L + 3T]

Unit 1: Introduction to environmental studies

[02 L]

- Multidisciplinary nature of Environmental studies;
- Scope and importance; Concept of sustainability and sustainable development.

Unit 2: Ecosystems [06 L]

- Concept and structure.
- Ecosystem functions.
- Types of Ecosystem.

Unit 3: Biodiversity and Conservation [07 L]

- India as a mega-Biodiversity nation; Endangered and endemic species of India
- Threats to Biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions;
- Conservation of Biodiversity: In-situ and Ex-situ conservation of Biodiversity.

MODULE-2 [12 L + 3T]

Unit 4: Environmental Pollution [07 L]

- Environmental pollution: types, causes, effects and controls; Air, Water, and Soil pollution.
- Solid and liquid waste management: Control measures of urban and industrial waste.

Unit 5: Environmental Programs and Policies [08 L]

- Developed Countries, Developing Countries.
- New Environmental policy of India; Government initiatives.

References:

1. Singh R. B. (1993) Environmental Geography. Delhi, India: Heritage Publishers.
2. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
3. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
4. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi 1992.
5. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
6. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
7. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
8. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi

Course Code – CCHWT-111
Course Name: HEALTH AND WELLNESS-I

Course Type-Theory
No. of Credits: 02

COURSE OBJECTIVES:

1. To help understand the importance of a healthy lifestyle
2. To familiarize students about physical and mental health
3. To create awareness of various life style related diseases
4. To provide understanding of stress management

UNIT I. INTRODUCTION TO HEALTH & WELLNESS (15 lectures)

- Define and differentiate health and wellness.
- Importance of health and wellness Education.
- Local, demographic, societal issues and factors affecting health and wellness.
- Diet and nutrition for health & wellness.
- Essential components of balanced diet for healthy living with specific reference to the role of carbohydrates, proteins, fats, vitamins & minerals.
- Malnutrition, under nutrition and over nutrition.
- Processed foods and unhealthy eating habits.
- Body systems and common diseases.
- Sedentary lifestyle and its risk of disease.
- Stress, anxiety, and depression.
- Factors affecting mental health.
- Identification of suicidal tendencies.
- Substance abuse (Drugs, Cigarette, Alcohol), de-addiction, counselling and rehabilitation.

UNIT II. MANAGEMENT OF HEALTH AND WELLNESS. (15 lectures)

- Healthy foods for prevention and progression of Cancer, Hypertension, Cardiovascular, and metabolic diseases (Obesity, Diabetes, Polycystic Ovarian Syndrome).
- Types of Physical Fitness and its Health benefits.
- Modern lifestyle and hypo-kinetic diseases; prevention and management through exercise.
- Postural deformities and corrective measures.
- Spirituality and mental health.
- Role of Yoga, asanas and meditation in maintaining health and wellness.
- Role of sleep in maintenance of physical and mental health.

SUGGESTED BOOKS:

1. Physical Activity and Health by Claude Bouchard, Steven N. Blair, William L. Haskell.
2. Mental Health Workbook by Emily Attached & Marzia Fernandez, 2021.
3. Mental Health Workbook for Women: Exercises to Transform Negative Thoughts and Improve Well-Being by Nashay Lorick, 2022
4. Lifestyle Diseases: Lifestyle Disease Management, by C. Nyambichu & Jeff Lumiri, 2018.
5. Physical Activity and Mental Health by Angela Clow & Sarah Edmunds, 2013.

प्रथम वर्ष कला ,SEM-I

व्यावहारिक मराठी भाग -१ AEC - MAAET-111

अभ्यासक्रम :

घटक	तपशील	श्रेयांक	घड्याळी तास
१.	अर्जलेखन ● अर्जलेखन विविध नमुने –विनंती अर्ज , संगणकीय अर्ज ,माहिती अधिकारातील अर्ज इ .	१	१५
२	● भाषांतर ● साग्रहण ● परिच्छेद लेखन	१	१५

संदर्भ ग्रंथ

- व्यावहारिक मराठी –ल.रा.नासिराबादकर .
- व्यावहारिक व उपयोजित मराठी –डॉ.वेदश्री थिंगळे ,डॉ. प्रभाकर जोशी .

CO 1 नोकरीसाठी अर्ज करता येईल .

CO 2 भाषांतर करता येईल .

CO 3 साग्रहण करता येईल .

CO 4 व्यावहारिक मराठीतील बारकावे समजतील .

Ability Enhancement Courses (AEC), Hindi

AEC FIRST YEAR- BBA, B.VOC, BCS, BBA CA, B.Sc, SEMESTER-I & II २०२३-२४ से		
Title of the Course	सामान्य हिंदी SEMESTER --I & II	Number of Credits : 02
Course Code	HIAET-111 AEC सामान्य हिंदी - I] कहानी, कविता और निबंध लेखन [HIAET-121 AEC सामान्य हिंदी - II [कहानी, कविता और व्यावहारिक हिंदी [	
Unit No.	Title of Unit and Contents	No. of lectures
	HIAET-111 AEC सामान्य हिंदी - I] कहानी, कविता और निबंध लेखन	
I	अ] कहानी विधा - १. एक टोकरी भर मिट्टी- माधवराव सप्रे २. कफ़न-प्रेमचंद ३. आकाश द्वीप- जयशंकर प्रसाद ४. क्लेम- मोहन राकेश	12
II	आ] कविता विधा- १. फूल की चाह- माखनलाल चतुर्वेदी २. जन-जन का चेहरा एक- गजानन माधव मुक्तिबोध ३. माँ- चित्रा डोंगे ४. नॉट आउट- प्रवीण कोटला	10
III	इ] साहित्येत्तर पाठ्यक्रम १. निबंध लेखन] पर्यावरण, आत्मकथा, विज्ञान, समस्या, समाचार आदि [२. पत्राचार लेखन] सरकारी गैर सरकारी[	8

संदर्भ ग्रन्थ-

- १ [हिंदी कथाधारा- सं. दूधनाथ सिंह
- २ [गद्य वैभव- सं. राजेंद्र खैरनार
- ३ [वसुधा- चित्रा डोंगे
- ४ [फिर से शून्य- प्रवीण कोटला
- ५ [हिंदी कविता- सं. दूधनाथ सिंह

Course Outcomes (COs) On completion of the course, the students will be able to:	
CO1	हिंदी कहानियों की गरिमा को समझ जायेंगे।
CO2	चरित्र प्रधान कहानियों की जानकारी प्राप्त होंगी।
CO3	घटना प्रधान कहानियों से परिचित हो जायेंगे।
CO4	आत्मकथा परक विषयों पर निबंध लिखना सिख जायेंगे।
CO5	सरकारी कार्यालयों के लिए पत्राचार करना सिख जायेंगे।
CO6	सरकारी पत्राचार के महत्व को समझ जायेंगे।

SEMESTER II

NEP-2020: First Year UG Major BCA(Science)**Course Code: BSMAT-121****Course Type: Theory****Course Name: Advanced 'C' Programming****Credits allotted: 2 credits****Lectures allotted: 30 Lectures**

Chapter No	Name of the Chapter	Lectures Assigned
1	Preprocessor	4L
2	Pointers	7L
3	Strings	4L
4	Structures	7L
5	Union	4L
6	File Handling	4L

Module-1**[12L+3T]****Chapter-1: Preprocessor****[4 L]**

Concept, Format of preprocessor directives, File inclusion directives (#include), Macro substitution directives (#define), nested macros, parameterized macros; Macros versus functions, #error / #pragma directives, Conditional compilation (#if/#ifdef/#else/#elif/#endif), Predefined macros (_DATE_ / _TIME_ / _FILE_ / _LINE_ / _STDC_)

Reference Book 2: Page No 239-269(Chapter No.7)

Chapter-2: Pointers**[7 L]**

Concept – reference & dereference, Declaration, definition, initialization & use, Types of pointers; Pointer Arithmetic, Multiple indirection; parameter passing – call by value and call by reference Arrays & Pointers - Pointer to array, Array of pointers; Functions & pointers - Passing pointer to function, returning pointer from function, function pointer, Pointers & const.; Dynamic memory management, Allocation, Resizing, Releasing, Memory leak / dangling pointers.

Reference Book 1: Page No 93-122(Chapter No.5)

Chapter-3: Strings**[4 L]**

Concept, Declaration, definition, initialization, format specifiers, String literals/ constants & variables – reading & writing from & to console, Importance of terminating NULL character, Strings & pointers; Array of strings & array of character pointers, User defined functions, predefined functions in string.h - strlen, strcpy, strcat, strcmp, strcmpi, strrev, strlwr,strupr, strset, strchr, strrchr, strstr, strncpy, strncat, strncmp, strncmpi, strnset, strtok, Command line arguments – argc and argv.

Reference Book 2: Page No 333-359(Chapter No.9)

Module-2**[12L+3T]****Chapter-4: Structures****[7 L]**

Concept, Declaration, definition, initialization, accessing structure members (. operator), Array of structures, Pointers to structures, declaring pointer to structure; Accessing structure members via pointer to structure, Structures & functions; Passing each member of structure as a separate argument, Passing structure by value / address; Nested structures, typedef & structures.

Reference Book 1: Page No 127-147(Chapter No.6)

Book 2: Page No 369-391(Chapter No.10)

Chapter-5: Union

[4 L]

Unions - Concept, Declaration, definition, accessing union members, Difference between Structures & unions; structures within union, union within structures, pointers and unions, nested unions; enumerated data types, Bit fields, Concept, need, use, multi-file programs.

Reference Book 1: Page No 147-149(Chapter No.6)

Reference Book 2: Page No 539-547(Chapter No.15)

Chapter-6: File Handling

[4 L]

Concept of streams, need, Types of files, Operations on text & binary files, Random access file; library functions for file handling – fopen, fclose, fgetc, fseek, fgets, fputc etc.

Reference Book 2: Page No 425-463(Chapter No.12)

Reference Books:

Reference Book 1: The C Programming Language (Second Edition) – By B. W. Kerninghan & D. M. Ritchie

Reference Book 2: Y S Kanetkar, “Let Us C”, BPB Publications

Reference Book 3: Programming with C – By Byron S Gottfried (Schaum’s Outlines)

Course Outcome

At the end of course, student will able -

CO-1: define Pre-processor directives;

CO-2: describe and explain pointers;

CO-3: manipulate strings using library functions;

CO-4: explain pointers and structures

CO-5: explain unions, exercise on union

CO-5: exercise files concept to show input and output of files.

NEP-2020: First Year UG Major BCA(Science)**Course Code: BSMAT-122****Course Type: Theory****Course Name: Relational Database Management System****Credits allotted: 2 credits****Lectures allotted: 30 Lectures**

Chapter No	Name of the Chapter	Lectures Assigned
1	Relational Database Design	5L
2	Transaction Concepts	5L
3	Concurrency Control	5L
4	Crash Recovery	6L
5	Database Security	5L
6	Database System Architecture	4L

Module-1**[12L+3T]****Chapter-1: Relational Database Design****[5 L]**

PL/ Postgres SQL: Language structure; Controlling the program flow, conditional statements, loops; Views Functions; Handling errors and exceptions; Cursors; Triggers.

Reference Book 2: Page No 952-953,401-408,485-491

Chapter-2: Transaction Concepts**[5 L]**

Transaction, properties of transaction, states of transactions; Concurrent execution of transactions and conflicting operations; Schedules, types of schedules, concept of serializability, precedence graph for serializability.

Reference Book 2: Page No 583-588,592-596 (Chapter 29)

Reference Book 1: Page No 627-655(Chapter 14)

Chapter-3: Concurrency Control**[5 L]**

Ensuring serializability by locks, different lock modes; 2PL and its variations; Multiple Granularity locking protocol; Basic timestamp method for concurrency, Thomas Write Rule; Locks with multiple granularity; dynamic database concurrency (Phantom Problem); Timestamps versus locking; Optimistic concurrency control algorithm, multi version concurrency control; Deadlock handling methods -Detection and Recovery (Wait for graph); Prevention algorithms (Wound-wait, Wait-die); Deadlock recovery techniques (Selection of Victim, Starvation, Rollback).

Reference Book 1: Page No 661-708(Chapter 15)

Reference Book 2: Page No 590-592,596-606(Chapter 29)

Module-2**[12L+3T]****Chapter-4: Crash Recovery****[6 L]**

Transaction Failure classification; Recovery concepts; Checkpoints; Recovery with concurrent transactions (Rollback, checkpoints, commit); Log base recovery techniques (Deferred and Immediate update); Buffer Management; Database backup and recovery from catastrophic

failures; Shadow paging.

Reference Book 2: Page No 615-631

Chapter-5: Database Security

[5 L]

Introduction to database security concepts; methods for database security; discretionary access control method; mandatory access control and role based access control for multilevel security; use of views in security enforcement; overview of encryption technique for security; Statistical database security.

Reference Book 2: Page No 537-558

Chapter-6: Database System Architecture

[4 L]

Centralized and Client – Server Architectures; Server System Architectures; Introduction to Parallel Systems; Introduction to Distributed Systems; Introduction to Object Based Databases.

Reference Book 1: Page No 769-791

Reference Books:

Reference Book1: Database System Concepts – Abraham Silberschatz, Henry F. Korth, S. Sudarshan, 6th edition- McGraw-Hill

Reference Book2: Alexis Leon, Mathews Leon, “Database Management Systems”, Leon Vikas

Reference Book 3: Database Management Systems -Raghu Ramakrishnan, Johannes Gehrke, 3rd edition, Tata McGraw Hill

Course Outcome

At the end of course, student will able -

CO1: define PL/PgSQL Language structure (Views, Functions, cursors, Triggers);

CO2: explain Transaction Properties, States of Transactions, Deadlock concept, Types of Schedule;

CO3: discuss Precedence Graph, Lock mechanism, Different lock Modes for ensuring serializability;

CO4: solve Problems on Checkpoints to achieve Transaction recovery;

CO5: exercise Recovery with Concurrent transactions (Rollback, Checkpoints, Commit);

CO6: discuss Client-server Architectures with Encryption Techniques for security;

NEP-2020: First Year UG Major BCA(Science)**Course Code: BSMAP-113****Course Type: Practical****Course Name: Advanced 'C' and RDBMS****Credits allotted: 2 credits****Lectures allotted: 60 Lectures****Section A: Advanced 'C' Programming**

Sr. No.	Assignment	No of Sessions
1.	To demonstrate use of preprocessor directives	1
2.	To demonstrate use of pointers	2
3.	To demonstrate concept of strings, array of strings	2
4.	To demonstrate string operations using pointers	2
5.	To demonstrate command line arguments	1
6.	To demonstrate structures (using array and functions)	2
7.	To demonstrate nested structures and Unions	2
8.	To demonstrate use of bitwise operators.	1
9.	To demonstrate file handling	2

Section B : Relational Database Management System

Sr. No.	Assignment	No of Sessions
1.	Simple and Nested Queries	02
2.	Views Creation	02
3.	Stored Functions	02
4.	Cursors (Simple Cursor, Parameterize Cursor)	02
5.	Designing a Database using normalization theory for the given application/database design	02
6.	Error and Exception handling (Raise Notice, Raise Exception)	02
7.	Triggers(Before (Insert, Update, Delete), After (Insert, Update, Delete))	03

Course Outcome**At the end of course, student will able -****CO-1:** implement C programs using C preprocessor, Pointers, arrays, strings and functions;**CO-2:** exercise on pointers, Structures and Unions with dynamic memory allocation;**CO-3:** solve problems on bit-fields and file handling using command line arguments;**CO-4:** illustrate PL/PgSQL Language structure (Views, Functions, cursors, Triggers);**CO-5:** explain Transaction Properties and serializability with concurrency;**CO-6:** compare Client-server Architectures with encryption techniques for security.

NEP-2020: First Year UG Minor BCA(Science)**Course Code: BSVSP-121****Course Type: Practical****Course Name: Programming foundation with HTML and CSS****Credits allotted:2 credits****Lectures allotted: 60 Lectures**

Sr. No.	Assignment	No of Sessions
1. Creating Simple HTML Pages, HTML Programming using lists, hyperlinks		02
2. Adding images and links to web pages		01
3. HTML Programming using table and frames		02
4. Applying inline styles, internal stylesheets, and external stylesheets		02
5. Applying internal CSS and External CSS		01
6. Creating input fields, checkboxes, and radio buttons		01
7. Adding audio and video controls. Creating simple layouts		01
8. Creation of forms, small case study to create HTML pages using all the above learnt techniques		02
9. Creation of Forms layout designing by using div element with CSS property		02
10. Creating smooth transitions for element states(hover)		01

Course Outcome**At the end of course, student will able -****CO-1:** implement of the basic structure of HTML;**CO-2:** apply various tags and attributes to structure content;**CO-3:** execute CSS to control the visual presentation of HTML elements;**CO-4:** design concept of responsive web pages using CSS;**CO-5:** create and customize web forms using HTML, and style form elements using CSS;**CO-6:** construct a web page using HTML & CSS.

Semester II	
Fundamentals of Analogue and Digital Electronics	
Course code: ELCMIT-121	No. of Credits: 2

Unit No.	Unit Title and Contents
Module 1	
1	Semiconductor Diodes (4) Semiconductor, P and N type semiconductors, Formation of PN junction diode, it's working, Forward and Reverse bias characteristics, Zener diode: working principle, breakdown mechanism and characteristics, Working principle of Light emitting diode, photo diode, opto - coupler, Solar cell working principle and characteristics
2	Bipolar Junction Transistor(BJT) (7) Symbol, types, construction, working principle of BJT, Transistor configurations- CB, CC (only concept), CE configuration: input and output characteristics, Concept of Biasing, Potential Divider bias, Transistor as amplifier, Transistor as a switch, RC coupled single stage transistor amplifier, (Concept of Gain and Bandwidth expected),
3	MOSFET (4) FET and MOSFET: types, Working principle, Characteristics, Application of FET and MOSFET as a Switch.
Module 2	
I	Number system and codes (5) Decimal, binary, octal, hexadecimal number systems, Conversion of numbers from one number system to another including decimal / binary points, Binary addition, subtraction, multiplication, division, 1's and 2's complement method of subtraction BCD code numbers and their limitations, Concept of parity, Error detection using parity, ASCII code
2	Logic gates and Boolean Algebra (10) Introduction to analog signals and digital signals, Positive and Negative logic, Logic gates: definition, symbols, truth tables, Boolean expressions, pulsed operation of NOT, OR, AND, NAND, NOR, EX-OR, EX-NOR gates Rules and laws of Boolean algebra, logic expression, De Morgan's theorems, their proof, Sum of products form (min. terms), Product of sum form (max. terms), Simplification of Boolean expressions using Boolean algebra and Karnaugh map up to 4 variables. Conversion of Boolean equations into digital circuits
Text and Reference Books:	
1.	Malvino Electronics Principles By- Malvino A. P. Ed-6, McGraw Hill publication.
2.	Modern Digital Electronics By- Jain R.P. Ed-4, Pub- Tata McGraw Hill publication India
3.	Digital Fundamentals By Floyd T.M. Ed-11, Pub- Person Education Publication.

Course Outcomes (COs): On completion of the course, the students will be able to:	
CO1:	Study and Explain construction details of various semiconductor devices.
CO2:	Explain operation and characteristics behavior of various semiconductor devices.

CO3:	Explain needs and operation details of elementary electronic circuits and systems.
CO4:	Get familiar with concepts of digital electronics.
CO5:	Learn number systems and their representation.
CO6:	Understand basic logic gates, Boolean algebra.
CO7:	Simplify and design simple digital systems using Boolean algebra and K-Map.

Skill Enhancement Course (SEC)

Course Code: STSEP-121

Course Title: Basic Statistics using MS-Excel

No. of Credits: 2

Lectures: 60 Hrs.

Pre-requisites: None

List of Practicals –

Sr. No.	Title of the practical
1 & 2	Construction of frequency distribution for raw (Use of at least two data sets more than 50 observations- each for constructing frequency distribution) data and also using MS-EXCEL
3	Diagrammatic representation using MS-EXCEL (Simple Bar, Subdivided Bar, Pie Diagram, Multiple Bar, Percentage Bar).
4	Graphical representation using MS-EXCEL.(Histogram, less than and more than ogive curve, frequency curve, Box Plot)
5	Data Interpretation from diagrams (problems on the basis of competitive examinations to be taken)
6	Data Interpretation from graphs (problems on the basis of competitive examinations to be taken)
7	Summary statistics, Box-plot for ungrouped data and comparison for consistency using MS-EXCEL.
8	Fitting of Binomial distribution (and also using MS-EXCEL)
9	Fitting of Poisson distribution (and also using MS-EXCEL)
10	Applications of Binomial and Poisson distributions
11	Drawing a random sample using SRSWOR, SRSWR, Stratified and systematic using MS-EXCEL..
12	Report Writing- Statistical software's for Data analysis
13, 14 & 15	Data collection and exploratory Data Analysis (in a team of max.8) /Data analysis and interpretation from secondary data (individually)

References:

1. George W. Snedecor, William G, Cochran, Statistical Methods, John Wiley & sons
2. B.L. Agarwal, Programmed Statistics, New Age International Publishers
3. Wayne Winston, Microsoft Excel Data Analysis and Business Modeling (Office 2021 and Microsoft 365)
(Business Skills) 7th Edition

Course Outcomes: After completion of this course, the student will be able to

CO1: Tabulate and construct frequency distribution of the given data in Excel.

CO2: Draw various graphs and diagrams using Excel

CO3: Solve questions on diagrams and graphs and interpret from the data.

CO4: Compute and compare data sets using measures of central tendency and dispersion

CO5: Fit Binomial and Poisson distribution to given data.

CO6: Draw samples from finite population using SRSWOR, stratified and systematic sampling.

Curricular Course, 2 Credits, 60L (Sem.-II)

CCPEP-121: Physical Education

Theory and Active Participation

- Introduction to Physical Education and Sports
- Concept of Physical Education, its Definition and Scope.
- Concept of Physical Fitness
- Components of Health Related Physical Fitness
- (Cardio-vascular Endurance, Muscular Strength, Endurance, Flexibility, and Body Composition)
- Components of Skill Related Physical Fitness (Agility, Balance, Co-ordination, Speed, Power, Reaction Time)
- Concept of Health, Wellness, and Health & Hygiene.

Fitness Assessment & Participation in Sports

In order to improve the physical fitness standards of students, they should be given opportunity and facilities to participate in Physical Fitness Activity and a game / sport from the list of Association of Indian Universities, New Delhi (List of events available on website www.aiuweb.org). The choice of game / sports will be according to the facilities available in the college.

Participation in Fitness Activity:

- Every student should participate in Fitness Activity for 12 hours.

Participation in Games and Sports:

- A student will have to select one game/sport from the list of Association of Indian Universities, New Delhi (List of events available on website www.aiuweb.org). The choice of game/sports will be according to the facilities available in the college.

Every student should participate in Games and sports for 12 hours.

Fitness Assessment:

- Cardiovascular Endurance
- Flexibility
- Muscular Strength Endurance
- Body Composition (No marks)

EVALUATION STRUCTURE:

Table 1

Course	Type of Assessment	Marks	Mode of Evaluation
COURSE –	Internal	15	Assignment (15

CCPEP-121 PHYSICAL EDUCATION, SPORTS	Assessment		marks) Project on the selected Sports Event
	External Assessment	35	Participation (10 marks) (24 hrs. of participation in Fitness and selected game/sport). Practical – Fitness Test- 25 marks

To complete first credit of Course – Physical Education, Sports, Teacher will have to **conduct 5 theory lectures** (college may schedule these lectures during first or second semester before fitness assessment) and student will have to attend 5 theory lectures and has to participate in Fitness and selected game / sport for **minimum 24hrs.and submit the assignment**.

- Procedure for fitness tests are given in the guidelines section which also includes Norms Table. Marks to be awarded in accordance with the norms table.

Sr. No.	Component	Test	Marks
1	Cardiovascular Endurance (Any One)	1. Modified Queens College Test or 2. 12 Min. Run Walk	10
2	Flexibility	2. Sit and Reach Test	05
3	Muscular Strength Endurance	3. Bent Knee Sit Ups	10
4	Body Composition	4. Fat Percentage	-----
		Total	25

CONSIDERATIONS AND EXEMPTIONS:

Differently Able Students

Differently able students will be exempted from the course **CCPEP-121 PHYSICAL EDUCATION AND SPORTS** after producing the valid documents. This is not depriving them from the equality of opportunity with other students. The student shall have to submit his/her medical certificate at the time of admission from a Civil Surgeon of respective District Civil Hospital.

Important Note:

- Temporary illness will not give students exemption from the course. If he / she miss any assessment/task he / she will be given opportunity in the ensuing semester.

Exemption

Any Student representing college / institute in the enlisted games of Association of Indian Universities / Indian Olympic Association / State Olympic Association shall be **exempted from mandatory participation in selected game / sport for minimum 24hrs** of first credit of Course – **CCPEP-121 Physical Education and Sports**.

Value Education Course VEC**VEEAT-121: Democracy and Indian Constitution****2 Credit, 30 L****Unit-1: The Concept of Democracy**

- A. Meaning – Nature and Definition.
- B. Origin and Development.
- C. Types of Democracy. Direct and Indirect

Unit-2: A. Major Feature of Democracy.

- B. Social Democracy.
- C. Demerits of Democracy.

Unit-3: Making of Indian Constitution.

- A. Fundamental Rights in the Indian Constitution.
- B. Basic Structure of the Indian Constitution.

Unit: 4 A. Fundamental Duties of Citizens

- B. Election Commission of India (Electoral Reforms/ E.V.M./Code of Conduct)

English Reference Books/Text

1. An introduction to Political Theory, Author: Rajiv Bhargava Publication: Pearson.
2. Bryce, Modern Democracies.
3. E. Asirvatham, political Theory.
4. Bharatiya Rajyaghatna va Ghatanatmak prakriya, Author: Tukaram Jadhav
Publication: Unique Academy Pune.
5. Introduction to the Constitution of India Author: Dr. Durga
मराठी संदर्भ साधने:
१) डॉ. बाळ कांबळे, २०१२, भारताची राज्यघटना, राजकारण व कायदा डायमंड प्रकाशन पुणे.
२) पाटील बी. बी., २०१६, भारतीय शासन आणि राजकारण फडके प्रकाशन कोल्हापूर.
३) डॉ. जोती बीडलन, डॉ. देशपांडे. भारतीय संविधानाचा परिचय, निराली प्रकाशन, पुणे.
४) प्राचार्य. काने राजकीय सिद्धांत आणि राजकीय विचार, पिंपळापुरे प्रकाशन, नागपूर
५) प्रा. प्रमोद तांबे, राज्यशास्त्र परिचय, निराली प्रकाशन, पुणे.
६) डॉ. विजय देव, आधुनिक राजकीय विश्लेषण कोश, डायमंड प्रकाशन, पुणे,
७) भार्गव राजीव, राजकीय सिद्धांत परिचय, अनुवाद-हेमंत खानझोडे, पीयरसन प्रकाशन.
८) ना य. डोळे, राजकीय विचाराचा इतिहास, कॉन्टिनेन्टल प्रकाशन, पुणे.

PROGRAMME OUTCOMES

Political Science undergraduate program was born out of recognition of the increasing significance of cross-disciplinary studies in the social sciences. The program is organized around the combined perspectives and analytical tools of Sociology, Political Science, International Relations, and History.

1. Develop knowledge of theories, concepts, and research methods in humanities and social sciences.
2. Assess how global, national and regional developments affect society.
3. The Political Science degree furnishes the students with a unique multidisciplinary approach in social sciences and prepares them for further academic study and for careers in the public and the private sector.

Video Lecture Links

Unit 1: <https://youtu.be/fJaLKyF8Qhw?si=qhL26a4lYps9UV4C>

Unit 1 and 2 : <https://www.youtube.com/watch?v=DXcJoihea7Y>

Unit 2: <https://www.youtube.com/watch?v=GIiyEBlpH4>

Unit 3: <https://youtu.be/XCvTZzvzh2E?si=kd4eVMXfTTf-IsAL>

Unit 4: https://drive.google.com/file/d/1v_E9q_5UwgyVXF0BcR35u2LOgYVMgYa7/view

प्रथम वर्ष कला ,SEM-II

व्यावहारिक मराठी भाग -२ AEC- MAAET-121

अध्यासक्रम :

घटक	तपशील	श्रेयांक	घड्याळी तास
१.	पत्रलेखन पत्रलेखनाचे विविध प्रकार व घटक व स्वरूप	१	१५
२	- संवादलेखन - पारिभाषिक संज्ञा - निबंध लेखन	१	१५

संदर्भ ग्रंथ

- व्यावहारिक व उपयोजित मराठी – डॉ. प्रभाकर जोशी , डॉ .वासुदेव वळे ,प्रशांत पब्लिकेशन.
- व्यावहारिक मराठी –ल.रा.नासिराबादकर .

CO 1 पत्र लिहिता येईल व पत्राचे इतर प्रकार समजतील .

CO 2 संवाद लेखन करता येईल .

CO 3 कार्यालयीन पत्रव्यवहार करता येईल .

CO 4 पारिभाषिक संज्ञा समजतील .

F.Y. BSC,BCS,VOC,BBA &ALL SCI DEPT Semester II

Title of the Course	II –SEMESTER HIAET-121 सामान्य हिंदी –II [कहानी,कविता और व्यावहारिक हिंदी]	Number of Credits : 02
Course Code	HIAET-121 सामान्य हिंदी – II	

Unit No.	Title of Unit and Contents	No. of Lectures
I	अ) कहानी विधा – १.उसने कहा था- चंद्रधर शर्मा गुलेरी २. खेल- जैनेन्द्र कुमार ३.लाल पान की बेगम- फनीश्वरनाथ रेणु ४.पार्वती एक- दीप्ती खंडेलवाल	10
II	ब) कविता विधा – १.तोड़ती पत्थर- निराला २.हम दीवानों की क्या हस्ती- भगवती चरण वर्मा ३.अकाल और उसके बाद- नागार्जुन ४.साथी दुःख से घबराता हैं- नीरज	10
III	क] पाठ्यपुस्तकेत्तर 1.कल्पना विस्तार 2.पारिभाषिक शब्दावली १.कल्पना विस्तार] विषय:- १[जहाँ सुमति वहाँ सम्पति नाना, २[जिन खोजा तिन पाइयां गहरे पानी पैठी, ३[मन के हारे हार हैं.मन के जीते जीत ४[वही मनुष्य हैं कि जो मनुष्य के लिए मरे, ५[पराधीन सपने हूँ सुख नहीं २.पारिभाषिक शब्द] अंग्रेजी के 30 शब्द हिंदी पर्याय :-	10

	1)ACCOUNT-लेखा/ खाता 2)BILL-विधायक 3) CIRCULAR-परिपत्र 4) COMMISSION-आयोग 5) DESIGNATION-पदनाम 6) DIRECTOR-निर्देशक 7) EMPLOYEE-कर्मचारी 8) FUND-निधि 9) FACULTY-संकाय 10) GRANT-अनुदान 11) HEAD-प्रमुख 12) INVESTIGATER-अन्वेषक 13) JUDGE-न्याय देनेवाला	
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14] ISSUE-जारी करना	
15] JUNIOR-कनिष्ठ	
16] LEAVE-छुट्टी/ अवकाश	
17] MANAGER-प्रबंधक	
18] MINISTER-मंत्री	
19] MINISTRY-मंत्रालय	
20] NOTICE-सूचना	
21] OFFICIAL- कार्यालयीन	
22] PLAN-योजना	
23] POST-पद	
24] QUALIFICATION-अहर्ता,योग्यता	
25] RECORD-अभिलेख/ रिकार्ड	
26] REGISTRATION-पंजीकरण	
27] SANCTION-स्वीकृति/ मंजूरी	
28] SECRETARY-सचिव	
29] TRANSFER-तबादला/ बदली	
30] UNDERTAKING-उपक्रम/ वचनबद्धता	
31] WHIP-सचेतक	

संदर्भ ग्रन्थ-

१ [हिंदी कथाधारा- सं.हिंदी अध्ययन मंडल,प्रा.रामकृष्ण मोरे महाविद्यालय,आकुर्डी पुणे- ४४

२ [काव्य वैभव- सं. हिंदी अध्ययन मंडल,प्रा.रामकृष्ण मोरे महाविद्यालय,आकुर्डी पुणे- ४४

अंक विभाजन- पूर्णांक= 50		
आंतरिक परीक्षा- 15 अंक शोध परियोजना,समूह चर्चा,मौखिक प्रस्तुति,क्षेत्रीय अध्ययन आदि।		
सत्रांत परीक्षा- 35 अंक		
समय- दो घंटे		पूर्णांक- 35
१. प्रथम इकाई पर प्रश्न] दो में से एक [१० अंक		
२ .द्वितीय इकाई पर प्रश्न] दो में से एक [१० अंक		
३.तृतीय इकाई पर प्रश्न] तीन में से एक निबंध लेखन [१० अंक		
४ .तृतीय इकाई] पत्राचार लेखन [५ अंक		

Course Outcomes (COs)**On completion of the course, the students will be able to:**

CO1	हिंदी कहानियों की गरिमा को समझ लेंगे।
CO2	चरित्र प्रधान कहानियों की जानकारी प्राप्त कर लेंगे।
CO3	घटना प्रधान कहानियों से परिचित हो जायेंगे।
CO4	कल्पना विस्तार का महत्व समझ लेंगे।
CO5	पारिभाषिक शब्दों की जानकारी प्राप्त कर लेंगे।
CO6	पारिभाषिक शब्दावली की महत्ता को समझ जायेंगे।

S.Y.B.C.A. (Science) Syllabus

CBCS Semester Pattern

Under Autonomy and NEP-2020

To Be Implemented from

Academic Year 2024-2025

**Courses Offered by B.C.A(Science) Department
at Second year of Graduation
Year 2024-25**

S.Y BCA(Science) Semester III			
Major B.C.A.(Science) Courses			
Semester	Course code	Title of the paper	Credits
III	BSMAT-231	Data Structures Using 'C'	2
	BSMAT-232	Python Programming	2
	BSMAP-233	Data Structures Lab	2
	BSMAP-234	Python Programming Lab	2
Vocational Skill Courses (VSC) Related to Major			
III	BSVST-231	Object Oriented Software Engineering	2
Minor			
III	ELCMIT-231	Analogue and Digital Systems	2
	ELCMIP-232	Electronics Practical Lab-1	2
FP			
III	BSFPP-231	Field Project	2
AEC			
III	ENAET-231	English Communication & Soft Skill-I	2
CC			
III	CCHRT-231	Human Rights-I	2
1 OE/GE Subject for Third Semester Select from Arts or Commerce Basket			
S.Y BCAScience Semester IV			
Major B.C.A.(Science) Courses			
II	BSMAT-241	Object Oriented Programming using C++	2
	BSMAT-242	Web Technology	2
	BSMAP-243	Object Oriented C++ Programming Lab	2
	BSMAP-244	Web Technology Lab	2
SEC for BCA (Science)			
IV	STSET-241	Applied Statistics	2
Minor			
IV	ELCMIT-241	Computer Instrumentation	2
	EICMIP-242	Electronics Practical Lab-2	2
CEP			
IV	BSCEP-241	Community Engagement and Service	2
AEC			
IV	ENAET-241	English Communication & Soft Skill-II	2
CC			
IV	CCCST-241	Cyber Security-I	2
1 OE/GE Subject for Fourth Semester Select from Arts or Commerce Basket			

SEMESTER III																							
NEP-2020: Second Year UG Major BCA(Science) Course Code: BSMAT-231 Course Type: Theory Course Name: Data Structures using 'C' Credits allotted: 2 Credits Lectures allotted: 30 Lectures																							
	<table border="1"> <thead> <tr> <th>Chapter No</th><th>Name of the Chapter</th><th>Lectures Assigned</th></tr> </thead> <tbody> <tr> <td>1</td><td>Introduction to data structure</td><td>4L</td></tr> <tr> <td>2</td><td>Array as a data structure</td><td>4L</td></tr> <tr> <td>3</td><td>Linked List</td><td>7L</td></tr> <tr> <td>4</td><td>Stack and Queue</td><td>5L</td></tr> <tr> <td>5</td><td>Tree</td><td>5L</td></tr> <tr> <td>6</td><td>Graph</td><td>5L</td></tr> </tbody> </table>	Chapter No	Name of the Chapter	Lectures Assigned	1	Introduction to data structure	4L	2	Array as a data structure	4L	3	Linked List	7L	4	Stack and Queue	5L	5	Tree	5L	6	Graph	5L	
Chapter No	Name of the Chapter	Lectures Assigned																					
1	Introduction to data structure	4L																					
2	Array as a data structure	4L																					
3	Linked List	7L																					
4	Stack and Queue	5L																					
5	Tree	5L																					
6	Graph	5L																					
MODULE-1 [12L+3T]																							
	Course Contents																						
Unit I	Introduction to data structure	[4L]																					
	1.1 Data type and data object 1.2 Abstract Data Type (ADT), Type of data structure 1.3 Algorithm analysis 1.3.1 Space and Time complexity 1.3.2 Asymptotic notation – BigO, OmegaΩ																						
Unit II	Array as a data structure	[4L]																					
	2.1 Array representation- Row and column major 2.2 Sorting techniques with time complexity: Bubble sort, Insertion sort, Merge sort, Quick sort. 2.3 Searching techniques with time Complexity: Linear search, Binary Search																						
Unit III	Linked List	[7L]																					
	3.1 Introduction 3.2 Representation -Static &Dynamic 3.3 Types of linked lists- singly, doubly, circular 3.4 Operations-create, display, insert, delete, reverse, search, sort, concat,merge 3.5 Applications –single variable polynomial manipulation																						
MODULE-2 [12L+3T]																							
Unit IV	Stack and Queues	[5L]																					

	4.1 Introduction 4.2 Representation -Static & Dynamic 4.3 Operations– push, pop 4.4 Applications of Stack – Recursion, Infix to postfix, Infix to prefix ,postfix evaluation 4.5 Representation of Queues -Static &Dynamic 4.7 Operations on Queues– insert, delete 4.8 Types of Queues- Circular Queue Priority queue 4.9 Real world Applications of queue	
Unit VI	Tree	[5L]
	6.1 Introduction 6.2 Tree terminologies- all definitions, root, leaf, level, height, depth 6.3 Binary tree 6.3.1 Types 6.3.2 Types of Traversal– Preorder, Inorder, Postorder 6.3.3 Representation – Static &Dynamic 6.4 Binary Search Tree (BST)	
Unit VII	Graph	[5L]
	7.1 Introduction 7.2 Graph terminologies 7.3 Representation – Adjacency matrix, Adjacency list, Adjacency multilist 7.4 Traversal– DFS, BFS 7.5 Applications: AOV network – Topological sort, AOE network – Critical path	
Course Outcome After successfully completing this course, students will be able to: CO1: Recall different types of data. CO2: Identify linear and Non-linear data structures. CO3: Recognize particular data structure as per the need of application. CO4: Choose appropriate data structures. CO5: Illustrate linear and nonlinear data structure diagrammatically. CO6: Compare linear and nonlinear data structures. CO7: Design different types of trees and Graphs for given data. CO8: Apply the knowledge data structure for various data.		

SEMESTER III**NEP-2020: Second Year UG Major BCA(Science)****Course Code: BSMAT-232****Course Type: Theory****Course Name: Python Programming****Credits allotted: 2 credits****Lectures allotted: 30 Lectures**

Chapter No	Name of the Chapter	Lectures Assigned
1	Introduction to Python	5L
2	Python Strings	5L
3	Python Tuples	5L
4	Python Sets	6L
5	Python Dictionary & Functions	9L

MODULE-1 [12L+3T]

	Course Contents	
Unit I	Introduction to Python	[5L]
	1.1. Starting the Interpreter, Use of Python 1.2. Basic Python Program 1.3. Immediate/Interactive mode 1.4. Script Mode Programming 1.5. Integrated Development Environment (IDE) 1.6. Python's Comments, Indentation and Standard data types 1.7. Python operator, Decision making Statement 1.8. Python – Loops	
Unit II	Python Strings	[5 L]
	2.1. Concept, Accessing Values in Strings. 2.2. Escape characters 2.3. String special operations 2.4. String formatting operator 2.5. Triple quotes 2.6. Built-in String Methods	
Unit III	Python Tuples	[5 L]
	3.1. Creating & deleting tuples 3.2. Accessing values in a tuple 3.3. Updating tuples, delete tuple elements 3.4. Basic tuple operations 3.5. Indexing, slicing and Matrices, built-in tuple functions	
MODULE-2 [12L+3T]		
Unit IV	Python Sets	[6 L]

	4.1. Creating & changing set 4.2. Removing elements 4.3. Python Set Operations 4.4. Built-in Functions with Set	
Unit V	Python Dictionary & Functions	[9 L]
	5.1. Concept, Creating a dictionary 5.2. Change or add elements in a dictionary 5.3. Python Dictionary Methods 5.4 Defining a function (def) 5.5 Function arguments - Pass by value, Keyword 5.6 Return functions & Anonymous functions 5.7 Scope of Variables	

Reference Books:

- 1.“The Python Language Reference Manual (version 3.2)” by Guido van Rossum, and Fred L. Drake, Jr. (Editor)
2. Introducing Python- Modern Computing in Simple Packages – Bill 3. Lubanovic, O.,Reilly Publication Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress

Course Outcomes:

After studying this course, students will be able to.

CO1 understand why Python is a useful scripting language for developers

CO2 define the fundamental Python syntax and semantics;

CO3 explain the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python;

CO4 understand the proficiency in the handling of strings and functions;

CO5 explain the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets;

CO6 determine the commonly used operations involving file systems and regular expressions.

NEP-2020: Second Year UG Major BCA(Science) Course Code: BSMAP-233 Course Name: Data Structures Lab Lectures allotted: 60 Lectures		
Section A: Data Structures		
Sr. No.	Assignment	No of Sessions
1.	Non-Recursive Sorting Techniques 1. Bubble Sort 2. Insertion Sort	01
2.	Recursive Sorting Techniques 1. Quick Sort 2. Merge Sort	01
3.	Searching Techniques 1. Linear search 2. Binary Search	02
4.	Linked List 1. Linked List 2. Singly Circular Linked List 3. Doubly Linked List 4. Doubly Circular Linked List	04
5.	Stack 1. Static Stack Implementation 2. Dynamic Stack Implementation	01
6.	Queue 1. Static Queue Implementation 2. Dynamic Queue Implementation	02
7.	Binary Search Tree (Dynamic)	02
8.	Graph 1. Adjacency Matrix Representation 2. Adjacency List Representation In-degree and Out-degree calculation	02
	Total 15	

	SEMESTER III	
	NEP-2020: Second Year UG Major BCA(Science)	
	Course Code: BSMAP-234	Course Type: Practical
	Course Name: Python Programming Lab	Credits allotted: 2 credits
	Lectures allotted: 60 Lectures	
Python Programming Laboratory		
Sr. No.	Assignment	No of Sessions
1.	Basic Python	02
2.	Python Strings	03
3.	Python Tuple	03
4.	Python Set	03
5.	Python Dictionary	02
6.	Functions in Python	02
	Total 15	
Course Outcome After studying this course, student will able to – CO1 create a program, Test and Debug the Python Programs; CO2 use functions and represent Compound data using Lists, Tuples and Dictionaries; CO3 implement Conditionals and Loops for Python Programs; CO4 implement functions to perform various operations; CO5 implementation of various applications using Python; CO6 design database applications and GUI applications.		

SEMESTER III																				
NEP-2020: Second Year Vocational Skill Courses (VSC) UG BCA(Science) Course Code: BSVST-231 Course Name: Object Oriented Software Engineering Credits allotted: 2 credits Lectures allotted: 30 Lectures																				
<table border="1"> <thead> <tr> <th>Chapter No</th><th>Name of the Chapter</th><th>Lectures Assigned</th></tr> </thead> <tbody> <tr> <td>1</td><td>Introduction to Object-Oriented Programming</td><td>2L</td></tr> <tr> <td>2</td><td>Overview of UML</td><td>5L</td></tr> <tr> <td>3</td><td>Structural Diagrams</td><td>8L</td></tr> <tr> <td>4</td><td>Behavioral Diagrams</td><td>8L</td></tr> <tr> <td>5</td><td>Interaction Diagrams</td><td>7L</td></tr> </tbody> </table>			Chapter No	Name of the Chapter	Lectures Assigned	1	Introduction to Object-Oriented Programming	2L	2	Overview of UML	5L	3	Structural Diagrams	8L	4	Behavioral Diagrams	8L	5	Interaction Diagrams	7L
Chapter No	Name of the Chapter	Lectures Assigned																		
1	Introduction to Object-Oriented Programming	2L																		
2	Overview of UML	5L																		
3	Structural Diagrams	8L																		
4	Behavioral Diagrams	8L																		
5	Interaction Diagrams	7L																		
MODULE-1 [12L+3T]																				
	Course Contents																			
Unit I	Introduction to Object-Oriented Programming	[2L]																		
	1.1 Basics of objects and classes 1.2 Encapsulation, inheritance, and polymorphism 1.3 Interfaces																			
Unit II	Overview of UML	[5L]																		
	2.1 Introduction of UML 2.2 UML-Building Blocks 2.3 Rules to connect the building blocks 2.4 Common mechanisms of UML 2.5 Architecture of UML																			
Unit III	Structural Diagrams	[8L]																		
	3.1 Logical Diagrams: 3.1.1 Class Diagrams 3.1.2 Object Diagram 3.2 Physical Diagrams: 3.2.1 Component Diagrams 3.2.2 Deployment Diagrams 3.3 Case Studies																			
MODULE-2 [12L+3T]																				
Unit IV	Behavioral Diagrams	[8 L]																		

	4.1 Use Case Diagrams 4.2 State Machine Diagrams: 4.2.1 Activity Diagrams 4.2.2 State Chart Diagrams 4.3 Case Studies	
Unit V	Interaction Diagrams	[7L]
	5.1 Collaboration Diagrams 5.2 Sequence Diagrams 5.3 Case Studies	

Reference Books:

1. "Object-Oriented Analysis and Design with Applications" by Grady Booch, Robert A. Maksimchuk, et al.
2. "Design Patterns: Elements of Reusable Object-Oriented Software" by Erich Gamma, Richard Helm, et al.
3. "Agile Principles, Patterns, and Practices in C#" by Robert C. Martin and Micah Martin.

Course Outcomes:

After studying this course, students will able to.

CO1 understand the principles of object-oriented programming and design

CO2 define the significance of OOP concepts

CO3 discuss various testing techniques to verify the correctness and reliability of object-oriented software systems.

CO4 understand software components and modules of object-oriented design principles.

CO5 explain the importance of requirement analysis and design in the software development process.

Semester III	
Analogue and Digital Systems	
Course code: ELCMIT-231	No. of Credits: 2

Unit No.	Unit title and Contents
Module 1	
I	Combinational Circuits (5) Half adder, Full adder circuit and its operation, Parallel binary adder, Half Subtractor, and full Subtractor Multiplexer(2:1 and 4:1), De-multiplexer (1:2 and 1:4), Encoder, Priority encoder, Decoder, BCD to seven segment decoder
2	Sequential Circuits (8) Difference between combinational and sequential circuits, the Concept of clock and types, synchronous and asynchronous circuits, Latch, S-R-latch, D-latch, S-R, J-K, and D flip-flop their operation and truth tables, race around condition, Master-slave JK flip flop, T flip flop (Timing diagram and truth tables). The basic building block of the counter, Ripple counter, up counter, down counter, Up-Down counter, Concept of modulus counters, Decade counter, Shift registers: SISO, SIPO, PISO, PIPO, Ring counter, Universal 4-bit shift register
3	Semiconductor memory (5) Memory Architecture, Memory parameters (Access time, speed, capacity, cost), Concept of Address Bus, Data Bus, Control Bus, Memory Hierarchy, Types of semiconductor Memories, Data Read/ Write process, Vertical and Horizontal Memory Expansion, Role of Cache memory,
Module 2	
1	POWERSUPPLY (7) Block Diagram of Regulated Power Supply, Rectifiers (half wave, wave, Bridge), rectifier with capacitor-filter, Use of Zener Diode as a Voltage Regulator, IC 78XX and 79XX as regulator, Block Diagram and explanation of SMPS, Block diagram and explanation of UPS
2	OSCILLATORS (5) Concept of Feedback, Barkhausen Criteria, Low frequency Phase shift oscillator, High frequency crystal oscillator, IC555 as Astable multivibrator used as square wave generator
Text and Reference Books:	
1.	Malvino Electronics Principles By- Malvino A. P. Ed-6, Pub-McGraw Hill
2.	publication. Digital Logic and Computer Design By -M. Morris Mano Ed-7 Pub-PHI
3.	Publication. Modern Digital Electronics By Jain R.P. Ed-4, Pub- Tata McGraw Hill publication India

Course Outcomes (COs): On completion of the course, the students will be able to:	
CO1: Explain needs and operation details of elementary electronic circuits and systems such as power supplies and oscillators etc.	
CO2: Study and design simple combinational circuits (construction and operations) using digital techniques	
CO3: Study and design simple sequential circuits (construction and operations) using digital techniques.	
CO4: Understand concept of Clock and timing diagram in sequential circuits used in digital systems.	
CO4: Design and Explain working principles of various sequential circuits used in digital systems.	

CO5: Understand and illustrate different types semiconductor memory.
CO6: Understand Memory organization, and need and methods of memory expansion.
Semester III
Electronics practical Lab-1
Course Code: ELCMIP-232 Number of Credits: 02

Sr. No.	Title of Experiment/Practical
Total 10 experiments are to be performed by student. Any five experiments from each group	
Group A	
1.	Study of different types of diodes (PN junction diode, LED, Photo diode)
2.	Study of rectifier (Half, Full and Bridge) circuits along with filters
3.	Study of Zener diode as Voltage regulator.
4.	Study of CE characteristics of Bipolar Junction Transistor
5.	Study of characteristics of JFET / MOSFET
6.	Study of transistor as a switch.
7.	Study of RC coupled transistor amplifier.
8.	Study of IC 555 as an Astable multivibrator.
9.	Study of Transistorized Phase shift Oscillator.
Group B	
1.	Study of different types of logic gates and verification of De-Morgan's laws.
2.	Interconversion of logic gates using NAND and NOR gates.
3.	Study of parity code generator and error detector.
4.	Study of Half adder and full adder
5.	Study of Multiplexer and De-multiplexer (4:1 MUX and 1:4 DEMUX)
6.	Study of SR and JK flip flops (T and D as modification)
7.	Study of 4-bit UP/DOWN counter.
8.	Study of Modulo counter using IC 7490. (Mod-2 , Mod-5 and Mod 10)
9.	Study of 4-bit Shift register.

Course Outcomes (COs): On completion of the course, the students will be able to:	
CO1	Describe the circuit diagrams using different symbols various components.
CO2	To design and connect experimental board circuit.
CO3	Discuss the working of circuits of individual experiments.
CO4	To acquire skills of studying and analyzing the responses of electronic circuits.
CO5	Analyze observations of each experiment based on the aim and objectives of an experiment.
CO6	Evaluate observed outputs with expected theoretical outputs.
CO7	Discuss the need and requirement of electronic equipment in daily life.
CO8	Reconstruct the given circuit to obtain an electronic gadget.

Community Engagement and Field Project Guidelines

(Government of Maharashtra)

Ref: <https://dhepune.gov.in/wp-content/uploads/2017/01/RPT-20221020-Dr-R-D-Kulkarni-Committee-Report-1.pdf> (Kulkarni Committee report 04-11-2022)

Community Engagement and Field Projects

The field-based learning/project should attempt to provide opportunities for students to understand the different socio-economic contexts. It should aim at giving students exposure to development-related issues in rural and urban settings. It will provide opportunities for students to observe situation in rural and urban contexts, and to observe and study actual field situations regarding issues related to socio-economic development. Students should be given opportunities to gain a first-hand understanding of the policies, regulations, organizational structures, processes, and programmes that guide the development process. They should have opportunity to gain an understanding of the complex socio-economic problems in the community, and innovative practices required to generate solutions to the identified problems.

The curricular component of 'community engagement and service' seeks to expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems. This component will include participation in activities related to National Service Scheme (NSS), National Cadet Corps (NCC), adult education/literacy initiatives and mentoring school students.

A minimum of 4-6 weeks of summer work, either on university campus in activities related to preservation of environment/biodiversity or community-based work in the neighboring community (through NSS unit) or field-level work with a recognized NGO or regional case studies programme at Villages may be undertaken as a part of Field projects.

As per UGC guidelines, Regional Case Study Course or Social Entrepreneurship Course, with 02 Credits, can be floated an optional mode or as add-on-credit with total duration of 30 hours. At least 50% of the course is to be done compulsorily in the field for all students.

Ability Enhancement Course, Semester-III,

ENAET-231: English Communication and Soft Skills-I; 2 Credits, 30 L

Unit-1: Defining Soft Skills [10 L]

- i. Introduction to soft skills
- ii. Soft skills and hard skills
- iii. Enhancing soft skills
- iv. Significance of soft skills in today's globalized world

Unit-2: Motivation, Goal Setting and Self-Esteem [10 L]

- i. What is motivation?
- ii. Importance of goal setting
- iii. What is self-esteem?
- iv. The power of positive thinking

Unit-3: Time Management [10 L]

- i. Importance of time management
- ii. Avoiding procrastination
- iii. Developing priority-management skills
- iv. Strategies for managing time

Course Outcome- At the end of course the students will be able to -

CO-1: Define soft skills.

CO-2: Distinguish between soft skills and hard skills.

CO-3: Define motivation and understand the importance of goal setting.

CO-4: Analyse the concept of self-esteem.

CO-5: Examine the power of positive thinking.

CO-6: Develop strategies for managing time.

CO-7: Relate soft skills to real life.

Co-Curricular Course (CC), Sem-III
CCHRT-231: Human Rights-I **No. of Credits: 2**

1. Basic Concept **[8 L]**

- a) Human Values- Dignity , Liberty, Equality , Justice, Unity in Diversity, Ethics and Morals
- b) Meaning and significance of Human Rights Education

2. Perspectives of Rights and Duties **[7 L]**

- a) Rights: Inherent-Inalienable-Universal- Individual and Groups
- b) Nature and concept of Duties
- c) Interrelationship of Rights and Duties

3. Introduction to Terminology of Various Legal Instruments **[8 L]**

- a) Meaning of Legal Instrument- Binding Nature
- b) Types of Instruments: Covenant-Charter-Declaration-Treaty-Convention-Protocol-Executive Orders and Statutes

4. United Nations and Human Rights **[7 L]**

- a. Brief History of Human Rights- International and National Perspectives
- b. Provision of the charters of United Nations
- c. Universal Declaration of Human Rights- Significance-Preamble

References:

1. Donnelly, Jack. **Universal Human Rights in Theory and Practice**. Cornell University Press, 2013.
2. Nickel, James W. **Making Sense of Human Rights**. Wiley-Blackwell, 2007.
3. Clapham, Andrew. **Human Rights: A Very Short Introduction**. Oxford University Press, 2007.
4. Freeman, Michael. **Human Rights: An Interdisciplinary Approach**. Polity Press, 2017.
5. Ishay, Micheline R. **The History of Human Rights: From Ancient Times to the Globalization Era**. University of California Press, 2008.
6. Mertus, Julie A. **The United Nations and Human Rights: A Guide for a New Era**. Routledge, 2005.
7. Hunt, Lynn. **Inventing Human Rights: A History**. W.W. Norton & Company, 2008.
8. Goodhart, Michael, editor. **Human Rights: Politics and Practice**. Oxford University Press, 2013.
9. Moyn, Samuel. **The Last Utopia: Human Rights in History**. Harvard University Press, 2012.
10. Steiner, Henry J., Philip Alston, and Ryan Goodman. **International Human Rights in Context: Law, Politics, Morals**. Oxford University Press, 2007.

अ.न.	CCHRT-231: मानवी हक्क : परिचय (क्रेडिट: 2, 30 L)	
I	मूलभूत संकल्पना अ) मानवी मूल्ये- प्रतिष्ठा, स्वातंत्र्य, समानता, न्याय, विविधतेतील एकता, नैतिकता आणि नैतिकता ब) मानवी हक्क शिक्षणाचा अर्थ आणि महत्त्व	०८
II	अधिकार आणि कर्तव्यांचा दृष्टीकोन अ) हक्क: अंतर्निहित-अविभाज्य-सार्वत्रिक-वैयक्तिक आणि गट ब) कर्तव्याचे स्वरूप आणि संकल्पना क) हक्क आणि कर्तव्यांचा परस्परसंबंध	०७
III	विविध कायदेशीर साधनांच्या शब्दावलीचा परिचय अ) कायदेशीर साधनाचा अर्थ- बंधनकारक निसर्ग ब) साधनांचे प्रकार: करार-सनद-घोषणा-करार-कन्व्हेन्शन-प्रोटोकॉल- कार्यकारी आदेश आणि कायदे	०८
IV	संयुक्त राष्ट्र आणि मानवाधिकार अ) मानवी हक्कांचा संक्षिप्त इतिहास- आंतरराष्ट्रीय आणि राष्ट्रीय दृष्टीकोन ब) संयुक्त राष्ट्रांच्या चार्टरची तरतूद क) मानवी हक्कांची सार्वत्रिक घोषणा- महत्त्व- प्रस्तावना	०७

SEMESTER IV

	SEMESTER IV
	NEP-2020: Second Year UG Major BCA(Science)

Course Code: BSMAT-241		Course Type: Theory
Course Name: Object Oriented Programming Using C++		
Credits allotted: 2 credits		
Lectures allotted: 30 Lectures		

	3.1. Structures and class, Class, Object, Access specifies, 3.2. Class members, 3.3. Defining member functions: Inside and outside the class definition, 3.4. Creating objects. String class, operation on string, 3.5. 'this' pointer. 3.6. Array and Array of Objects 3.7 Type Casting in C++ Book 2: Chapter 5 Introduction to C++ Classes Page No: 88 to 132 This pointer page No: 202 to 207 Book 3 Module 4: Array, String & Pointers Page No:130 to175	
Unit IV	Function in C++	[5L]
	4.1. Call by reference, Return by reference, 4.2. Function overloading and default arguments 4.3. Inline function 4.4. Passing and returning objects from functions, Static class members 4.5. Friend Concept – Function, Class Book 2 : Chapter 3 Default Function Argument Page No: 47 to 57, Function Overloading Page No: 247 to 252 Inline function : Module 8 Classes and Objects Page No: 130 to 175	
MODULE-2 [12L+3T]		
Unit V	Constructors and Destructors	[4L]
	5.1. Memory allocation and static data members 5.2. Definition of constructor Types of constructors: Default Constructor 5.3. Constructor with default arguments 5.4. Parameterized Constructor 5.5. Copy Constructor 5.6. Overloaded constructors in a class 5.7. Destructors Book 2 Chapter 6 Constructor and Destructor Functioning Page No: 141 to 180	
Unit VI	Inheritance	[4L]

	6.1. Introduction 6.2. Types of Inheritance: Single inheritance Multiple inheritance, Multilevel inheritance Hierarchical inheritance Hybrid inheritance. 6.3. Derived Class Constructors and Destructors 6.4. Ambiguity in multiple Inheritances, virtual base classes, Abstract base class. Book 2 Chapter 10 Class Inheritance Page No: 331 to 341 Book3 Module 10 Inheritance, Virtual Function and Polymorphism Page No: 409 to 440	
Unit VII	Virtual Function & Polymorphism	[4L]
	7.1. Introduction, Pointer to object, Pointer to derived 7.2.class, Overriding member functions, Virtual function, Rules for virtual functions, pure virtual function, Run- time type information (RTTI) Book 3 Module 10 ,Inheritance, Virtual Functions and Polymorphism Page No:441 to 455	
Unit VIII	Files and Exception Handling	[3L]
	8.1. Introduction to File 8.2. Classes for File Stream and Operations 8.3. Opening and Closing of File 8.4. Introduction to Exception handling Mechanism Book3 Module 12 Exceptions, Templates & Other Advanced Topics Page No: 503 to 513 Book3 Module 11 File I/O Page No:480 to 501	
Course Outcome After successfully completing this course, students will be able to: CO1: Describe OOPs concepts CO2: Define and identify the use of input and output stream in C++. CO3: Implement the concept of classes and objects CO4: Use functions and pointers in your C++ program CO5: Describe and use constructors and destructors. CO6: An ability to develop a program using any type of Inheritance. CO7: Demonstrate the use of various OOPs concepts with the help of programs.		

Reference Books:-

1. C++ Programming Language by Bjarne Stroustrup
2. Learning C++ (A Hands On Approach) by Eric Naglet
3. C++ A beginners Guide by Herbert Schildt
4. Let us C++ by– Yashwant Kanitkar
5. Mastering C++ by Venugopal, TRavishankar, Rajkumar THM Pub.
6. Thinking in C++ 2nd Edition by Bruce Eckel, Prentice Hall Pub.

	SEMESTER																				
IV																					
	NEP-2020: Second Year UG Major BCA(Science) Course Code: BSMAT-242 Course Type: Theory Course Name: Web Technology Credits allotted:2 credits Lectures allotted: 30 Lectures																				
	<table><tr><th>Chapter No</th><th>Name of the Chapter</th><th>Lectures Assigned</th></tr><tr><td>1</td><td>Introduction to PHP</td><td>3L</td></tr><tr><td>2</td><td>Web Techniques</td><td>5L</td></tr><tr><td>3</td><td>Functions and Arrays</td><td>7L</td></tr><tr><td>4</td><td>Object Oriented Programming</td><td>8L</td></tr><tr><td>5</td><td>Databases</td><td>7L</td></tr></table>			Chapter No	Name of the Chapter	Lectures Assigned	1	Introduction to PHP	3L	2	Web Techniques	5L	3	Functions and Arrays	7L	4	Object Oriented Programming	8L	5	Databases	7L
Chapter No	Name of the Chapter	Lectures Assigned																			
1	Introduction to PHP	3L																			
2	Web Techniques	5L																			
3	Functions and Arrays	7L																			
4	Object Oriented Programming	8L																			
5	Databases	7L																			
	MODULE-1 [12L+3T]																				
		Course Contents																			
	Unit I	Introduction to PHP	[3L]																		
		1. HTTP basics, Introduction to web server and web browser 2. Introduction to PHP 3. PHP - Lexical structure, Language basics.																			
	Unit II	Web Techniques	[5L]																		
		1. Variables 2. Server information 3. Processing forms 4. SSL																			
	Unit III	Functions and Arrays	[7L]																		

	1. Defining and calling a function 2. Default parameters 3. Variable parameters, Missing parameters 4. Variable function, Anonymous function 5. Indexed Vs Associative arrays 6. Identifying elements of an array 7. Storing data in arrays 8. Multidimensional arrays 9. Extracting multiple values 10. Traversing arrays 11. Sorting Using arrays	
MODULE-2 [12L+3T]		
Unit IV	Object Oriented Programming	[8L]
	1. Classes 2. Objects 3. Introspection 4. Serialization 5. Inheritance 6. Interfaces 7. Encapsulation	
Unit V	Databases	[7L]
	1. Using PHP to access a database 2. Relational databases and SQL 3. PEAR DB basics 4. Advanced database techniques	
Course Outcome After successfully completing this course, students will be able to: CO1: understand basic concepts of HTTP & PHP; CO2 describe the concept of web techniques; CO3: describe the concepts of Functions & Arrays; CO4: explain the Object Oriented Programming concepts; CO5: illustrate the different methods to interact with the databases; Reference Books:- 1 Programming PHP By Rasmus Lerdorf and Kevin Tatroe, O'Reilly publication 2. Beginning PHP5, Wrox publication 3. PHP for Beginners, SPD publication		

SEMESTER IV		
NEP-2020: Second Year UG Major BCA(Science)		
Course Code: BSMAP-243 Course Type: Practical Course Name: Object Oriented C++ Programing Lab Credits allotted:2 credits Lectures allotted: 60 Lectures		
Section : Object Oriented C++ Programing		
Sr. No.	Assignment	No of Sessions
1.	Introduction to C++	01
2.	Classes and Objects	02
3.	Constructors	02
4.	Memory Allocation	02
5.	Functions	02
6.	Inheritance	03
7.	Files and Exception Handling	03
	Total 15	
	Course Outcome After successfully completing this course, students will be able to: CO1: Understand basic Structure of the C ++ PROGRAMMING, declaration and usage of variables CO2: Understand C++ programs using Class and operators CO3: Exercise conditional and iterative statements CO4: Apply object oriented programming concepts using class and objects CO5: Understand for C++ programs using Pointers to access arrays, strings and functions CO6: Understand C++ programs using pointers and allocate memory using dynamic memory management functions.	

NEP-2020: Second Year UG Major BCA(Science)**Course Code: BSMAP-244****Course Type: Practical****Course Name: Web Technology Lab****Credits allotted: 2 credits****Lectures allotted: 60 Lectures****Section B: Web Technology Laboratory**

Sr. No.	Assignment	No of Sessions
1.	PHP Programming	02
2.	Functions	03
3.	Arrays	03
4.	Inheritance and Interfaces	03
5.	Accessing Databases	04
	Total 15	

Course Outcome**After successfully completing this course, students will be able to:**

- CO1: understand simple programming in PHP using flow control statements;
- CO2: illustrate user defined & library functions & their implementation in programs;
- CO3: use of Arrays;
- CO4: illustrate Object Oriented Programming concepts;
- CO5: build Dynamic website using PHP & Database connectivity;

Skill Enhancement Course (SEC) - SEM -IV**Course Code: STSET-241****Course Title: Applied Statistics****No. of Credits: 2****Lectures: 30 Hrs.****Pre-requisites: None****TOPICS/CONTENTS:****UNIT 1: Correlation (For ungrouped data)****[5 L]**

- 1.1 Concept of bivariate data, scatter diagram, its interpretation, concept of correlation, Positive correlation, negative correlation, zero correlation.
- 1.2 Karl Pearson's coefficient of correlation, properties of correlation coefficient, Interpretation of correlation coefficient, properties of correlation coefficient (without proof), coefficient of determination with interpretation.
- 1.3 Spearman's rank correlation coefficient (formula with and without ties).
- 1.4 Numerical problems

UNIT 2: Regression (for ungrouped data)

[10 L]

- 2.1 Concept of linear regression.
- 2.2 Illustrations, appropriate situations for regression and correlation
- 2.3 Linear regression: Fitting of line of regression using least square method (stepwise procedure expected).
- 2.4 Regression coefficient - interpretation and properties
- 2.5 Nonlinear regression models: Second degree curve, exponential curves of the type $Y = ab^x$ (stepwise procedure expected).
- 2.6 Numerical problems related to real life situations

UNIT 3: Time Series

[7 L]

- 3.1 Meaning and utility
- 3.2 Components of time series
- 3.3 Additive and multiplicative models
- 3.4 Methods of estimating trend: moving average method, least squares method and exponential smoothing method (with graph and interpretation).
- 3.5 Numerical problems related to real life situations

UNIT 4: Index Numbers

[8 L]

- 4.1 Introduction and scope of Index Numbers, Definition, types and Meaning of Index Numbers.
- 4.2 Problems / Considerations in the construction of Index Numbers.
- 4.3 Simple and weighted Price Index Numbers based on price relatives and aggregates.
- 4.4 Laspeyre's, Paasche's and Fisher's Index Numbers
- 4.5 Cost of Living Index Number, Methods of construction.
- 4.6 Base shifting, splicing and deflating
- 4.7 Real Index Numbers – BSE, NSE

References:

- 1. Fundamentals of Applied Statistics (3rd Edition), Gupta and Kapoor, S. Chand and Sons, New Delhi, 1987
- 2. Fundamentals of Statistics, Vol. 1, Sixth Revised Edition, Goon, A. M., Gupta, M. K. and Dasgupta, B. (1983). The World Press Pvt. Ltd., Calcutta
- 3. Introduction to Linear Regression Analysis, Douglas C. Montgomery, Elizabeth A. Peck, G. Geoffrey Vining, Wiley
- 4. Time Series Methods, Brockwell and Davis, Springer, 2006.
- 5. Time Series Analysis, 4th Edition, Box and Jenkin, Wiley, 2008.
- 6. Ranjit Chitale : Statistical and Quantitative Methods, Nirali Prakashan, Pune

Course Outcomes:

After completion of this course, the student will be able to

- CO1: Understand the concept of correlation coefficient for bivariate data and interpret it.
- CO2: Calculate and interpret Spearman's rank correlation coefficient from given bivariate data.

CO3: Fit lines of regression for given bivariate data.

CO4: Fit curves (non-linear regression) for given bivariate data.

CO5: Understand components of time series and methods of measurement of trend.

CO6: Understand and calculate various types of index numbers

Semester IV	
Computer Instrumentation	
Course code: ELCMIT-241	No. of Credits: 2

Unit No.	Unit title and Contents
Module 1	
1	Sensors and Transducers (6) Introduction, Need and Definition of sensors and transducers, Classification of sensors: Active and passive sensors, Specifications of sensor: Accuracy, range, linearity, sensitivity, resolution, reproducibility, Temperature and Humidity sensors: Thermistor, LM-35, AD590 and DHT 11, Piezoelectric sensor, Optical sensor (LDR), Displacement sensor (LVDT), Passive Infrared sensor (PIR), Concept of Touch sensor and Ultrasonic sensor. (Pin diagrams, features and applications)
2	Operational Amplifier (8) Operational Amplifier: Block diagram, symbol, Characteristics of OP-AMP, Concept of virtual ground, Inverting and Non-inverting amplifier, OPAMP as an adder and subtractor, OP-AMP as an integrator and differentiator, Three OP-AMP instrumentation amplifier.
3	Signal Conditioning Circuits (4) Introduction and need of signal conditioning, voltage divider circuits, bridge circuits, filters, Sample and hold circuit.
Module 2	
1	DATA CONVERTERS (7) Need of Data converters, Digital to Analog converters (DAC) and Analog to Digital converter, Parameters of DAC, Types of DACs: weighted resistive network and R-2R ladder network. Study of DAC IC-0808 (Block diagram, Parameters) Parameters of ADC, Types of ADCs: Flash ADC, successive approximation ADC. Dual slope ADC. Study of ADC IC-0809 (Block diagram, Parameters).
2	Basics of Computer System (5) Basic Computer Organization, CPU block diagram and explanation of each block, Concept of Stack & its organization, I/O organization: need of interface, block diagram of general I/O interface.
Text and Reference Books:	
1.	Malvino Electronics Principles By- Malvino A. P. Ed-6, McGraw Hill publication.
2.	Modern Digital Electronics by Jain R.P. Ed-4, Pub- Tata McGraw Hill publication India
3.	Digital Logic and Computer Design By -M. Morris Mano Ed-7 Pub PHI Publication
4.	Process control Instrumentation Technology By - C.D. Johnson Ed-8 Pub-Pearson Publication.

Course Outcomes (COs): On completion of the course, the students will be able to:

- CO1: Define sensor and its parameters.
 CO2: Classify Sensors and discuss the need for signal conditioning circuits.
 CO3: Concept of Operational amplifier and its use in signal conditioning circuits.
 CO4: Analyze different types of ADCs and DACs.
 CO5: Compare the frequency response of different types of filters and discuss the need for selecting filters.
 CO6: Understand different blocks needed to design digital computer system.
 CO7: Understand and illustrate block diagram of central processing unit.
 CO8: Understand I/O organization and need of interfacing with general I/O interface.

Semester IV**Electronics practical Lab-2****Course Code: ELCMIP-242****Number of Credits : 02**

Sr. no.	Title of Experiment/ Practical
Total 10 experiments are to be performed by student. Any five experiments from each group	
Group A	
1	Study of LDR characteristics.
2	Study of Thermistor / AD-590 / DHT 11 / LM 35.
3	Study of LVDT as a displacement sensor.
4	Study of frequency response of active filter circuits(RC filters)
5	Study of Inverting and Non-inverting amplifier
6	Study of Adder and Subtractor using OP-Amp.
7	Study of Integrator and differentiator using OP-Amp.
8	Study of Sample and Hold circuit.(Using suitable IC e.g. IC1496)
9	Study of Switch Mode Power Supply (SMPS).(Using suitable IC e.g. IC 3524)
Group B	
1	Study of Crystal Oscillator using inverters.
2	Study of Universal 4-bit adder/subtractor.
3	Study of RAM and read/write action of RAM (using suitable IC e.g. IC 7489).
4	Study of Diode matrix ROM and read action of ROM.
5	Study of Priority Encoder using IC 74148/74147.
9	Study of R-2R Digital to Analog Converter.
7	Study of 3-bit Flash Analog to Digital Converter.
8	Study of BCD to 7-segment Display
6	Study of Keyboard matrix encoder

Course Outcomes (COs): On completion of the course, the students will be able to:

CO1	Identify different analog and digital electronic circuits.
CO2	Identify different sensors and analyze their response.
CO3	Recognize need of various circuit elements in analogue and digital systems.
CO4	To acquire skills of studying and analyzing the responses of electronic circuits.
CO5	Analyze observations of each experiment based on the aim and objectives of an experiment.
CO6	Evaluate observed outputs with expected theoretical outputs.
CO7	Discuss the need and requirement of electronic equipment in daily life.
CO8	Acquirers the skill of design and build his /her simple circuit ideas

Date: 27/06/2024

Community Engagement and Field Project Guidelines

(Government of Maharashtra)

Ref: <https://dhepune.gov.in/wp-content/uploads/2017/01/RPT-20221020-Dr-R-D-Kulkarni-Committee-Report-1.pdf> (Kulkarni Committee report 04-11-2022)

Community Engagement and Field Projects

The field-based learning/project should attempt to provide opportunities for students to understand the different socio-economic contexts. It should aim at giving students exposure to development-related issues in rural and urban settings. It will provide opportunities for students to observe situation in rural and urban contexts, and to observe and study actual field situations regarding issues related to socio-economic development. Students should be given opportunities to gain a first-hand understanding of the policies, regulations, organizational structures, processes, and programmes that guide the development process. They should have opportunity to gain an understanding of the complex socio-economic problems in the community, and innovative practices required to generate solutions to the identified problems.

The curricular component of 'community engagement and service' seeks to expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems. This component will include participation in activities related to National Service Scheme (NSS), National Cadet Corps (NCC), adult education/literacy initiatives and mentoring school students.

A minimum of 4-6 weeks of summer work, either on university campus in activities related to preservation of environment/biodiversity or community-based work in the neighboring community (through NSS unit) or field-level work with a recognized NGO or regional case studies programme at Villages may be undertaken as a part of Field projects.

As per UGC guidelines, Regional Case Study Course or Social Entrepreneurship Course, with 02 Credits, can be floated an optional mode or as add-on-credit with total duration of 30 hours. At least 50% of the course is to be done compulsorily in the field for all students.

Ability Enhancement Course, Semester-IV,

ENAET-241: English Communication and Soft Skills-II; 2 Credits, 30 L

Unit-1: Creative Thinking and Problem Solving [10 L]

- i. What is creative thinking?
- ii. Difference between critical and creative thinking
- iii. Importance of creative thinking in problem solving
- iv. Strategies for developing creative thinking for solving problems

Unit-2: Team Building [10 L]

- i. What is a team?
- ii. Strategies for resolving the interpersonal conflicts
- iii. Developing the interpersonal negotiation skills
- iv. Importance and significance of effective team building

Unit-3: Leadership [10 L]

- i. What are leadership skills?
- ii. Types of leadership
- iii. Developing leadership skills
- iv. Strategies for developing leadership

Course Outcome- At the end of course the students will be able to -

CO-1: Distinguish between critical and creative thinking.

CO-2: Explore strategies for developing creative thinking for solving problems.

CO-3: Analyse the concept of self-esteem and apply it to real life.

CO-4: Examine the power of positive thinking.

CO-5: Develop interpersonal negotiation skills for resolving interpersonal conflicts.

CO-6: Identify different types of leadership and choose strategies for developing leadership.

CO-7: Apply soft skills to real life.

Co-Curricular Course (CC), Sem-IV

CCCST-241: Cyber Security-I

No. of Credits: 2

Module-1:

Chapter 1: Overview of Networking Concepts

[7 L]

1. Basics of Communication Systems
2. Transmission Media
3. Topology and Types of Networks
4. TCP/IP Protocol Stacks
5. Wireless Networks
6. The Internet

Ref Book1(chapter 1 page no 3 to 28 and 552 to 568)

Chapter 2: Information Security Concepts

[8 L]

1. Information Security Overview: Background and Current Scenario
2. Types of Attacks
3. Goals for Security
4. E-commerce Security
5. Computer Forensics
6. Steganography

Ref Book2(chapter 1 page no 3 to 79)

Module-2:

Chapter 3: Security Threats and Vulnerabilities

[6 L]

1. Overview of Security threats
2. Weak / Strong Passwords and Password Cracking
3. Insecure Network connections
4. Malicious Code
5. Programming Bugs
6. Cyber crime and Cyber terrorism
7. Information Warfare and Surveillance

Ref Book3

Chapter 4: Cryptography / Encryption

[9 L]

1. Introduction to Cryptography / Encryption
2. Digital Signatures
3. Public Key infrastructure
4. Applications of Cryptography
5. Tools and techniques of Cryptography

Ref Book1 (chapter 8 page no 766 onwards)

Reference Book:

Ref Book 1 : Computer Networks By Andrew S. Tanenbaum, 5th Edition By Pearson Education

Ref Book 2 : Network Security: A Beginner's Guide, 3rd Edition by Eric Maiwald

Ref Book 3 : Handbook of Information Security: Threats, Vulnerabilities, Prevention, Detection, and Management, Volume 3 by Hossein Bidgoli, Wiley

Course Outcome:

CO1 : Understand the concepts of networking and it's type

CO2 : Interpret the concepts of Information Security

CO3 : Understand the concepts of Security Threats

CO4 : Describe insecure Network Connections, Cyber Crime

CO5 : Interpret the concepts of Basic Cryptography

CO6 : Define the tools and techniques of Cryptography

T. Y. B.C.A. (Science) Syllabus

CBCS Semester Pattern

**Under Autonomy and NEP-
2020 To Be Implemented from
Academic Year 2025-2026**

**Courses Offered by B.C.A(Science) Department
at Third year of Graduation
Year 2025-26**

Major B.C.A.(Science) Courses			
Semester	Course code	Title of the paper	Credit
V	BSMAT-351	Core Java	2
	BSMAT-352	Principles of Operating System	2
	BSMAT-353	Artificial Intelligence	2
	BSMAP-354	Core Java Programming Lab	2
	BSMAP-355	Operating Systems and AI Lab	2
VI	BSMAT-361	Advanced Java	2
	BSMAT-362	Data Mining	2
	BSMAT-363	Software Testing	2
	BSMAP-364	Advanced Java Lab	2
	BSMAP-365	Data Mining Lab	2
Vocational Skill Courses (VSC) Related to Major			
V	BSVST-351	Computer Networks	2
Major Elective			
V	BSMET-356A	Internet of Things	2
	BSMEP-357A	Internet of Things Lab	2
	OR		
	BSMET-356B	Advanced Python Programming	2
	BSMEP-357B	Advanced Python Lab	2
VI	BSMET-366A	Android Programming	2
	BSMEP-367A	Android Programming Lab	2
	OR		
	BSMET-366B	Basics of Data Analytics using spreadsheet	2
	BSMEP-367B	Basics of Data Analytics using spreadsheet Lab	2
Minor			
V	ELCMIT-351	Principles of Microcontroller and embedded systems	2
	ELCMIP-352	Electronics practical Lab-3	2
VI	ELCMIT-361	Principals of Communication Systems	2
	ELCMIP-362	Electronics practical Lab-4	2
Research Project			
V	BSRPP-351	Research Project	2
OJT			
VI	BSOJT-361	Individual Student OJT	4

SEMESTER V**NEP-2020: Third Year UG Major BCA(Science)****Course Code: BSMAT-351****Course Type: Theory****Course Name: Core Java****Credits allotted: 2 credits****Lectures allotted: 30 Lectures**

Chapter No	Name of the Chapter	Lectures Assigned
1	Java Fundamentals	6L
2	Classes, Objects and Methods	5L
3	Inheritance, Package and Collection	4L
4	Exception Handling	4L
5	File Handling	5L
6	Applet, AWT, Event and Swing Programming	6L

MODULE-1 [12L+3T]

	Course Contents	
Unit I	Java Fundamentals	[6 L]
	1.1 Introduction to Java 1.2 Basics of Java Data Types. Variable. Expression, Operators, Constant 1.3 Structure of Java Program 1.4 Execution Process of Java Program 1.5 JDK Tools 1.6 Command Line Arguments 1.7 Array and String 1.7.1 Single Array and Multidimensional Array 1.7.2 String. String Buffer 1.8 Built In Packages and Classes 1.8.1 java.util. Scanner, Date, Math etc. 1.8.2 java.lang	
Unit II	Classes, Objects and Methods	[5 L]
	2.1 Class and Object 2.2 Object Reference 2.3 Constructor: Constructor Overloading 2.4 Method: Method Overloading, Recursion, Passing and Returning Object Form Method 2.5 New Operator, this and static keyword, finalize() Method 2.6. Nested Class, Inner Class and Anonymous Inner Class	
Unit III	Inheritance, Package and Collection	[4 L]
	3.1 Overview of Inheritance 3.2 Inheritance in Constructor 3.3 Inheriting Data Members and Methods 3.4 Multilevel Inheritance - Method Overriding Handle Multilevel Constructors 3.5 Use of Super and Final Keyword 3.6 Interface 3.7 Creation and Implementation of an Interface, Interface Reference	

	3.8 Interface Inheritance 3.9 Dynamic Method Dispatch 3.10 Abstract Class 3.11 Comparison between Abstract Class and Interface 3.12 Access Control 3.13 Packages 3.13.1 Packages Concept 3.13.2 Creating User Defined Packages 3.13.3 Java Built Inpackages 3.13.4 Import Statement, Static Import 3.14 Collection 3.14.1 Collection Framework 3.14.2 Interfaces: Collection, List, Set 3.14.3 Navigation: Enumeration, Iterator, Listiterator 3.14.4 Classes LinkedList, ArrayList, Vector, HashSet	
	MODULE-2 [12L+3T]	
Unit IV	Exception Handling	[4 L]
	4.1 Exception and Error 4.2 Use of try, catch, throw, throws and finally 4.3 Built in Exception 4.4 Custom exception 4.5 Throwable Class	
Unit V	File Handling	[5 L]
	5.1 Overview of Different Stream (Byte Stream, Character stream) 5.2 Readers and Writers class 5.3 File Class 5.4 File Input Stream, File Output Stream 5.5 Input Stream Reader and Output Stream Writer 5.6 FileReader and FileWriter Class 5.7 Buffered Reader Class	
Unit VI	Applet, AWT, Event and Swing Programming	[6 L]

	Applet 6.1 Introduction 6.2. Types Applet 6.3. Applet Lifecycle 6.3.1 Creating Applet 6.3.2 Applet Tag 6.3.3 Applet Classes 6.4 AWT 6.4.1 Color 6.4.2 Graphics 6.4.3 Font 6.5 Components and container used in AWT 6.6 Layout Managers 6.7 Listeners and Adapter Classes 6.8 Event Delegation Model Swing 6.9 Introduction to Swing Component and Container Classes 6.10 Exploring Swing Controls - JLabel and Image Icon, JText Field, The Swing Butto JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Par JList, JTable, JComboBox, Swing Menus, Dialogs, JFileOpen, JColorChooser	
Reference Books: Reference Book 1: Programming with JAVA - E Balgurusamy Reference Book 2:The Complete Reference – JAVA Herbert Schildt Course Outcome After studying this course, student will able to – - CO1: Understand the Fundamentals of Java Programming; - CO2: Master Object-Oriented Programming (OOP) Concepts; - CO3: Work with Java Libraries and API; - CO4: Design and Develop Java Applications; - CO5: Debug, Test, and Optimize Java Code; - CO6: Gain Practical Experience in Java Development;		

	SEMESTER V																							
	NEP-2020: Third Year UG Major BCA(Science) Course Code: BSMAT-352 Course Name: Principles of Operating System Lectures allotted: 30 Lectures Course Type: Theory Credits allotted: 2 credits																							
	<table><tr><th>Chapter No</th><th>Name of the Chapter</th><th>Lectures Assigned</th></tr><tr><td>1</td><td>Introduction to Operating System Concepts</td><td>3L</td></tr><tr><td>2</td><td>Process and Thread Management</td><td>6L</td></tr><tr><td>3</td><td>Process Scheduling</td><td>6L</td></tr><tr><td>4</td><td>Process Synchronization</td><td>3L</td></tr><tr><td>5</td><td>Deadlocks</td><td>6L</td></tr><tr><td>6</td><td>Memory Management</td><td>6L</td></tr></table>			Chapter No	Name of the Chapter	Lectures Assigned	1	Introduction to Operating System Concepts	3L	2	Process and Thread Management	6L	3	Process Scheduling	6L	4	Process Synchronization	3L	5	Deadlocks	6L	6	Memory Management	6L
Chapter No	Name of the Chapter	Lectures Assigned																						
1	Introduction to Operating System Concepts	3L																						
2	Process and Thread Management	6L																						
3	Process Scheduling	6L																						
4	Process Synchronization	3L																						
5	Deadlocks	6L																						
6	Memory Management	6L																						
	MODULE-1 [12L+3T]																							
		Course Contents																						
	Unit I	Introduction to Operating System Concepts	[3L]																					
		1.1 Operating System Objectives and Functions - Definition of Operating System ,Role and Objectives of Operating System, Operating System as a User View and System View 1.2 Evolution of Operating System 1.3 Operating System Structure(Monolithic, Layered and Microkernel) 1.4 System Boot																						
	Unit II	Process and Thread Management	[6 L]																					
		2.1 Process Concept – Process , Process Model , Process Control Block 2.2 Operations on Process – Process creation , Process Termination 2.3 Process Scheduling - Scheduling queues, Schedulers, Context switch 2.4 Inter Process Communication –Cooperating Process, Shared Memory Systems, Message Passing Systems 2.5 Overview of Threads 2.6 Concept of Multithreaded Programming and Multicore Programming 2.7 Types of threads – User and Kernel 2.8 Multithreading Models – Many to One , One to Many, Many to Many																						
	Unit III	Process Scheduling	[6L]																					
		3.1 Basic Concept – CPU-I/O burst cycle, CPU scheduler, Preemptive scheduling, Dispatcher 3.2 Scheduling Criteria 3.3 Scheduling Algorithms – FCFS, SJF, Priority scheduling, Round-robin scheduling, Multiple queue scheduling, Multilevel feedback queue scheduling																						
	MODULE-2 [12L+3T]																							
	Unit IV	Process Synchronization	[3 L]																					

	4.1 Background – Problems with Concurrency , Race Condition 4.2 Critical Section Problem – Peterson"s Solution(for two process) 4.3 Semaphores: Usage, Implementation 4.4 Classic Problems of Synchronization – Producer Consumer problem, Reader Writer problem, Dining Philosopher Problem	
Unit V	Deadlocks	[6 L]
	5.1 System Model 6.2 Deadlock Characterization – Necessary Conditions, Resource Allocation Graph 5.3 Deadlock Prevention 5.4 Deadlock Avoidance - Safe State, Resource Allocation Graph Algorithm, Banker"s Algorithm 5.5 Deadlock Detection 5.6 Recovery From Deadlock – Process Termination, Resource Preemption	
Unit VI	Memory Management	[6 L]
	6.1 Background – Basic Hardware, Address Binding, Logical Versus Physical Address Space, Dynamic Loading, Dynamic Linking and Shared Libraries 6.2 Swapping 6.3 Contiguous Memory Allocation – Memory Mapping and Protection, Memory Allocation, Fragmentation 6.4 Paging – Basic Method, Hardware Support, Protection, Shared Pages 6.5 Segmentation – Basic Concept, Hardware 6.6 Virtual Memory Management – Background, Demand Paging 6.7 Page Replacement Algorithms – FIFO, OPT, LRU, Second Chance Page Replacement.	
Reference Books: 1. "Operating System Concepts", 9 th Edition ,by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, John Wiley & Sons (ASIA) Pvt. Ltd, 2013. 2. "Operating Systems: Internals and Design Principles", 7th Edition, by William Stallings, Prentice Hall, 2011 3. "Modern Operating Systems", 4 th Edition, by Andrew S. Tanenbaum, Prentice Hall of India Pvt. Ltd, 2014. 4. "Operating Systems : Principles and Design" – Pabitra Pal Choudhary (PHI Learning Private Limited) Course Outcomes: After studying this course, students will be able to. CO1 : To understand the objectives, structure and functions of operating system CO2 : To learn about concept of processes, threads and its scheduling algorithms CO3 :To understand design issues in process synchronization and CO4 : deadlock management CO5 : To study various memory management schemes		

	NEP-2020: Third Year UG Major BCA(Science)		
	Course Code: BSMAT-353		Course Type: Theory
	Course Name: Artificial Intelligence		Credits allotted:2 credits
	Lectures allotted: 30 Lectures		
	Chapter No	Name of the Chapter	Lectures Assigned
	1	Introduction to Artificial Intelligence	4L
	2	Problems, Problem Spaces and search	5L
	3	Searching Algorithms	6L
	4	Knowledge Representation	7L
	5	Slot and Filler Structures	4L
	6	Recent Trends in AI and Applications	4L
	MODULE-1 [12L+3T]		
		Course Contents	
	Unit I	Introduction to Artificial Intelligence	[4L]
		1.1 Introduction to AI 1.2 Comparison of AI, Machine Learning, Deep Learning 1.3 Applications of AI 1.4 AI Techniques 1.5 Intelligent Agents, Agents and Environments, Structure of Agents	
	Unit II	Problems, Problem Spaces and search	[5L]
		2.1 Defining problem as a State Space Search 2.2 Production System 2.3 Problem Characteristics 2.4 Search & Control Strategies 2.5 Problems – Water Jug problem, Missionary Cannibal Problem, Block words Problem, Monkey & Banana problem	
	Unit III	Searching Algorithms	[6 L]
		3.1 Uninformed Search Algorithms/Blind Search Techniques 3.2 Breadth-first Search 3.3 3.1. Depth-first Search 3.4 Informed (Heuristic) search Techniques 3.5 Generate-and-test 3.6 Simple Hill Climbing 3.7 Best First Search 3.8 Constraint Satisfaction 3.9 Means End Analysis 3.10 A* and AO*	
	MODULE-2 [12L+3T]		
	Unit IV	Knowledge Representation	[7 L]
		4.1 Definition of Knowledge 4.2 Types of knowledge (Procedural and Declarative knowledge) 4.3 Approaches to Knowledge Representation 4.4 Knowledge representation using Propositional and Predicate logic 4.5 Conversion to clause form	

	4.6 Resolution in Propositional logic 4.7 Resolution in Predicate logic	
Unit V	Slot and Filler Structures	[4 L]
	5.1 Weak structures (Semantic networks and Frame) 5.2 Strong structures (Conceptual dependencies and Script)	
Unit VI	Recent Trends in AI and Applications	[4 L]
	6.1 Introduction to Machine Learning, 6.2 Types of Learning, (Supervised, Unsupervised and Reinforcement Learning), 6.3 Predictive Analytics (Weather Forecasting) AI-Powered Chatbots (SBI card chatbot (ILA))	

Reference Books:

- 1) Artificial Intelligence, Tata McGraw Hill, Elaine Rich and Kevin Knight
 - 2) Computational Intelligence, Eberhart, Elsevier, ISBN 9788131217832
 - 3) Artificial Intelligence: A New Synthesis, Nilsson, Elsevier, ISBN 9788181471901
 - 4) Introduction to Artificial Intelligence and Expert System, Dan Patterson, Prentice Hall of India Pvt. Ltd., New Delhi, 1997
 - 5) Artificial Intelligence: A Modern Approach, Russel & Norvig, Pearson Education
- Introduction to Machine Learning, Ethem Alpaydin, PHI

E-References:

- 1) <https://www.oracle.com/in/chatbots/what-is-a-chatbot/>
- 2) <https://www.dataversity.net/case-study-predictive-analytics-and-data-science-keep-an-eye-on-the-weather/>
- 3) <https://www.senseforth.ai/conversational-ai-case-studies/SBI-Cards/>

Course Outcome :

After successfully completing this course, students will be able to:

- Apply the suitable algorithms to solve AI problems
- Identify and apply suitable Intelligent agents for various AI applications
- Build smart system using different informed search / uninformed search or heuristic approaches
- Represent complex problems with expressive language of representation

SEMESTER V	
NEP-2020: Third Year UG Major BCA(Science)	
Course Code: BSMAP- 354	Course Type: Practical
Course Name: Core Java Programming Lab	Credits allotted:2 credits
Lectures allotted: 60 Lectures	

Sr. No.	Assignment	No of Sessions
1	Java Tools and IDE, Simple java programs Introduction to the java environment Use of java tools like java, javac, jdk and javadoc Defining simple classes and creating objects.	2
2	Array of Objects and Packages Defining a class. Creating an array of objects. Creating a package	2
3	Inheritance and Interfaces To implement inheritance in java. To define abstract classes. To define and use interfaces and Functional Interface.	3
4	Exception And File Handling Demonstrate Exception Handling Mechanism in Java. Use of try, catch, throw, throws ,finally blocks Defining User defined Exception classes. Creation of files and demonstration of I-O operations	3
5	GUI Designing, Event Handling To demonstrate GUI creation using Swing Package and Layout managers. To understand Event handling mechanism in Java. Using Event classes, Event Listeners and Adapters	5
	Total 15	
Course Outcome : After studying this course, student will able to – CO1: Use Java development tools and IDEs effectively; CO2: Work with arrays of objects and organize code using packages in Java; CO3: Implement inheritance and interfaces for code reuse and abstraction; CO4: Handle exceptions and work with file input/output operations in Java; CO5: Develop simple GUI applications using Swing and handle user events;		

SEMESTER V		
NEP-2020: Third Year UG Major BCA(Science)		
Course Code: BSMAP- 355		Course Type: Practical
Course Name: Operating Systems and AI Lab		Credits allotted:2 credits
Lectures allotted: 60 Lectures		
Sr. No.	Assignment	No of Sessions
1	Operations on processes	2
2	CPU Scheduling	3
3	Deadlock detection and avoidance	3
4	Page Replacement Algorithms: FIFO, Optimal, LRU	4

5	A* and AO* Algorithm	3
	Total 15	

Course Outcome :

After studying this course, student will able to –

- Implement algorithms for Process scheduling and Memory management
- Describe process synchronization and multithreading
- Compare and contrast the algorithms for memory management and its allocation policies.
- Use searching algorithms
- Design a simple Expert system

	SEMESTER V																				
	NEP-2020: Third Year UG Vocational Skill Courses (VSC) BCA(Science) Course Code: BSVST-351 Course Name: Computer Networks Lectures allotted: 30 Lectures																				
	Course Type: Theory Credits allotted:2 credits																				
	<table><tr><td>Chapter No</td><td>Name of the Chapter</td><td>Lectures Assigned</td></tr><tr><td>1</td><td>Introduction to Data Communications and Computer Networks</td><td>4L</td></tr><tr><td>2</td><td>Network Models</td><td>5L</td></tr><tr><td>3</td><td>Physical Layer</td><td>6L</td></tr><tr><td>4</td><td>Data Link Layer</td><td>8L</td></tr><tr><td>5</td><td>Network Layer</td><td>7L</td></tr></table>			Chapter No	Name of the Chapter	Lectures Assigned	1	Introduction to Data Communications and Computer Networks	4L	2	Network Models	5L	3	Physical Layer	6L	4	Data Link Layer	8L	5	Network Layer	7L
Chapter No	Name of the Chapter	Lectures Assigned																			
1	Introduction to Data Communications and Computer Networks	4L																			
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4	Data Link Layer	8L																			
5	Network Layer	7L																			
	MODULE-1 [12L+3T]																				
	<table><tr><td></td><td>Course Contents</td><td></td></tr><tr><td>Unit I</td><td>Introduction to Data Communications and Computer Networks</td><td>[4L]</td></tr><tr><td></td><td>1.1 Data communications, Characteristics of Data Communication 1.2 Components of Data communication 1.3 Data Representation – Text, Numbers, Images, Audio, Video 1.4 Types of Data flow – Simplex, Half Duplex, Full Duplex 1.5 Computer Networks applications –Business Application, Home Application, Mobile User 1.6 Broadcast and point-to-point networks 1.7 Network Topologies - Bus, Star, Ring, Mesh 1.8 Network Types- LAN, MAN, WAN, PAN, Wireless Networks, Home Networks, internetworks 1.9 Protocols and standards</td><td></td></tr><tr><td>Unit II</td><td>Network Models</td><td>[5L]</td></tr></table>				Course Contents		Unit I	Introduction to Data Communications and Computer Networks	[4L]		1.1 Data communications, Characteristics of Data Communication 1.2 Components of Data communication 1.3 Data Representation – Text, Numbers, Images, Audio, Video 1.4 Types of Data flow – Simplex, Half Duplex, Full Duplex 1.5 Computer Networks applications –Business Application, Home Application, Mobile User 1.6 Broadcast and point-to-point networks 1.7 Network Topologies - Bus, Star, Ring, Mesh 1.8 Network Types- LAN, MAN, WAN, PAN, Wireless Networks, Home Networks, internetworks 1.9 Protocols and standards		Unit II	Network Models	[5L]						
	Course Contents																				
Unit I	Introduction to Data Communications and Computer Networks	[4L]																			
	1.1 Data communications, Characteristics of Data Communication 1.2 Components of Data communication 1.3 Data Representation – Text, Numbers, Images, Audio, Video 1.4 Types of Data flow – Simplex, Half Duplex, Full Duplex 1.5 Computer Networks applications –Business Application, Home Application, Mobile User 1.6 Broadcast and point-to-point networks 1.7 Network Topologies - Bus, Star, Ring, Mesh 1.8 Network Types- LAN, MAN, WAN, PAN, Wireless Networks, Home Networks, internetworks 1.9 Protocols and standards																				
Unit II	Network Models	[5L]																			

		2.1. OSI Model – layered architecture, Peer-to-peer processes, Encapsulation 2.2 TCP/IP Model – layers and Protocol Suite 2.3 Addressing- Physical, Logical, Port addresses, Specific addresses	
	Unit III	Physical Layer	[6L]
		3.1 Analog and Digital data, Analog and Digital signals, Digital Signals-Bit rate, Bit length 3.2 Baseband Transmission, Broadband Transmission 3.3 Performance of the Network Bandwidth, Throughput, Latency (Delay) 3.4 Line Coding Characteristics 3.5 Transmission Modes, Parallel Transmission and Serial Transmission– Asynchronous and Synchronous and Isochronous 3.6 Multiplexing FDM and TDM 3.7 Switching-Circuit Switching, Message Switching and Packet Switching.	
		MODULE-2 [12L+3T]	
	Unit IV	Data Link Layer	[8L]
		4.1 Framing – Concept, Methods – Character Count, Flag bytes with Byte Stuffing, Starting & ending Flags with Bit Stuffing 4.2 Elementary data link protocols - Simplex stop & wait protocol, PPP 4.3 Random Access Protocols - ALOHA, CSMA/CD, CSMA/CA 4.4 Controlled Access - Reservation, Polling and Token Passing 4.5 Channelization – Definitions – FDMA, TDMA and CDMA	
	Unit V	Network Layer	[7L]
		5.1 IPv4 Addresses: Address space, Notation, Sub netting, Super netting 5.2 IPv4: Datagram, Fragmentation, checksum, options 5.3 IPv6 Addresses: Structure, address space 5.4 IPv6: Packet format, Extension headers	
Reference Books: Computer Networks-Andrew S. Tanenbaum, 5th Edition, Pearson Education Data Communication and Networking- Behrouz Fourouzan, 5th Edition, McGraw Hill Pvt. Ltd. Course Outcomes: 1. Understand the OSI and TCP/IP Reference Models and in particular have a good knowledge of Layers. 2. Understand the working of various protocols. 3. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies			

	SEMESTER -V
	NEP-2020: Third Year UG Major Elective BCA(Science) Course Code: BSMET-356A Course Type: Theory Course Name: Internet Of Things(IoT) Credits allotted:2 credits Lectures allotted: 30 Lectures

Chapter No	Name of the Chapter	Lectures Assigned
1	Introduction to Embedded Systems	3L
2	Internet of Things : Concepts	3L
3	Introduction to IoT Design Methodology	4L
4	Introduction to IoT Protocols	5L
5	Cloud Platforms for IoT	3L
6	Security in IoT	6L
7	IoT Application and Case study	6L
MODULE-1 [12L+3T]		
	Course Contents	
Unit I	Introduction to Embedded Systems	[3L]
	1.1 Definition, Characteristics of Embedded System, 1.2 Real time systems, Real time tasks 1.3 Processor basics: General Processors in Computer Vs Embedded Processors, Micro controllers and Properties, Components of Microcontrollers, System-On- Chip and its examples. 1.4 Components of Embedded Systems, Introduction to embedded processor.	
Unit II	Internet of Things : Concepts	[3 L]
	2.1 Definition, Characteristics of IoT, Trends in Adoption of IoT, 2.2 IoT Devices, IoT Devices Vs Computers. 2.3 Basic Building Blocks. 2.4 Physical Design of IoT: - Things in IoT, Interoperability of IoT Devices, Sensors and Actuators, Need of Analog/Digital Conversion. 2.5 Logical Design of IoT:- IoT functional blocks, IoT Enabling technologies, IoT levels and deployment templates, Applications of IoT.	
Unit III	Introduction to IoT Design Methodology	[4 L]
	3.1 Design Steps 3.2 Basics of IoT Networking, Networking Components, Internet Structure 3.3 IoT Communication Models and IoT Communication APIs, 3.4 Sensor Networks 3.5 Four pillars of IoT: M2M, SCADA,WSN, RFID	
Unit IV	Introduction to IoT Protocols	[5 L]
	4.1 Protocol Standardization for IoT 4.2 M2M and WSN Protocols 4.3 RFID Protocol, 4.4 Modbus Protocol, ZigBee Architecture. 4.5 IP based Protocols: MQTT (Secure), 6LoWPAN, LoRa.	
MODULE-2 [12L+3T]		
Unit V	Cloud Platforms for IoT	[3 L]
	5.1 Introduction to Cloud Storage Models, Communication API 5.2 Cloud for IoT 5.3 Introduction to Amazon Web Services for IoT and Skynet IoT 5.4 Messaging Platform	

	5.5 Introduction to RESTful Web Services -GRPC,SOAP.	
Unit VI	Security in IoT	[6 L]
	6.1 Introduction, Vulnerabilities of IoT, Security Requirements 6.2 Challenges for Secure IoT, Threat Modeling 6.3 Key elements of IoT Security: Identity establishment, Access control, Data and message security, Non-repudiation and availability 6.4 Security model for IoT 6.5 Challenges in designing IOT applications, Introduction to Lightweight cryptography	
Unit VII	IoT Application and Case study	[6 L]
	Application of IoT and Case studies: Home Automation, Smart Parking, Water Management, Agriculture, Citizen Safety, Waste Management, Smart city.	

Course Outcome:

After successfully completing this course, students will be able to:

- CO1: By the end of this course students will be able to define the vision and introduction of IoT.
- CO2: By the end of this course students will be able to explain IoT Market perspective and State of the Art IoT Architecture
- CO3: By the end of this course students will be able to use devices, Gateways and Data Management in IoT.
- CO4: By the end of this course students will be able to classify Real World IoT Design Constraints, Industrial Automation in IoT.
- CO5: By the end of this course students will be able to evaluate the data received through sensors in IOT.
- CO6: After the completion of the course, the students will be able design some IOT based prototypes.

REFERENCES:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning
2. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
3. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
4. "Mobile Computing," Tata McGraw Hill, Asoke K Talukder and Roopa R Yavagal, 2010.
5. Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte. Ltd., Delhi, 4th Edition
6. Data and Computer Communications; By: Stallings, William; Pearson Education Pte. Ltd., Delhi, 6th Edition

SEMESTER-V**NEP-2020: Third Year UG Major Elective BCA(Science)****Course Code: BSMEP-357A****Course Type: Practical****Course Name: Internet of Things Lab****Credits allotted: 2 Credits****Lectures allotted: 60 Lectures**

Sr. No.	Assignment	No of Sessions
1	Study the fundamental of IOT softwares and components.	2
2	Familiarization with Arduino/Raspberry Pi and perform necessary software	2
3	To interface LED/Buzzer with Arduino/Raspberry Pi and write a program to turn ON LED for 1 sec after every 2 seconds.	2
4	To interface Push button/Digital sensor (IR/LDR) with Arduino/Raspberry Pi and write a program to turn ON LED when push button is pressed or at sensor detection	3
5	To interface DHT11 sensor with Arduino/Raspberry Pi and write a program to print temperature and humidity readings.	3
6	To interface motor using relay with Arduino/Raspberry Pi and write a program to turn ON motor when push button is pressed.	3
	Total 15	

Course Outcome:**After studying this course, student will able to –**

CO1 - Integrate hardware and software for simple IoT applications.

CO2 - Create IoT applications by interfacing various sensors and embedded boards.

CO3 - Create IoT applications by interfacing various actuators and embedded boards.

CO4 - Develop IoT applications using IoT networking devices.

CO5 - Develop database based IoT application by integrating sensors with single board computer.

SEMESTER V		
NEP-2020: Third Year UG Major Elective BCA(Science) Course Code: BSMET-356B Course Name: Advanced Python Programming Lectures allotted: 30 Lectures		
Course Type: Theory Credits allotted: 2 Credits		
Chapter No	Name of the Chapter	Lectures Assigned
1	Introduction OOPs	7L
2	Errors and Exception Handling	8L
3	Connecting Python Database with GUI and Widgets	8L
4	Graphical user interface	7L
MODULE-1 [12L+3T]		
	Course Contents	
Unit I	Introduction OOPs	[7L]
	OOPs in python: Features of Object Oriented Programming system (oops)- classes and objects, encapsulation, abstraction, inheritance, polymorphism, constructors and destructors Classes and objects: Creating a class, the self-variable, types of variables, namespaces, types of methods, instance methods, class methods, static methods, passing members of one class to another class, inner classes Inheritance and polymorphism: Inheritance in python, types of inheritance- single inheritance, multilevel inheritance, hierarchical inheritance, multiple inheritance, constructors in inheritance, overriding super class constructors and methods, the super() method, method resolution order (mro), polymorphism, duck typing, operator overloading, method overloading, method overriding, Abstract classes and interfaces: Abstract class, abstract method, interfaces in python, abstract classes vs. Interfaces.	
Unit II	Errors and Exception Handling	[8 L]
	Exceptions in python: Errors in a python program, compile & run-time errors, logical error, exceptions-exception handling, types of exceptions, the except block, the assert statement, user-defined exceptions, logging the exceptions.	
MODULE-2 [12L+3T]		
Unit III	Connecting Python Database with GUI and Widgets	[8L]
	Types of data bases, working with MySQL, working with Mongo DB. Widgets: Button, Canvas, Check button, Entry, Frame, Label, List, List box, Menu button, Menu, Message, Radio button, Scale, text, Top-level, spin box, paned window, label frame, tk message box. Handling standard attributes and properties of widgets. Layout management: Designing GUI application with proper layout management features .Look and feel. Customization: Enhancing Look and Feel of GUI using different Appearances of widgets.	
Unit IV	Graphical User Interface:	[7 L]
	Storing Data in our Database via Our GUI: Connecting to a MySql Database from python, Configuring the MySql Connection, Designing the python GUI	

	database,using the insert command,using the update command,using the delete command,storing and retrieving data from MySql database.	
Textbooks: 1. Paul Gries , Jennifer Campbell, Jason Montojo, Practical Programming: An Introduction to Computer Science Using Python 3, Pragmatic Bookshelf, 3rd Edition, 2018 2. Programming through Python, M. T Savaliya, R. K. Maurya, G M Magar, Revised Edition, Sybgen Learning India, 2020 References: 1. Advanced Python Programming, Dr. Gabriele Lanaro, Quan Nguyen, SakisKasampalis, Packt Publishing, 2019 2. Programming in Python 3, Mark Summerfield, Pearson Education, 2nd Ed, 2018 3. Python: The Complete Reference, Martin C. Brown, McGraw Hill, 2018 4. Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress,2017 5. Programming in Python 3, Mark Summerfield, Pearson Education, 2nd Ed, 2018 Course Outcome After studying this course, student will able to – CO1: Demonstrate proficiency in object-oriented programming (OOP) principles: This includes understanding classes, inheritance, polymorphism, and encapsulation. CO2: Apply advanced data structures and algorithms: This could involve using lists, dictionaries, sets, tuples, and understanding time/space complexity. CO3: Utilize regular expressions, closures, and decorators: These are powerful tools for manipulating strings and code structure. CO4: Implement and debug complex Python programs: This includes understanding error handling, exception handling, and testing. CO5: Understand memory management in Python: This is crucial for writing efficient and robust code.		

SEMESTER V		
NEP-2020: Third Year UG Major Elective BCA(Science)		
Course Code: BSMEP-357B		Course Type: Practical
Course Name: Advanced Python Programming Lab		Credits allotted: 2 Credits
Lectures allotted: 60 Lectures		
Sr. No.	Assignment	No of Sessions
1	Write a program to Python program to implement various file operations	2
2	Write a program to Python program to demonstrate use of regular expression for suitable application.	2
3	Write a Program to demonstrate concept of threading and multitasking in Python	2
4	Write a Python Program to work with databases in Python to perform operations such as a. Connecting to database b. Creating and dropping tables c. Inserting and updating into tables	3
5	Write a GUI Program in Python to design application that demonstrates a. Different fonts and colors b. Different Layout Managers c. Event Handling	3
6	Write a program to Python program to implement concepts of OOP such as a. Types of Methods	3

	b. Inheritance c. Polymorphism	
	Total 15	
Course Outcomes: After studying this course, student will able to – CO1: Apply exception handling and user defined exception(s) CO2: Develop Module(s) and Package(s) in python CO3: Make use of Pandas and Numpy Libraries CO4: Implement Object Oriented concepts in programming CO5: Apply Collection modules for the data types		

SEMESTER V	
NEP-2020: Third Year UG Major Elective BCA(Science) Course Code: ELCMIT-351 Course Type: Theory Course Name: Principles of Microcontroller and Embedded Systems Lectures allotted: 30 Lectures Credits allotted: 2 Credits	
Unit	Title and Contents
Module 1	
1	Basics of Microcontroller & Intel 8051 architecture [8] Introduction to microcontrollers, difference in microcontroller and microprocessor. Architecture of 8051: Internal block diagram of 8051: ALU, PC, DPTR, PSW, Latch, SFRs, General purpose registers, pin diagram and pin functions of 8051, I/O ports: Port0, Port1, Port2, and Port3. Structure, Operation and specifications of I/O Ports, Memory organization: Program and Data Memory Map, Internal RAM organization, Internal ROM. External Memory Interface. Stack, Stack Pointer and Stack operation.
2	Programming model of 8051 [9] Instruction set: Instruction classification, Data Transfer, Arithmetic, Logical, Branching, Machine Control, Stack operations and Boolean operations. Addressing Modes: Immediate, register, direct, indirect and relative, Assembler directives: ORG, DB, EQU, END, CODE, DATA. Software development cycle: editor, assembler, simulator, cross-compiler, linker, compiler. 8051 Assembly language programming and C programming: arithmetic and logical programming, Looping, Counting, Time delay loop, Look-up table, Bit addressability, I/O Bit & Byte programming
Module 2	
3	Serial communication [8] Timers & Counters: Timers/Counters SFRs: TMOD, TCON logic diagram and its operation in various Timer modes: mode 0, mode 1 and mode 2. Programming for time delay Interrupt: Introduction to interrupt, Interrupt types Interrupt structure, SFRs - Interrupt enable register (IE) and interrupt priority register(IP). vector address, priority and operation. ISR – Interrupt Service Routine. Serial Communication: Definition, various modes Synchronous and asynchronous, baud rate for serial communication. Configuration, using SFRs - SCON, SBUF, PCON Programming serial port without interrupt, Use of timer/counter Programming serial port with interrupt: Configuration of interrupts for serial communication,
4	Applications of 8051 using Embedded 'C' [5] Interfacing Input Devices: Pushbutton, thumb wheel switch ADC, LM35, rain sensor.

	Interfacing Output Digital Devices: LED, 7-segment LED display, LCD display, DC and Stepper motor, DAC.
Text and Reference Books:	
1	8051 microcontroller and Embedded system using assembly and C: Mazidi, Mazidi and McKinley, Pearson pub.
2	The 8051 microcontroller Architecture, programming and applications: K. Uma Rao and Andhe Pallavi, Pearson pub
Course Outcomes (COs): On completion of the course, the students will be able to:	
CO1:	Demonstrate the basic concepts of microcontrollers and differentiate between microcontrollers and microprocessors.
CO2:	Familiarize with the 8051 instruction set, including the classification of instructions (data transfer, arithmetic, logical, branching, machine control, etc.).
CO3:	Understand the operation of timers and counters in 8051, including the programming for various timer modes (mode 0, mode 1, mode 2) and time delay generation.
CO4:	Develop 8051 Assembly and 'C' programs using 8051 instruction set for embedded systems using microcontroller.
CO5:	Interface various input devices (pushbutton, thumb wheel switch, LM35, rain sensor etc.) with the 8051 and develop programs for their control.
CO6:	Interface various output devices (DAC, LED, LCD, SSD, stepper motor, DC motor etc.) with the 8051 and develop programs for their control.
CO7:	Design and implement application circuits using the 8051.

SEMESTER V	
NEP-2020: Third Year UG Major Elective BCA(Science)	
Course Code: ELCMIP-352	Course Type: Practical
Course Name: Electronics Practical Lab-3	
Lectures allotted: 60 Lectures	Credits allotted: 2 Credits
Sr.No.	Title of Experiment/ Practical
Total 10 experiments are to be performed by student. Any five experiments from each group	
Group A	
1	Write and execute programs based on Arithmetic Instructions (8/16 bit Addition, Subtraction, Multiplication, Division) in Assembly and Embedded C.
2	Write and execute programs based on Logical Instructions (AND, OR, Rotate, etc.) in Assembly and Embedded C
3	Write and execute programs based on various addressing modes and assembler directives.
4	Write and execute programs based on Branch Instructions in Assembly and Embedded C.
5	Write and execute programs based on Looping, Counting, and Indexing concept in Assembly and Embedded C.
6	Write and execute program to introduce delay (e.g. 1ms Delay) using Timer/Counter in Assembly and Embedded C.
7	Write and execute programs to generate various waveforms (square, triangular, saw tooth, trapezoidal) using timers in Assembly and C.
8	Write and execute programs to turn ON/OFF LED using interrupt in Assembly and Embedded C.
9	Write and execute programs to interface 4x4 matrix keypad in Assembly and Embedded C.
Group B (Based on Embedded 'C')	

1	Interfacing of thumbwheel & seven segment display to 8051 microcontroller
2	Interfacing LCD to 8051Microcontroller
3	Interfacing temperature sensor LM35/DHT11 and displaying temperature by configuring ADC (ADS1115).
4	Event counter using opto-coupler, seven segment LED/LCD display interface to 8051Microcontroller
5	Waveform generation using DAC Interface to 8051Microcontroller
6	Interface stepper motor and rotate in clockwise and anticlockwise.
7	ON/OFF temperature controller using LM35/DHT11 and switching relay.
8	Traffic light controller using 8051 microcontroller.
9	Speed control of DC motor.
Course Outcomes (COs): On completion of the course, the students will be able to:	
CO1	Familiarize with assembler directives and syntax of embedded C programs used for 8051 Controller.
CO2	Write programs with data transfer, arithmetic, logical, branching, machine control, instructions of the 8051 instruction set.
CO3	Write Functions to introduce delay (e.g.1ms Delay) using Timer/Counter in Assembly and embedded C programming
CO4	Interface various digital input/ output devices (pushbutton, thumb wheel switch, matrix keypad, LED, LCD, SSD, stepper motor etc.) with the 8051 and develop programs for their control
CO5	Interface various Analogue input/ output devices (LM35, rain sensor, DAC, thumb wheel switch, LED, LCD, SSD) with the 8051 and develop programs for their control.
CO6	Analyze observations of each experiment based on the aim and objectives of an experiment.
CO7	Acquire the skill to design and build his /her simple circuit ideas

SEMESTER - VI

SEMESTER VI	
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NEP-2020: Third Year UG Major BCA(Science)

Course Code: BSMAT-361 **Course Type: Theory**

Course Name: Advanced Java	Credits allotted:2 credits
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Lectures allotted: 30 Lectures

Chapter No	Name of the Chapter	Lectures Assigned
1	JDBC	6L
2	Multithreading	5L
3	Networking	4L
4	Servlet and JSP	8L
5	Spring and Hibernate	7L

MODULE-1 [12L+3T]

	Course Contents	
Unit I	JDBC	[6 L]
	1.1 Introduction 1.2 JDBC Architecture 1.3 JDBC Process 1.4 Working with ResultSet Interface	
Unit II	Multithreading	[5 L]
	2.1 Introduction to Multithreading 2.2 Thread creation: Thread Class, Runnable Interface 2.3 Life cycle of Thread 2.4 Thread Priority 2.5 Execution of Thread Application 2.6 Synchronization and Interthread Communication	
Unit III	Networking	[4 L]
	3.1 Overview of Networking 3.2 Networking Basics: Port Number, Protocols and classes 3.3 Sockets, Reading from and Writing to a Socket	
	MODULE-2 [12L+3T]	
Unit IV	Servlet and JSP	[8 L]
	Servlet 4.1 Introduction to Servlet 4.2 Types of Servlet: Generic Servlet and Http Servlet 4.3 Life Cycle of Servlet 4.4 Session Tracking 4.5 Servlet with Database JSP 4.6 Introduction to JSP 4.7 JSP Life Cycle 4.8 Components of JSP 4.9 JSP with Database	
Unit V	Spring and Hibernate	[7 L]
	Spring: 5.1 Introduction	

	5.2 Applications and Benefits of Spring 5.3 Architecture and Environment Setup 5.4 Hello World Example 5.5 Core Spring - IoC Containers, Spring Bean Definition, Scope, Lifecycle Hibernate: 5.6 Architecture and Environment 5.7 Configuration, Sessions, Persistent Class 5.8 Mapping Files, Mapping Types 5.9 Examples	
Reference Books: Reference Book 1: The Complete Reference – JAVA Herbert Schildt Reference Book 2: Core java –II By Cay S. Horstmann and Gary Cornell Reference Book 3: Complete Reference J2EE – Jim Keogh Course Outcome After studying this course, student will able to – CO1: Understand JDBC and its Components; CO2: Master Multithreading Concepts and Java Threading Models; CO3: Develop Networking Applications using Sockets; CO4: Work with Servlets and JSP for Web Development; CO5: Learn and Apply Spring Framework for Enterprise Applications; CO6: Implement Advanced Java Concepts in Real-World Applications;		

	SEMESTER VI																	
	NEP-2020: Third Year UG Major BCA(Science) Course Code: BSMAT-362 Course Type: Theory Course Name: Data Mining Credits allotted: 2 credits Lectures allotted: 30 Lectures																	
	<table><tr><th>Chapter No</th><th>Name of the Chapter</th><th>Lectures Assigned</th></tr><tr><td>1</td><td>Introduction to Data Mining</td><td>7L</td></tr><tr><td>2</td><td>Data Warehousing</td><td>8L</td></tr><tr><td>3</td><td>Classification</td><td>8L</td></tr><tr><td>4</td><td>Clustering and Association Rule Mining</td><td>7L</td></tr></table>			Chapter No	Name of the Chapter	Lectures Assigned	1	Introduction to Data Mining	7L	2	Data Warehousing	8L	3	Classification	8L	4	Clustering and Association Rule Mining	7L
Chapter No	Name of the Chapter	Lectures Assigned																
1	Introduction to Data Mining	7L																
2	Data Warehousing	8L																
3	Classification	8L																
4	Clustering and Association Rule Mining	7L																
	MODULE-1 [12L+3T]																	
	Course Contents																	
	Unit I	Introduction to Data Mining	[7L]															
		1.1Definition Data mining 1.2 Data Mining issues 1.3 Stages of the Data Mining Process (KDD) 1.4 Data Mining Techniques/Tasks 1.5 Knowledge Representation Methods 1.6 Applications of Data mining 1.7 Data Pre-processing 1.7.1 Data Cleaning																

	1.7.2 Data Transformation 1.7.3 Data Reduction 1.7.4 Data Discretization	
Unit II	Data Warehousing	[8L]
	2.1 Introduction to Data Warehouse 2.2 Data Warehouse Architecture and its components 2.3 Data Modeling with OLAP 2.3.1 Introduction 2.3.2 Difference between OLTP and OLAP 2.3.3 Data Mart 2.3.4 Fact Table, Dimension Table, OLAP cube 2.3.5 Different OLAP Operations 2.4 Schema Design 2.4.1 Introduction 2.4.2 Star and snow-Flake Schema 2.5 Introduction to Machine Learning 2.6 Introduction to Pattern Matching	
MODULE-2 [12L+3T]		
Unit III	Classification	[8L]
	3.1 Introduction, Definition 3.2 Decision Tree 3.2.1 Introduction 3.2.2 Construction Principle 3.2.3 Attribute Selection Measures 3.2.4 Tree Pruning	
	3.3 Rule-Based Classification 3.3.1 Using IF-THEN Rules for Classification 3.3.2 Rule Extraction from a Decision Tree 3.4 Bayes Classification Methods 3.4.1 Bayes" Theorem 3.4.2 Naive Bayesian Classification 3.5 Bayesian Networks 3.6 Parameter and structure learning 3.7 Linear classifier 3.8 Perceptron 3.9 k-Nearest-Neighbor Classifiers 3.10 SVM classifiers 3.10.1 Introduction 3.10.2 Types of SVM 3.10.3 Working of SVM 3.11 Regression 3.11.1 Linear Regression 3.11.2 Non linear Regression 3.12 Introduction to Prediction	
Unit IV	Clustering and Association Rule Mining	[7L]
	4.1 Cluster Analysis 4.1.1 Introduction 4.1.2 Requirements for Cluster Analysis 4.2 Hierarchical Methods 4.2.1 Agglomerative Hierarchical Clustering 4.2.2 Divisive Hierarchical Clustering 4.3 Partitioning Methods 4.3.1 k-Means: A Centroid-Based Technique	

	4.3.2 k-Medoids: A Representative Object-Based Technique 4.4 Introduction to Association Rule Mining Market Basket Analysis, Items, Itemsets and Large Itemsets 4.5 Apriori Algorithm	
Reference Books: 1)Data Mining : Introductory and Advanced Topics by Margaret Dunham, S. Sridhar, Pearson Publication 2) Data Mining concepts and Techniques by Jiawei Han and Micheline Kamber, ELSEVIER, Third Edition, 3) R and Data Mining, By Yanchang Zhao, Elsevier Inc., ISBN-10: 0123969638 Course Outcomes: CO1: Identify the key processes of data mining, data warehousing and knowledge discovery CO2: Design data warehouse with dimensional modeling and apply OLAP operations. CO3: Identify appropriate data mining algorithms to solve real world problems CO4: Apply suitable classification algorithm to train the classifier and evaluate its performance. CO5: Choose association rule mining algorithms and generate frequent item-sets and association rules. CO6: Interpret appropriate clustering algorithm to cluster data and evaluate clustering quality.		

	SEMESTER VI																						
	NEP-2020: Third Year UG Major BCA(Science) Course Code: BSMAT-363 Course Type: Theory Course Name: Software Testing Credits allotted: 2 credits Lectures allotted: 30 Lectures																						
	<table> <tr> <th>Chapter No</th><th>Name of the Chapter</th><th>Lectures Assigned</th></tr> <tr> <td>1</td><td>Introduction to Software Testing</td><td>5L</td></tr> <tr> <td>2</td><td>Approaches to Testing –Testing Methods</td><td>5L</td></tr> <tr> <td>3</td><td>Software Testing Strategies & Software metrics</td><td>5L</td></tr> <tr> <td>4</td><td>Software metrics</td><td>4L</td></tr> <tr> <td>5</td><td>Testing for Specialized Environments</td><td>5L</td></tr> <tr> <td>6</td><td>Testing Tools & Software Quality Assurance</td><td>6L</td></tr> </table>		Chapter No	Name of the Chapter	Lectures Assigned	1	Introduction to Software Testing	5L	2	Approaches to Testing –Testing Methods	5L	3	Software Testing Strategies & Software metrics	5L	4	Software metrics	4L	5	Testing for Specialized Environments	5L	6	Testing Tools & Software Quality Assurance	6L
Chapter No	Name of the Chapter	Lectures Assigned																					
1	Introduction to Software Testing	5L																					
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4	Software metrics	4L																					
5	Testing for Specialized Environments	5L																					
6	Testing Tools & Software Quality Assurance	6L																					
	MODULE-1 [12L+3T]																						
	Course Contents																						
Unit I	Introduction to Software Testing	[5L]																					
	1.1 Introduction, Nature of errors 1.2 Testing Objectives 1.3 Testing principles 1.4 Testing fundamentals 1.5 Software reviews, Formal Technical reviews 1.6 Inspection and walkthrough 1.7 Testing Life Cycle																						
Unit II	Approaches to Testing –Testing Methods	[5 L]																					

	2.1 White Box Testing and types of white box testing 2.2 Test Case Design 2.3 Black Box Testing and types of black box testing 2.4 Gray Box Testing	
Unit III	Software Testing Strategies & Software metrics	[5 L]
	3.1 Software Testing Process 3.2 Unit Testing 3.3 Integration- Top-down ,Bottom up 3.4 System Testing 3.5 Acceptance Testing (alpha, Beta testing) 3.6 Validation and Verification 3.7 Big Bang Approach 3.8 Sandwich approach 3.9 Performance Testing 3.10 Regression Testing 3.11 Smoke Testing 3.12 Load Testing	
MODULE-2 [12L+3T]		
Unit IV	Software metrics	[4 L]
	4.1 Introduction 4.2 Basic Metrics –size-oriented metric, Function –oriented metric 4.3 Cyclometric Complexity Metrics Examples on Cyclometric Complexity	
Unit V	Testing for Specialized Environments	[5 L]
	5.1 Testing GUI's 5.2 Testing of Client/Server Architectures 5.3 Testing Documentation and Help Facilities 5.4 Testing for Real-Time Systems	
Unit VI	Testing Tools & Software Quality Assurance	[6 L]
	6.1 JUnit, Apache JMeter, Win runner 6.2 Load runner, Rational Robot 6.3 Quality Concepts, Quality Movement, Background Issues, SQA activities 6.4 Formal approaches to SQA 6.5 Informal Reviews	

Reference Books:

1. Software Engineering-A Practitioner's approach, Roger S Pressman, 7th Edition Tata McGraw-Hill
2. Effective Methods of Software Testing, William E Perry, Wiley Publishing Inc.
3. Software Testing Principles and Practices, Srinivasan Desikan, Gopalswamy Ramesh, Pearson Publication.

Course Outcomes:

After studying this course, students will be able to.

CO1: To understand the basic application of techniques used to identify useful ideas for tests;

CO2: To understand and describe the basic concepts of functional software testing;

CO6: To understand knowledge of basic SQA;

SEMESTER VI		
NEP-2020: Third Year UG Major BCA(Science)		
Course Code: BSMAP- 364		Course Type: Practical
Course Name: Advanced Java Lab		Credits allotted:2 credits
Lectures allotted: 60 Lectures		
Sr. No.	Assignment	No of Sessions
1	Database Programming To communicate with a database using java. To execute queries on tables. To obtain information about the database and tables.	4
2	Multithreading To create and use threads in java. To demonstrate multithreading using Thread Synchronization, Inter-thread . Communication, Thread Priorities.	3
4	Servlets To understand server-side programming. Simple steps to create and execute servlets. How to pass parameters using doGet and doPost methods. Handling data from HTML to servlet . How to connect a servlet to a database . Use of various session tracking methods like Cookies.	3
5	Java Server Pages JSP life-cycle. Use of JSP implicit objects. JSP Directives. Use of Scripting Elements. To understand actiontags in JSP. Understanding flow of JSP custom tags.	3
6	Spring Framework To create and understand the steps to develop Spring application.	2
	Total 15	

Course Outcome

After studying this course, student will able to –

CO1: Establish **JDBC connections**, execute SQL queries, and manage database interactions in Java.;

CO2: Develop multithreaded applications and demonstrate **thread synchronization, inter-thread communication**, and **thread priorities**;

CO4: Develop and deploy **Servlets**, pass parameters via HTTP methods, and manage **session tracking** using **cookies**;

CO5: Create dynamic web pages using **JSP**, understand its lifecycle, and work with **JSP directives, scripting elements**, and **custom tags**;

CO6: Develop applications using the **Spring Framework**, implement **Inversion of Control, Dependency Injection**, and **Spring MVC** for web applications;

SEMESTER VI		
NEP-2020: Third Year UG Major BCA(Science) Course Code: BSMAP- 365 Course Type: Practical Course Name: Data Mining Lab Credits allotted: 2 credits Lectures allotted: 60 Lectures		
Sr. No.	Assignment	No of Sessions
1	R Programming Basics, Programs using List, Matrix, String and Factors, Program using data frame and visualization	4
2	Data Preprocessing	2
3	Classification	2
4	Association Rules	2
5	Regression Analysis and Outlier detection	2
6	Clustering	3
	Total 15	
Course Outcomes After studying this course, student will able to – CO1: Implement data mining tasks using R; CO2: Perform different phases of data pre-processing such as data cleaning, data integration, Data transformation and data reduction ; CO3: demonstrate the different classification algorithms; CO4: Implement association rule mining algorithms; CO5: Simulation of different regression analysis; CO6: implement clustering algorithm;		

SEMESTER VI**NEP-2020: Third Year UG Major Elective BCA(Science)****Course Code: BSMET -366A****Course Type: Theory****Course Name: Android Programming****Credits allotted: 2 Credits****Lectures allotted: 30 Lectures****Credits allotted: 2Credits**

Chapter No	Name of the Chapter	Lectures Assigned
1	Introduction to Android	6L
2	Activities, Fragments and Intents	5L
3	Android User Interface	4L
4	Designing Your User Interface with Views	8L
5	Databases - SQLite, Messaging and E-mail	7L

MODULE-1 [12L+3T]

	Course Contents	
Unit I	Introduction to Android	[6 L]
	1.1 Overview 1.2 History 1.3 Features of Android 1.4 Architecture of Android 1.5 SDK Overview 1.6 Creating your first Android Application	
Unit II	Activities, Fragments and Intents	[5 L]
	2.1 Introduction to Activities 2.2 Activity Lifecycle 2.3 Introduction to Intents 2.4 Linking Activities using Intents 2.5 Calling built-in applications using Intents 2.6 Introduction to Fragments 2.7 Adding Fragments Dynamically 2.8 Lifecycle of Fragment 2.9 Interaction Between Fragment 2.10 Toast	
Unit III	Android User Interface	[4 L]

	3.1 Understanding the components of a screen 3.2 Adapting to Display Orientation 3.3 Split Screen/Multi-Screen Activities	
	MODULE-2 [12L+3T]	
Unit IV	Designing Your User Interface with Views	[8 L]
	4.1 Using Basic Views 4.2 Using Picker Views 4.3 Using List Views to Display Long Lists 4.4 Understanding Specialized Fragments 4.5 Displaying Pictures and Menus 4.6 Video View	
Unit V	Databases - SQLite, Messaging and E-mail	[7 L]
	5.1 Introduction to SQLite 5.2 SQLiteOpenHelper and SQLite Database 5.3 Creating and Using database 5.4 Working with Cursors 5.5 Building and Executing Queries 5.6 SMS Messaging 5.7 Sending E-mail	
Reference Books: Reference Book 1: Android Programming with Kotlin for Beginners by John Horton Reference Book 2: Head First Android Development: A Brain-Friendly Guide Reference Book 3: Android App Development for Dummies, 3ed Course Outcome After studying this course, student will able to – CO1: Understand the Basics of Android Development; CO2: Work with Android Activities, Fragments, and Intents; CO3: Design and Implement Android User Interfaces; CO4: Create Interactive and User-Friendly Interfaces; CO5: Use SQLite Database for Data Storage; CO6: Develop and Deploy Real-World Android Applications;		

SEMESTER VI		
NEP-2020: Third Year UG Major Elective BCA(Science)		
Course Code: BSMEP-367A		Course Type: Practical
Course Name: Android Programming Lab		Credits allotted: 2 Credits
Lectures allotted: 60 Lectures		
Sr. No.	Assignment	No of Sessions
1	Introduction to Android	2
2	Activities, Fragments and Intents	2
3	Android User Interface	2
4	Designing User Interface with Views	3
5	Databases-SQLite, Messaging and E-mail	3

6	Location-Based Services and Google Map	3
	Total 15	
Course Outcome: After studying this course, student will able to – CO1: Understand Android Development Basics; CO2: Work with Activities, Fragments, and Intents; CO3: Design and Implement Android User Interfaces; CO4: Create Dynamic User Interfaces with Views; CO5: Implement SQLite Database for Local Data Storage; CO6: Implement Location-Based Services and Google Maps;		

SEMESTER VI		
NEP-2020: Third Year UG Major Elective BCA(Science) Course Code: BSMET-366B Course Type: Theory Course Name: Basics of Data Analytics using spreadsheet Lectures allotted: 30 Lectures Credits allotted: 2 credits		
Chapter No	Name of the Chapter	Lectures Assigned
1	Introduction to Data analytics	8L
2	Big Data	7L
3	Data Visualization	7L
4	Data, Ethics, and Industry: Case Studies	8L
MODULE-1 [12L+3T]		
	Course Contents	
Unit I	Introduction to Data analytics	[8L]
	1.1 Understanding data and its types (structured, unstructured, semi-structured) 1.2 Types of Data attributes 1.3 What is Data Analytics 1.4Types of data Analytics 1.5 Importance of Data Analytics 1.6 Data Analytics Lifecycle 1.7 Need of Data Analytics 1.8 Applications of Data Analytics	

Unit II	BIG DATA	[7L]
	2.1 Introduction to Big Data 2.2 5 V's of Big Data 2.3 Impact of Big Data on DBMS 2.4 Big Data Platforms 2.5 Introduction to HADOOP 2.6 Big Data Infrastructure 2.7 Use of Big Data in Data Analytics 2.8 Challenges with Big Data	
MODULE-2 [12L+3T]		
Unit III	DATA VISUALIZATION	[7L]
	3.1 Introduction to Data visualization 3.2 Principles of Data visualization 3.3 Types of Data visualization 3.4 Process and Applications of Data visualization 3.5 Choosing the right visualization 3.6 Dashboard development tools 3.7 Creating an interactive dashboard with slicers and timeline 3.8 Creating and customizing PivotTables and Pivot Charts	
Unit IV	DATA, ETHICS, AND INDUSTRY: CASE STUDIES	[8L]
	4.1 Data Collection Methods 4.2 Different Data Sources & format 4.3 Data Cleaning and Transformation 4.5 Handling Missing Data and Outliers 4.6 Ethical considerations in data analytics 4.7 Real-world Applications of Data Analytics 4.8 Industry-specific applications (finance, marketing, operations) - Case Study Note: Case study is for discussion not to be considered for evaluation.	
Course Outcomes: After studying this course, students will be able to. CO1: Identify the fundamental concepts of data analytics CO2: Apply data analysis techniques for applications handling large data CO3: Explain the design process to develop visualization methods and visualization systems, and methods for their evaluation CO4: Visualize and present the inference using various tools CO5: Analyze through the ethics surrounding privacy, data sharing and algorithmic decision-making		
Reference Books: • Too Big to Ignore: The Business Case for Big Data - <i>By Phil Simon</i> • Creating Value with Social Media Analytics: Managing, Aligning, and Mining Social Media Text, Networks, Actions, Location, Apps, Hyperlinks, Multimedia, & Search Engines Data - <i>By Gohar F. Khan</i>		

NEP-2020: Third Year UG Major Elective BCA(Science) Course Code: BSMEP-367B Course Name: Basics of Data Analytics using spreadsheet Lab Credits allotted: 2 credits			Course Type: Practical Lectures allotted: 60 Lectures
Sr. No.	Assignment	No of Sessions	
1	Introduction to Excel and Basic Functions	2	
2	Descriptive Statistics Using Excel	3	
3	Advanced Spreadsheet Functions	3	
4	Data Visualization Techniques	3	
5	Dashboard Creation	2	
6	Data Importing and Pre-processing	2	
	Total 15		
Course Outcome After studying this course, student will able to – CO-1: understand basic functions using Excel; CO-2: illustrate statistics functions using Excel; CO-3: Develop proficiency in using spreadsheet software for data manipulation and analysis; CO-4: visualize data by applying different techniques; CO-5: implement dashboard creation by different dashboard elements; CO-6: analyze data by applying Preprocessing methods			

SEMESTER VI	
NEP-2020: Third Year UG Major Elective BCA(Science)	
Course Code: ELCMIT-361	Course Type: Theory
Course Name: Principles of Communication Systems	
Lectures allotted: 30 Lectures	Credits allotted: 2 Credits
Unit No.	Title and Contents
Module 1	
1	Introduction to Electronic Communication (9) Introduction to Communication, Elements of Electronic Communication system. Types of communication: simplex, half duplex, full duplex, baseband and broadband. Electromagnetic spectrum: Frequency, Amplitude, Noise, Signal and channel bandwidth. Serial and parallel communication, Types of Serial communication: synchronous, asynchronous. Information Theory: rate of information (data rate, baud rate), channel capacity, Signal to noise ratio, Noise Figure, Nyquist theorem, Shannon theorem. Introduction and necessity of Error handling codes: Hamming code (in detail), CRC. Antenna: Introduction, Need, working Principle, Parameters of antenna: Gain, Directivity, Radiation pattern, Beam width, Bandwidth, front to back ratio (FBR).
2	Modulation and Demodulation (9) Introduction to concepts of modulation and demodulation. Need of Modulation, Modulation techniques: Analog modulation: Amplitude, Frequency and Phase modulation, Equation of AM and FM Modulated wave, modulation index and frequency spectrum, working of transistorized amplitude modulator and diode demodulator. (Phase and Frequency modulation circuits are not expected). Pulse Modulation, Pulse Amplitude Modulation (PAM), PWM, PPM (Concepts only). FSK, QPSK, QAM.

	Digital Modulation techniques: Pulse Code Modulation (PCM), delta modulation.
Module 2	
3	Multiplexing, Multiple Access System and Spread Spectrum (7) Introduction to Multiplexing Principles, Concept of Time division multiplexing and Code division multiplexing. Introduction to multiple access and corresponding access types: FDMA, TDMA, CDMA. Concept and types of Spread Spectrum techniques: Frequency hopping Spread Spectrum, Direct Sequence Spread Spectrum.
4	Wireless Communication Systems [5] Introduction to wireless communication system, Need of wireless communication systems. Introduction to mobile communication, Cellular concept, Working of GSM, Handover, Introduction to GPRS. Introduction to RFID, ZigBee, Bluetooth and Wi-Fi (Comparison Based on range, data rate, frequency, Power).
Text and Reference Books:	
1	Communication Electronics: Principles and Applications , by Frenzel, 5th edition, Tata McGraw Hill Publication.
2	Electronic Communication Systems , by George Kennedy, Bernard Davis, 5th Edition (2008), McGraw-Hill Education.
3	Data Communication and Networking , Forouzan, 5th edition, Mc Graw Hill publication.
Course Outcomes (COs) On completion of the course, the students will be able to:	
CO1:	Demonstrate of Electronic Communication Systems.
CO2:	Apply Information Theory to Communication Systems.
CO3:	Analyze Modulation Systems.
CO4:	Implement and Compare Multiplexing Techniques.
CO5:	Understand Wireless Communication Technologies.
CO6:	Demonstrate Modern Communication Systems and Applications.

SEMESTER VI	
NEP-2020: Third Year UG Major Elective BCA(Science)	
Course Code: ELCMIP-362	Course Type: Practical
Course Name: Electronics Practical Lab-4	
Lectures allotted: 60 Lectures	Credits allotted: 2 Credits
Sr. No.	Title of Experiment/ Practical
Total 10 experiments or 8 experiments along with one mini project (equivalent to 2 practical) should be performed by the student.	
1	Study of Radiation Pattern of an Antenna.
2	Study the generation and detection of amplitude-modulated (AM) signals.
3	Study the generation of frequency-modulated (FM) signals.
4	Generate and analyze a pulse amplitude modulated (PAM) signal.
5	Study the generation of ASK signals.
6	Study the generation of FSK signals.
7	Implement and analyze 3 or 4 bit pulse code modulation.

8	Study of Sampling theorem.
9	Error Detection and Correction using Hamming code.
10	Study the principles of Time Division Multiplexing
11	Understand the concept of Code Division Multiplexing and its application.
12	To study the PN sequence generator.
13	Report writing on Wireless technologies like RFID, Zigbee, Bluetooth, and Wi-Fi.
14	Study of Frequency Division Multiplexing.
Course Outcomes (COs): On completion of the course, the students will be able to:	
CO1	Recognize need of various circuit elements in analogue and digital communication systems.
CO2	Acquire skills of studying and analyzing the responses of electronic communication circuits.
CO3	Analyze observations of each experiment based on the aim and objectives of an experiment.
CO4	Evaluate observed outputs with expected theoretical outputs.
CO5	Discuss the need and requirement of electronic communication systems in daily life.
CO6	Acquire the skill of design and build his /her simple circuit ideas

PDEA's
Prof. Ramkrishna More ACS College, Akurdi, Pune 44 (Autonomous)
Internal Examination Paper Pattern

Marks: 20
Subject Code/Name:

Time: 1 Hour
Date:

Q.1) Multiple Choice Questions/ Fill in the Blanks **[1M X 5 = 5 Marks]**

Q.2) State whether the following statements are true or false **[1M X 5 = 5 Marks]**

Q.3) Answer the following questions. **[1M X 10 = 10 Marks]**

Total No of Questions: 4

Seat No:

PDEA's, Prof. Ramkrishna More
Arts Commerce and Science College Akurdi (Autonomous), Pune, 411044

CLASS Name Semester End Examination Semester – I

NEP -2020; CBCS Pattern - 2023

Course Code, Course Name

Instructions to the Candidate:

1. All questions are compulsory.
2. Figures to right indicate full marks.
3. Use of log table and scientific calculator is allowed.

Time: 2 Hours

Marks: 35

Credits: 02

Q-1] Solve any five of the following

[5 marks]

- i.
[CO----]
- ii.
[CO----]
- iii.
[CO----]
- iv.
[CO----]
- v.
[CO----]
- vi.
[CO----]
- vii.
[CO----]

Q-2: A] Solve any two of the following

[6 marks]

- i.
[CO----]
- ii.
[CO----]
- iii.
[CO----]

Q-2: B] Answer any one of the following

[4 marks]

i.
[CO-----]

ii.
[CO-----]

Q-3: A] Attempt any two of the following

[6 marks]

i .
[CO-----]

ii.
[CO-----]

iii.
[CO-----]

Q-3: B] Answer any one of the following

[4 marks]

i.
[CO-----]

ii.
[CO-----]

Q-4] Answer any four of the following

[10 marks]

i.
[CO-----]

ii.
[CO-----]

iii.
[CO-----]

iv.
[CO-----]

v.
[CO-----]

OE/GE For BCA (Science) Students

Psychology F.Y GE/OE 2023 Pattern

NEP-2020: First Year UG SEM-I- OE/GE – Psychology 2023 Pattern

Course Code: PSGET-111

Course Type: Theory

Course Name: Personality Development-I

Credit Allotted – 2

Lectures Allotted: 24+6 lectures

Module 1: Introduction

(12+3 lectures)

- 1.1 Personality: Definition and Meaning
- 1.2 Factor Effecting on Personality development.
- 1.3 SWOT Analysis
- 1.4 Five Pillars of personality development
- 1.5 Assessment of personality

Module 2: Core factors of personality

(12+3 lectures)

- 2.1 Self Esteem: Definition and Nature
- 2.2 Positive & Negative Self Esteem
- 2.3 Habits: Definition and Nature
- 2.4 Seven habits of highly effective people
- 2.5 Bad habits effect on personality development-
(Emotional immaturity, Over thinking, lack of sleep, lack of healthy food, & lack of exercise)

Reference:

1. Parulekar, A. (2003) Vyaktimatva Kase Ghadval Unmesh Prakashan.
2. Nemade, J. M. (2021) Personality Development. Prashant Publications
3. Covey, S. R. (2011) Seven habits of highly effective people Franklin Covey Company
4. Ghate, D.D. (2021) Personality Development. Vision Publications

Course Outcome

At the end of course, student will able -

- CO1:** To help students understand meaning of personality.
- CO2:** Students will be getting knowledge self-analyse process.
- CO3:** Students will be getting knowledge process of personality.
- CO4:** Will be get knowledge and gain insight about self.
- CO5:** Summarize and point out factors of habits.
- CO6:** Gain insight into complex and analyse the experience of self in day-to-day life.

NEP-2020: First Year UG SEM-I- OE/GE – Psychology (2023 Pattern)

Course Code: PSGET-112

Course Type: Theory

Course Name: Personality Development-II

Credit Allotted – 2

Lectures Allotted: 24+6 lectures

Module 1: Personality Determinants

(12+3 lectures)

1.1 Physical & Intellectual Determinant

1.2 Emotional & Social Determinant

1.3 Sex & Family Determinant

1.4 Aspiration & Achievements Determinant

1.5 Educational Determinant

Module 1: Symbol of self

(12+3 lectures)

1.1 Names and Nicknames, Clothing, Speech

1.2 Age, Success, Reputation

1.3 Roger's Self-Concept: Ideal & Real

1.4 Locus of Control

1.5 Development of Self Concept

Reference:

1. Parulekar, A. (2003) Vyaktimatva Kase Ghadval Unmesh Prakashan.
2. Nemade, J. M. (2021) Personality Development. Prashant Publications.
3. Hurlok, E. B. (2004) Personality Development Tata McGraw-Hill.
4. Ghate, D.D. (2021) Personality Development. Vision Publications

Course Outcome

At the end of course, student will able -

CO-1: To help students understand Theory of personality.

CO-2: Students will be getting knowledge Characteristics of Sick & Healthy Personality.

CO-3: Students will be getting knowledge process of Sick & Healthy personality.

CO-4: will be get knowledge and gain insight about Coping with sickness.

CO-5: Summarize and point out Enhanced healthy Personality of personality.

CO-6: Gain insight into complex and analyse the experience of self in day-to-day life.

Course Code: PSGET-121

Course Type: Theory

Course Name: Personality Development-III

Credit Allotted – 2

Lectures Allotted: 24+6 lectures

Module 1: Factors of personality development

(12+3 lectures)

1.1 Communication

1.2 Teamwork

1.3 Time management

1.4 Decision making

1.5 Interpersonal relationships

Module 2: Factors of Ideal personality

(12+3 lectures)

2.1 Assertiveness

2.2 Analysis of Strength

2.3 Emotional Awareness

2.4 Empathy of others

2.5 Good Manners and etiquette

Reference:

1. Parulekar, A. (2003) Vyaktimatva Kase Ghadval Unmesh Prakashan.
2. Nemade, J. M. (2021) Personality Development. Prashant Publications
3. Covey, S. R. (2011) Seven habits of highly effective people Franklin Covey Company

Course Outcome

At the end of course, student will able –

CO1: To help students understand Concept of role in personality development.

CO2: Students will be getting knowledge self-analyse process.

CO3: Students will be getting knowledge process of personality.

CO4: Will be get knowledge and gain insight about self.

CO5: Summarize and point out factors of habits.

CO6: Gain insight into complex and analyse the experience of self in day-to-day life.

NEP-2020: First Year UG SEM-II -OE/GE - Psychology

Course Code: PSGET-122

Course Type: Theory

Course Name: Personality Development-IV

Credit Allotted – 2

Lectures Allotted: 24+6 lectures

Module 1: Sick & Healthy Personality

(12+3 lectures)

- 1.1 Characteristics of Sick & Healthy Personality
- 1.2 Causes of sickness Personality
- 1.3 Causes of healthy Personality
- 1.4 Coping with sickness Personality
- 1.5 Enhanced healthy Personality

Module 1: Personality Theory

(12+3 lectures)

- 2.1 Freud Personality theory: Id, Ego, Super Ego
- 2.2 Freud: Conscious, subconscious & unconscious mind
- 2.3 Freud: Defense Mechanism
- 2.4 Transaction Analysis: PCA ego states
- 2.5 Personality theory: Karl Jung & Allport's Trait Theory

Reference:

- 1. Parulekar, A. (2003) Vyaktimatva Kase Ghadval Unmesh Prakashan.
- 2. Nemade, J. M. (2021) Personality Development. Prashant Publications.
- 3. Hurlock, E. B. (2004) Personality Development Tata McGraw-Hill.

Course Outcome

At the end of course, student will able -

CO-1: To help students understand Theory of personality.

CO-2: Students will be getting knowledge Characteristics of Sick & Healthy Personality.

CO-3: Students will be getting knowledge process of Sick & Healthy personality.

CO-4: will be get knowledge and gain insight about Coping with sickness.

CO-5: Summarize and point out Enhanced healthy Personality of personality.

CO-6: Gain insight into complex and analyse the experience of self in day-to-day life.

Psychology GE/OE S.Y.2023 Pattern

Name of the Programme	: B.A. Psychology	Program Code	: BAPSY
Class	: B.A. II	Semester	: III
Course Type	: Generic Elective		
Course Name	: Psychology of Health and Well-being		
Course Code	: PSGET-231		
No. of hours	: 30		
No. of Credits	: 02		

Course Outcome

At the end of course, student will able -

- CO1:** To understand the basics of health and well-being.
- CO2:** To understand the basics of stress and coping.
- CO3:** To manage stress through coping strategies.
- CO4:** To understand importance of health management
- CO5:** To develop health enhancing and protective behaviour
- CO6:** To promoting human strengths and life enhancement

Unit-1: Health, Wellbeing and Stress

[15]

- 1.1 Illness, Health and Wellbeing: meaning and nature
- 1.2 Models of health and illness: Medical, Bio psychosocial; Holistic Health;
- 1.3 Stress and Coping: Nature and Sources of Stress; Personal and Social
- 1.4 Mediators of Stress; Effects of Stress on Physical and Mental Health;
- 1.5 Coping and Stress management

Unit-2: Enhancing Health Management

[15]

- 2.1 Health Management: Meaning and Nature
- 2.2 Health enhancing behaviours: Exercise, Nutrition, Meditation, Yoga
- 2.3 Health compromising behaviours (alcoholism, smoking, internet addiction);
- 2.4 Health Protective behaviours, Illness Management.
- 2.5 Promoting Human Strengths and Life Enhancement: Strength realizing and overcoming weakness

READINGS:

- Ogden, J. (2017). Health psychology: A textbook (4th ed.). McGraw Hill Education.
- Sarafino, Edward P and Smith, Timothy W (2012). Health Psychology - Bio psychosocial Interaction (7th ed). Wiley India Edition.
- Taylor, Shelley E. (2018). Health Psychology (10th ed). McGraw Hill Higher Education. Indian Edition
- Weiten, W. and Lloyd, M. (2007). Psychology applied to modern life: Adjustment in the 21st century, Indian Edition 8th. Thomson
- देशमुख एन. व्ही., निकम, आर. एन., दरेकर. डी. जे. (२०२०). आरोग्य मानसशास्त्र. प्रशांत पब्लिकेशन्स.
- गाडेकर के. (२०२०). आरोग्याचे मानसशास्त्र. डायमंड पब्लिकेशन्स, पुणे.

Psychology GE/OE S.Y. 2023 Pattern

Name of the Programme	: B.A. Psychology	Program Code	: BAPSY
Class	: B.A. II	Semester	: IV
Course Type	: Generic Elective		
Course Name	: Psychology of Physical and Mental Health		
Course Code	: PSGET-241		
No. of hours	: 30		
No. of Credits	: 02		

Course Outcome

At the end of course, student will able -

- CO1:** Understand nature of Stress, Personality and Illness
- CO2:** Explore relationship between Personality, Emotions and diseases

- CO3:** Understand Habits, Lifestyles, and Health
CO4: Understand the concept of abnormality.
CO5: Understand criteria and classifications of disorders.
CO6: Explore the process of treatment for abnormalities.

UNIT-1: PSYCHOLOGY AND PHYSICAL HEALTH

[15]

- 1.1 Stress, Personality, and Illness
- 1.2 Personality, Emotions, and Heart disease
- 1.3 Stress, Cancer, Other diseases, immune functioning
- 1.4 Habits, Lifestyles, and Health: Smoking, Drinking, Overeating, Poor nutrition, Lack of exercise
- 1.5 Reactions to illness: the decision to seek treatment, the sick role, communicating with health providers, adherence to medical advice

UNIT-2: INTRODUCTION TO PSYCHOLOGICAL DISORDERS

[15]

- 2.1 Definition and concept of abnormality.
- 2.2 Abnormal behavior: myths and realities, the medical model applied to abnormal behavior
- 2.3 Criteria of abnormal behavior: Biological, Psychological, Socio-cultural
- 2.4 Psychodiagnosis: the classification of disorders, the prevalence of psychological disorders
- 2.5 The Elements of the Treatment Process: Treatments, Clients, Therapists - Psychologists, Psychologists, & Other Mental Health Professionals.

Reading:

Weiten, W. and Lloyd, M. (2018). Psychology applied to modern life: Adjustment in the 21st century, Thomson

Butcher, J. N., Hooley, J. M., & Mineka, S., (2014). Abnormal Psychology. (16th ed.). Pearson education.

राजहंस, एम., पाटील, ए., सुर्वे, एस. (२०१२). अपसामान्यांचे मानसशास्त्र. उन्मेष प्रकाशन, पुणे.

Psychology F.Y GE/OE 2024 Pattern

Name of the Programme	: B.A. Psychology	Program Code	: BAPSY
Class	: B.A. I	Semester	: I
Course Type	: Generic Elective – 1A		
Course Code	: PSGET-111		
Course Name	: <i>Psychology of Adjustment and Stress</i>		
No. of hours	: 30		
No. of Credits	: 02		

Course Outcome

At the end of course, student will able -

- CO1:** Understand nature and goals of psychology
CO2: Describe determinants of adjustment
CO3: Describe determinants of perception towards change.
CO4: Discuss the different types of stress and responses to it.
CO5: Understand common coping patterns.
CO6: Differentiate ways of coping with stressors in modern life.

UNIT 1: INTRODUCTION TO PSYCHOLOGY, ADJUSTMENT AND STRESS [15]

- 1.1 Psychology: Definition, Nature, Scope and Goals
- 1.2 Adjustment: Definition, Determining Adjustment in Individuals
- 1.3 Perception of Change: Positive and Negative Change Events, Planned and Unplanned Change,
- 1.4 Stress: Meaning and Nature; Types of stress
- 1.5 Responses to Stress: Emotional, Physiological, Behavioural Responses

UNIT 2: COPING WITH STRESS

[15]

- 2.1 Common Coping Patterns: Giving Up, Striking Out at Others, Indulging Yourself, Blaming Yourself, Using Defensive Coping
- 2.2 Appraisal-Focused Constructive Coping: Ellis's Rational Thinking and Humor
- 2.3 Problem-Focused Constructive Coping: Using Systematic Problem Solving, Seeking Help, and Using Time More Effectively
- 2.4 Emotion-Focused Constructive Coping: Enhancing Emotional Intelligence, Releasing Pent-Up Emotions
- 2.5 Coping with Occupational Hazards: Job Stress, Sexual Harassment, and Unemployment

READINGS:

- Ciccarelli, S. K., White, J. N., & Mishra, G. (2018). Psychology (5th Ed. Indian Adaptation). Pearson India Education Services Pvt. Ltd. 15
- Feldman, S. R. (2021). Essentials of understanding psychology (14th Ed.) McGraw Hill.
- Moritsugu, J., Vera, E.M., Jacobs, J.H. & Kennedy, M. (2017). Psychology of Adjustment: The Search for Meaningful Balance. New Delhi: Sage Publications, Inc.
- Ogden, J. (2017). Health psychology: A textbook (4th ed.). McGraw Hill Education.
- Taylor, S. E. (2018). Health Psychology (10th ed). McGraw Hill Higher Education. Indian Edition
- Weiten, W.; Dunn, D. S. & Hammer, E. Y. (2018). Psychology applied to modern life: Adjustment in the 21st century (12th Ed.). Canada: Cengage L

Psychology F.Y. GE/OE 2024 Pattern

Name of the Programme	: B.A. Psychology	Program Code	: BAPSY
Class	: B.A. I	Semester	: II
Course Type	: Generic Elective-1B		
Course Code	: PSGET-121		
Course Name	: Psychology of Interpersonal Relationships		
No. of hours	: 30		
No. of Credits	: 02		

Course Outcome

At the end of course, student will able –

- CO1: Explain perspectives on close relationships.
- CO2: Discuss psychological aspects of friendship and romantic love.
- CO3: Discuss Initial Attraction and Relationship Development.
- CO4: Understand basics of counselling in marital setups.
- CO5: To discuss marriage related process and adjustment.
- CO6: Evaluate factors related to vulnerable areas in marital adjustment.

UNIT 1: FRIENDSHIP AND LOVE

[15]

- 1.1 Perspectives on Close Relationships: The Ingredients of Close Relationships, Culture and Relationships, and the Internet and Relationships
- 1.2 Initial Attraction and Relationship Development: Initial Encounters, Getting Acquainted, and Established Relationships
- 1.3 Friendship: What Makes a Good Friend? Gender Differences in Friendship
- 1.4 Romantic Love: Sexual Orientation and Love, Gender Differences Regarding Love,
- 1.5 Theories of Love: Sternberg and Hendricks theory

UNIT 2: ISSUES IN MARRIAGE

[15]

- 2.1 Counselling: nature and Definition

2.2 Pre-marital counselling: nature and steps

2.3 Moving Toward Marriage: The Motivation to Marry, Selecting a Mate, Predictors of Marital Success

2.4 Marital Adjustment: across the Family Life Cycle

2.5 Vulnerable Areas in Marital Adjustment: Gaps in Role Expectations, Work and Career Issues, Financial Difficulties, Inadequate Communication

References:

Baron, R. A., Branscombe, N. R., and Byrne, D. Bhardwaj, Gopa. (2008). Social Psychology. (12th ed.). New Delhi: Pearson Education, Indian subcontinent adaptation 2009.

Weiten, W.; Dunn, D. S. and Hammer, E. Y. (2018). Psychology applied to modern life: Adjustment in the 21st century (12th ed.). Cengage Learning, Canada.

Psychology S.Y.GE/OE 2024 Pattern

Name of the Programme	: B.A. Psychology	Program Code	: BAPSY
Class	: B.A. II	Semester	: III
Course Type	: Generic Elective		
Course Name	: Psychology of Health and Well-being		
Course Code	: PSGET-231		
No. of hours	: 30		
No. of Credits	: 02		

Course Outcome

At the end of course, student will able -

CO1: To understand the basics of health and well-being.

CO2: To understand the basics of stress and coping.

CO3: To manage stress through coping strategies.

CO4: To understand importance of health management

CO5: To develop health enhancing and protective behaviour

CO6: To promoting human strengths and life enhancement

Unit-1: Health, Wellbeing and Stress

[15]

1.1 Illness, Health and Wellbeing: meaning and nature

1.2 Models of health and illness: Medical, Bio psychosocial; Holistic Health;

1.3 Stress and Coping: Nature and Sources of Stress; Personal and Social

1.4 Mediators of Stress; Effects of Stress on Physical and Mental Health;

1.5 Coping and Stress management

Unit-2: Enhancing Health Management

[15]

2.1 Health Management: Meaning and Nature

2.2 Health enhancing behaviours: Exercise, Nutrition, Meditation, Yoga

2.3 Health compromising behaviours (alcoholism, smoking, internet addiction);

2.4 Health Protective behaviours, Illness Management.

2.5 Promoting Human Strengths and Life Enhancement: Strength realizing and overcoming weakness

READINGS:

Ogden, J. (2017). Health psychology: A textbook (4th ed.). McGraw Hill Education.

Sarafino, Edward P and Smith, Timothy W (2012). Health Psychology - Bio psychosocial Interaction (7th ed). Wiley India Edition.

Taylor, Shelley E. (2018). Health Psychology (10th ed). McGraw Hill Higher Education. Indian Edition

Weiten, W. and Lloyd, M. (2007). Psychology applied to modern life: Adjustment in the 21st century, Indian Edition 8th. Thomson

देशमुख एन. व्ही., निकम, आर. एन., दरेकर. डी. जे. (२०२०). आरोग्य मानसशास्त्र. प्रशांत पब्लिकेशन्स.

गाडेकर के. (२०२०). आरोग्याचे मानसशास्त्र. डायमंड पब्लिकेशन्स, पुणे.

Psychology S.Y GE/OE 2024 Pattern

Name of the Programme	: B.A. Psychology	Program Code	: BAPSY
Class	: B.A. II	Semester	: IV
Course Type	: Generic Elective		
Course Name	: Psychology of Physical and Mental Health		
Course Code	: PSGET-241		
No. of hours	: 30		
No. of Credits	: 02		

Course Outcome

At the end of course, student will able -

CO1: Understand nature of Stress, Personality and Illness

CO2: Explore relationship between Personality, Emotions and diseases

CO3: Understand Habits, Lifestyles, and Health

CO4: Understand the concept of abnormality.

CO5: Understand criterias and classifications of disorders.

CO6: Explore the process of treatment for abnormalities.

UNIT-1: PSYCHOLOGY AND PHYSICAL HEALTH

[15]

1.1 Stress, Personality, and Illness

1.2 Personality, Emotions, and Heart disease

1.3 Stress, Cancer, Other diseases, immune functioning

1.4 Habits, Lifestyles, and Health: Smoking, Drinking, Overeating, Poor nutrition, Lack of exercise

1.5 Reactions to illness: the decision to seek treatment, the sick role, communicating with health providers, adherence to medical advice

UNIT-2: INTRODUCTION TO PSYCHOLOGICAL DISORDERS

[15]

2.1 Definition and concept of abnormality.

2.2 Abnormal behavior: myths and realities, the medical model applied to abnormal behavior

2.3 Criteria of abnormal behavior: Biological, Psychological, Socio-cultural

2.4 Psychodiagnosis: the classification of disorders, the prevalence of psychological disorders

2.5 The Elements of the Treatment Process: Treatments, Clients, Therapists - Psychologists, Psychologists, & Other Mental Health Professionals.

Reading:

Weiten, W. and Lloyd, M. (2018). Psychology applied to modern life: Adjustment in the 21st century, Thomson

Butcher, J. N., Hooley, J. M., & Mineka, S., (2014). Abnormal Psychology. (16th ed.). Pearson education.

राजहंस, एम., पाटील, ए., सुर्वे, एस. (२०१२). अपसामान्यांचे मानसशास्त्र. उन्मेष प्रकाशन, पुणे.

PDEA'S
Prof. Ramkrishna More Arts Commerce and Science College Akurdi-44.
Department of Political Science
2023-2024
F.Y Open Elective, Semester I
POGET-111: Indian Constitution and Political Process A
[Theory Credit :2, lectures-30]

Chapter Scheme

Unit I : The making of Indian Constitution and its Sources : [15 L]

- A) Historical Background
- B) Preamble –
- C) Salient features of the Indian Constitution.
- D) Critiques

Unit II : Fundamental Right, Duties & SPDP [15 L]

- A) Fundamental Right.
- B) Fundamental Duties.
- C) Directive Principles of State Policy.

Reference and Text Books

1. Bhartiya Rajyaghatna v Ghatnatmak Prakriya
Author : Tukaram Jadhav.
Publication Unique Academy Pune.
2. Introduction to the Constitution of India.
Author Dr. Durga Das Basu.
Publication Wadhwa and Company Law publisher Nagpur Maharashtra.

मराठी संदर्भ पाठ्यपुस्तके

१. लेखक डॉ बाळ कांबळे २०१२ भारताची राज्यघटना राजकारण व कायदा डायमंड प्रकाशन पुणे
२. पाटील बी.बी २०१६ भारतीय शासन आणि राजकारण फडके प्रकाशन कोल्हापूर.
३. डॉ. ज्योती बिडलन - डॉ. देशपांडे भारतीय संविधानाचा परिचय निराली प्रकाशन पुणे.
४. भारतीय शासन आणि राजकारण व राज्याचे शासन
५. प्रा. डॉ. विमल राठोड अंशुल पब्लिकेशन शक्ती माता नगर नागपूर.

Course Outcomes: At the end of syllabus student will able-

CO-1: The new Syllabus for all Faculty Recognise the need to deepen the Students understanding of the provisions & Working of the Constitution of India.

CO-2: This Course Syllabus Will Introduce you to idea of Constitution and the Story of the Making & Working of the Constitution.

CO-3: This Course allows you to Compare India and its Constitution to other Countries in the world having many Similar Concerns.

CO-4: To acquaint Students with the important features of the Constitution of India & with basic frame work of Indian Government and Administrative Structure and Bureaucracy System.

PDEA'S
Prof.Ramkrishna More Arts Commerce and Science College Akurdi-
44.

Department of Political Science
2023 Pattern 2023-24

F.Y Open Elective, Semester I
POGET-112 Indian Constitution and Political Process B
[Theory Credit: 2, lectures-30]

Chapter Scheme

Unit I - Nature of Indian Federation and Centre [15 L]

A) Features.

B) State Government Relations

Unit II - Issues of Conflict. [15 L]

A) River – Water.

B) Border.

C) Language.

Reference and Text Books

1.Bhartiya Rajyaghatna v Ghatnatmak Prakriya

Author : Tukaram Jadhav.

Publication Unique Academy Pune.

2. Introduction to the Constitution of India.

Author Dr.Durga Das Basu.

Publication Wadhwa and Company Law publisher Nagpur Maharashtra.

मराठी संदर्भ पाठ्यपुस्तके

१. लेखक डॉ बाळ कांबळे २०१२ भारताची राज्यघटना राजकारण व कायदा डायमंड प्रकाशन पुणे

२. पाटील बी.बी २०१६ भारतीय शासन आणि राजकारण फडके प्रकाशन कोल्हापूर.

३. डॉ.ज्योती बिडलन - डॉ. देशपांडे भारतीय संविधानाचा परिचय निराली प्रकाशन पुणे.

४. भारतीय शासन आणि राजकारण व राज्याचे शासन

५. प्रा. डॉ.विमल राठोड अंशुल पब्लिकेशन शक्ती माता नगर नागपूर.

Course Outcomes: At the end of syllabus student will able-

CO-1: This Course allows you to Compare India and its Constitution to other Countries in the world having many Similar Concerns.

CO-2: To acquaint Students with the important features of the Constitution of India & with basic frame work of Indian Government and Administrative Structure and Bureaucracy System.

PDEA'S
Prof. Ramkrishna More Arts Commerce and Science College Akurdi-44.

Department of Political Science
2023-24 2023 Pattern

F.Y Open Elective, Semester II
POGET-121 Indian Constitution and Political Process A
[Theory Credit: 2, lectures-30]

Chapter Scheme

Unit I : Union Government and Legislature

[15 L]

- A) Structure of Union Government.
- B) Legislature - Structure & Power.

Unit II : Executive

[15 L]

- A) Executive - President , Vice President.
- B) Prime Minister & Council of Minister.

Reference and Text Books

1. Bhartiya Rajyaghatna v Ghatnatmak Prakriya
Author : Tukaram Jadhav.
Publication Unique Academy Pune.
2. Introduction to the Constitution of India.
Author Dr. Durga Das Basu.
Publication Wadhwa and Company Law publisher Nagpur Maharashtra.

मराठी संदर्भ पाठ्यपुस्तके

१. लेखक डॉ बाळ कांबळे २०१२ भारताची राज्यघटना राजकारण व कायदा डायमंड प्रकाशन पुणे
२. पाटील बी.बी २०१६ भारतीय शासन आणि राजकारण फडके प्रकाशन कोल्हापूर.
३. डॉ. ज्योती बिडलन - डॉ. देशपांडे भारतीय संविधानाचा परिचय निराली प्रकाशन पुणे.
४. भारतीय शासन आणि राजकारण व राज्याचे शासन
५. प्रा. डॉ. विमल राठोड अंशुल पब्लिकेशन शक्ती माता नगर नागपूर.

Course Outcomes: At the end of syllabus student will able-

- CO-1: The new Syllabus for all Faculty Recognize the need to deepen the Students understanding of the provisions & Working of the Constitution of India.
- CO-2: This Course Syllabus Will Introduce you to idea of Constitution and the Story of the Making & Working of the Constitution.

PDEA'S

Prof.Ramkrishna More Arts Commerce and Science College Akurdi-44.

Department of Political Science

2023 Pattern 2023-2024

F.Y Open Elective , Semester II

POGET-122 Indian Constitution and Political Process B

[Theory Credit: 2, lectures-30]

Chapter Scheme

Unit I : Indian Judiciary System.

[15 L]

A) The Supreme Court - Nature Structure, Power and Function.

B) Judicial Review

Unit II: Constitutional Amendments: Scope and Limitations [15 L]

A) Constitutional provisions

B) Major Constitutional Amendments (42, 44, 52 & 86)

C) Basic Structure of the Indian Constitution

Reference and Text Books

1.Bhartiya Rajyaghatna v Ghatnatmak Prakriya

Author : Tukaram Jadhav.

Publication Unique Academy Pune.

2. Introduction to the Constitution of India.

Author Dr.Durga Das Basu.

Publication Wadhwa and Company Law publisher Nagpur Maharashtra.

मराठी संदर्भ पाठ्यपुस्तके

१. लेखक डॉ बाळ कोंबळे २०१२ भारताची राज्यघटना राजकारण व कायदा डायमंड प्रकाशन पुणे

२. पाटील बी.बी २०१६ भारतीय शासन आणि राजकारण फडके प्रकाशन कोल्हापूर.

३. डॉ.ज्योती बिडलन - डॉ. देशपांडे भारतीय संविधानाचा परिचय निराली प्रकाशन पुणे.

४. भारतीय शासन आणि राजकारण व राज्याचे शासन

५.प्रा. डॉ.विमल राठोड अंशुल पब्लिकेशन शक्ती माता नगर नागपूर.

Course Outcomes: At the end of syllabus student will able-

CO-1: This Course allows you to Compare India and its Constitution to other Countries in the world having many Similar Concerns.

CO-2: To acquaint Students with the important features of the Constitution of India & with basic frame work of Indian Government and Administrative Structure and Bureaucracy System.

PDEA'S

Prof.Ramkrishna More Arts Commerce and Science College, Akurdi-44.

Department of Political Science

2023-24 -2023 pattern
S.Y Open Elective, Semester III
POGET-231 An Introduction to Political Science-I
[Theory Credit: 2, lectures-30]

Chapter Scheme

Unit I – Introduction to Political Science	12
a. Meaning and Definition.	
b. Nature of Political Science.	
c. Scope of Political Science.	
d. Approaches to the Study Political Science -Traditional and Modern.	
Unit II – The State	10
a. Meaning and Definition.	
b. Evolution of State.	
c. Nature of State.	
d. Elements of the State.	
Unit III – Sovereignty	08
a. Meaning and Definition.	
b. Evolution of Sovereignty.	
c. Characteristics of Sovereignty.	
d. Types of Sovereignty.	

Reference Books/Text

- 1) An introduction to Political Theory Author: Rajiv Bhargava Publication: Pearson.
- 2) Bryce, Modern Democracies.
- 3) E.Asirvatham, political Theory.
- 4) लेखक : ना य. डोळे राजकीय विचाराचा इतिहास, कॉन्टिनेन्टल प्रकाशन पुणे.
- 5) प्रा. प्रमोद तांबे, राज्यशास्त्र परिचय, निराली प्रकाशन पुणे.
- 6) डॉक्टर विजय देव, आधुनिक राजकीय विश्लेषण कोश डायमंड प्रकाशन पुणे,
- 7) भार्गव राजीव, राजकीय सिद्धांत परिचय अनुवाद हेमंत खानझोडे पीयर्सन प्रकाशन.

Course Outcomes: At the end of syllabus student will able-

CO-1: The students will be able to understand the nature and scope of Political Science.

CO-2: The students shall understand the various traditional and modern approaches to the study of Political Science.

CO-3: The students will understand the basic concepts in Political Science and apply these concepts in making sense of social realities.

POGEP-241 An Introduction to Political Science-II

[Practical Credit: 2, lectures-60]

Syllabus

Activities 1. Write a report on the challenges facing democracy through Newspapers (Any one) 30

- | | |
|--------------------------------|----------------------------------|
| 1. Violation of Freedom | 2. Violation of Equality |
| 3. Violation of Sovereignty | 4. Violation of Justice |
| 5. Violation of Power of State | 6. Other violation of Democracy. |

Activities 2 : Write a report on the challenges facing democracy through films and Short Films. (Any one) 30

- | | |
|-------------------------------------|---------------------------------------|
| 1. Challenges before Freedom | 2. Challenges before Equality |
| 3. Challenges before Sovereignty | 4. Challenges before Justice |
| 5. Challenges before Power of State | 6. Other challenges before Democracy. |

Process of Activity:

1. Students have to complete each activity by studying the Newspapers and Films or Short films.
2. Each student has to complete these activities under the guidance of a guide/mentor. The Department of Political Science will allot the students respective guides/mentors. The Department of Political Science may also appoint guides/mentors from other faculties or subject related industry areas.
3. Students have to choose the topic of activity in consultation with the teacher/guide/mentor.
4. After the study the student has to submit two separate reports and each report will be a minimum of one thousand words. In the report along with write-up must be included photographs, newspaper clippings, images for the support of study. Students can give graphs, tables for statistics.
5. The report should contain objectives, observations and conclusions.
6. After the approval letter from the guide/mentor, students can submit the report to the department.
7. After submission of the report, the department will conduct an interview of students or arrange a presentation in the classroom.
8. Assessment will be done on the basis of a report and interview/presentation.
9. Activity reports will be of 35 marks and the interview will be of 15 marks.

Course Outcome: At the end of course student will able -

CO-1: To enable the students to apply their understanding of basic concepts of Political Science and their application.

CO-2: To understand the various dimensions of state, equality-freedom and democracy through their practical use.

Learning Outcomes :

1. Students will know how to apply the concepts learned in class in real life.
2. The students will know how the contents of Political Science are actually used.

PDEA'S

Prof.Ramkrishna More Arts Commerce and Science College Akurdi-44.

Department of Political Science

2024 Pattern

F.Y Open Elective , Semester I

POGET - 111 Introduction of Indian Constitution

[Theory Credit: 2, lectures-30]

Chapter Scheme

Unit 1 Introduction of Indian Constitution [15 L]

- A) Formation of Constituent Assembly & Definition.
- B) Preamble and Salient features of Indian Constitution.
- C) Provisions borrowed from the Constitutions of different Countries.

Unit 2: Federalism [15 L]

- A) Salient features of Indian Federalism.
- B) Center-State Relations
- C) Issues of Conflict (River Water ,Border and Language.

Reference and Text Books

- 1.Bhartiya Rajyaghatna v Ghatnatmak Prakriya , Tukaram Jadhav. Publication Unique Academy Pune.
2. Introduction to the Constitution of India. Author Dr.Durga Das Basu. Publication Wadhwa and Company Law publisher Nagpur Maharashtra.

मराठी संदर्भ पाठ्यपुस्तके

१. डॉ बाळ कांबळे २०१२ भारताची राज्यघटना राजकारण व कायदा डायमंड प्रकाशन पुणे
२. पाटील बी.बी २०१६ भारतीय शासन आणि राजकारण फडके प्रकाशन कोल्हापूर.
३. डॉ.ज्योती बिडलन - डॉ. देशपांडे, भारतीय संविधानाचा परिचय निराली प्रकाशन पुणे.
४. प्रा. डॉ.विमल राठोड - भारतीय शासन आणि राजकारण व राज्याचे शासन अंशुल पब्लिकेशन शक्ती माता नगर नागपूर.

Course Outcomes: At the end of syllabus student will able-

- CO-1. The new Syllabus for all Faculty recognizes the need to deepen the Students understanding of the provisions & Working of the Constitution of India.
- CO-2. This Course Syllabus Will Introduce you to the idea of the Constitution and the Story of the Making & Working of the Constitution.
- CO-3. This Course allows you to Compare India and its Constitution to other Countries in the world having many Similar Concerns.
- CO-4. To acquaint Students with the important features of the Constitution of India & with basic framework of Indian Government and Administrative Structure and Bureaucracy System.

PDEA'S

Prof.Ramkrishna More Arts Commerce and Science College Akurdi-44.

Department of Political Science

2024 Pattern 2025-2026

F.Y Open Elective , Semester II

POGET-121 Constitutional Process in India

[Theory Credit: 2, lectures-30]

Chapter Scheme

Unit 1: Legislature [10L]

- A) Union Legislature
 - a)Formation b) Structure c) Power
- B) State Legislature
 - a)Formation b)Structure c)Power

Unit 2: Executive [10L]

- A) President -powers, Functions & Role.
- B) Prime Minister Powers- Function & Role

- a) Supreme court powers & Functions.
- b) Judicial Review.

Reference and Text Books

1. Bhartiya Rajyaghatna v Ghatnatmak Prakriya, Tukaram Jadhav. Publication Unique Academy Pune.
2. Introduction to the Constitution of India. Author Dr. Durga Das Basu. Publication Wadhwa and Company Law publisher Nagpur Maharashtra.

मराठी संदर्भ पाठ्यपुस्तके

- १) लेखक: डॉ. बाळ कांबळे २०१२ 'भारताची राज्यघटना, राजकारण व कायदा', डायमंड प्रकाशन, पुणे.
- २) पाटील बी. बी. २०२२ 'भारतीय शासन आणि राजकारण', फडके प्रकाशन, कोल्हापूर.
- ३) डॉ. जोती बीडलान डॉ. देशपांडे. 'भारतीय संविधानाचा परिचय', निराली प्रकाशन, पुणे.
- ४) प्रा. डॉ. विमल राठोड, 'भारतीय शासन आणि राजकारण व राज्याचे शासन', अंशुल पब्लिकेशन, नागपूर.
- ५) चपळगांवकर नरेंद्र, २००२, राज्यघटनेचे अर्धशतक, मौज प्रकाशन, मुंबई
- ६) साठे सत्यरंजन, १९९९, राज्यघटनेची ५० वर्षे, कॉन्टिनेन्टल प्रकाशन, पुणे,
- ७) चपळगांवकर नरेंद्र, २००८, विधीमंडळे आणि न्यायसंस्था, मौज प्रकाशन, मुंबई
- ८) भोळे भा. ल. २००३ भारतीय गणराज्याचे शासन आणि राजकारण, पिंपळापुरे प्रकाशन, नागपूर
- ९) कसबे रावसाहेब, १९९२, डॉ. आंबेडकर आणि भारतीय राज्यघटना, पुणे, सुगावा प्रकाशन

Course Outcomes: At the end of syllabus student will able-

- CO-1. The Study of the working of the Indian Constitution here is a gateway to Studying politics in India,
- CO-2. The new Syllabus for political Science recognise the need to deepen the Students understanding of the provisions and the Working of the Constitution of India.
- CO-3. This Syllabus will introduce you to the idea of the Constitution and the Story of the making and working of the Constitution.
- CO-4 This Syllabus allows you to Compare India and its Constitution to other Countries in the world with many similar Concerns.

Political Science S.Y. GE/OE 2024 Pattern**S.Y Open Elective, Semester III****POGET-231 An Introduction to Political Science-I****[Theory Credit: 2, lectures-30]****Chapter Scheme**

Unit I – Introduction to Political Science	12
a. Meaning and Definition.	
b. Nature of Political Science.	
c. Scope of Political Science.	
d. Approaches to the Study Political Science -Traditional and Modern.	
Unit II – The State	10
a. Meaning and Definition.	
b. Evolution of State.	
c. Nature of State.	
d. Elements of the State.	
Unit III – Sovereignty	08
a. Meaning and Definition.	
b. Evolution of Sovereignty.	
c. Characteristics of Sovereignty.	

d. Types of Sovereignty.

Reference Books/Text

- 1) An introduction to Political Theory Author: Rajiv Bhargava Publication: Pearson.
- 2) Bryce, Modern Democracies.
- 3) E.Asirvatham, political Theory.
- 4) लेखक : ना य. डोळे राजकीय विचाराचा इतिहास, कॉन्टिनेन्टल प्रकाशन पुणे.
- 5) प्रा. प्रमोद तांबे, राज्यशास्त्र परिचय, निराली प्रकाशन पुणे.
- 6) डॉक्टर विजय देव, आधुनिक राजकीय विश्लेषण कोश डायमंड प्रकाशन पुणे,
- 7) भार्गव राजीव, राजकीय सिद्धांत परिचय अनुवाद हेमंत खानझोडे पीयर्सन प्रकाशन.

Course Outcomes: At the end of syllabus student will able-

CO-1: The students will be able to understand the nature and scope of Political Science.

CO-2: The students shall understand the various traditional and modern approaches to the study of Political Science.

CO-3: The students will understand the basic concepts in Political Science and apply these concepts in making sense of social realities.

Political Science GE/OE 2024 Pattern
S.Y Open Elective, Semester IV
POGET-241 Political Theory and Concept
[Theory Credit: 2, lectures-30]

Chapter Scheme

Unit I – Power and Authority	15
a. Nature of Power	
b. Relation between Power and Authority	
c. Types of Authority	
d. Nature of Authority	
Unit II – Liberty and Equality	15
a. Meaning and Nature	
b. Aspects of Liberty and Equality	
c. Types of Liberty	
d. Dimensions of Equality	

References :

1. Bhargava Rajeev and Ashok Acharya (eds.), 2008, Political Theory, Delhi, Pearson.
2. Gupta Sachdeo and Singh S K, 1987, Political Theory and Ideology, Delhi, Ajanta Prakashan.
3. Henry D. Aiken, 1956, The Age of Ideology, New York, Mentor.
4. Heywood Andrew, 2004, Political Theory – An Introduction, Palgrave Basingstoke.
5. Gauba O. P, An Introduction to Political Theory, अनुवाद - जाधव तुकाराम, 2010, पुणे, के. सागर.
6. Mackenzie I, Political Concepts, 2005, A Reader and Guide, Edinburg, Edinburg University Press

Student will acquire the skills of –

CO-1. The students will be able to understand the nature and scope of Political Science.

CO-2. The students shall understand the various traditional and modern approaches to the study of Political Science.

CO-3. The students will understand the basic concepts in Political Science and apply these concepts in making sense of social realities.



**Prof. Ramkrishna More Arts, Commerce & Science
(Autonomous) College Akurdi, Pune-411044**

Affiliated to

Savitribai Phule Pune University, Pune. (SPPU)

B.A Economics / B.A. Honors Economics

(Three Years B.A and Four Years B.A Honors Program)

Choice Based Credit System(CBCS)

Under Autonomy and NEP-2020 To Be Implemented

From Academic Year 2023 – 2024

Syllabus

Frist Year Graduate (F.Y.B.A)

Economics

Board of Studies Economics

Prof. Ramkrishna More Arts, Commerce & Science College Akurdi, Pune-411044



Affiliated to

Savitribai Phule Pune University, Pune.

F.Y. B.A. Economics GE/OE 2023 Pattern

CBCS Semester Pattern

Under Autonomy and NEP-2020 To Be Implemented from Academic Year 2023-2024

SEMESTER I

ECGET 111- Financial Planning -I

No. of Credit- 02

Lecture: - 30

Unit	Name and Contents	Number of Lectures
Unit 1	Introduction to Financial Literacy	10
	1.1 Meaning, importance and scope of financial literacy; Prerequisites of Financial Literacy	
	1.2 level of education, numerical and communication ability	
	1.3 Various financial institutions – Banks, Insurance companies, Post Offices; Mobile App based services	
	1.4 Need of availing of financial services from banks, insurance companies and postal services	
Unit 2	Banking	10
	2.1 Types of Deposits-Saving Bank Accounts, KYC norms, Banking products and services	
	2.2 Types of loans, taking a home loan, Definition of EMI, Calculation of EMI, Credit Cards Terminology, Credit Cards Math, Reading a Credit Card Statement	
	2.3 Post office-Account and transactions, Online Banking.	

Unit 3	Basics of Savings and Investment	10
	3.1 Savings Vs Investment, Power of Compounding, Principles of Investment–Safety, Liquidity and Return, Risk and Return, Inflation effects on Investment, Securities and its types,	
	3.2 Equity, Debentures or Bonds, IPOs and FPOs, Mutual Funds, Types of Mutual Funds, Brokers, sub-brokers, Process for becoming a capital market investor, Investment plans, Hybrid plans-Ulip, SIP and VIP of mutual funds, index funds.	

➤ **Course Learning Outcomes;-**

At the end of the course the learner will have ability –

CO 1: Students will be able to understand the various aspects of Indian Financial System.

CO 2: The students will be able to acquire the practical knowledge of Banking Financial Regulators in India

CO 3: The students will understand the challenges before Indian Financial System.

CO 4: To help the students to prepare for varied banking competitive examinations.

➤ **Course Objective:-**

1. Understand the structure, functions, and components of the Indian financial system.
2. Explore the operations and roles of the Indian money and capital markets.
3. Analyse the functions and significance of various Indian postal savings schemes and accounts
4. Examine the role and impact of India Post Payments Bank (IPPB) in the financial system.

➤ **Reference ;-**

1. Indian Banking: Evolution and Developments" by S. K. Bhatia. **Publication:** Kanishka Publishers, 2020.
2. Banking Theory and Practice" by K. C. Shekhar and Lekshmy Shekhar **Publication:** Vikas Publishing House, 2018
3. Indian Financial System" by M. Y. Khan **Publication:** McGraw-Hill Education, 2020.
4. Principles of Banking" by G. J. B. Wright **Publication:** Pearson Education, 2019.
5. Modern Banking: Theory and Practice" by J. M. C. Goel **Publication:** Atlantic Publishers & Distributors, 2018

➤ **Journal & Magazine :-**

1. Journal of Banking & Finance **Publisher:** Elsevier **Website:** Journal of Banking & Finance.
2. Reserve Bank of India Bulletin **Publisher:** Reserve Bank of India **Website:** RBI Bulletin
3. Indian Journal of Economics and Business. **Publisher:** Indian Economic Association
Website: [Indian Journal of Economics and Business](#)
4. Banking and Finance Review **Publisher:** BAFI Publications **Website:** [Banking and Finance Review](#)

Prof. Ramkrishna More Arts, Commerce & Science College Akurdi, Pune- 411044



Affiliated to

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F.Y. B.A. Economics GE/OE 2023 Pattern

CBCS Semester Pattern

Under Autonomy and NEP-2020 To Be Implemented from Academic Year 2023-2024

SEMESTER II

ECGET 121- Financial Planning-II

No. of Credit- 02

Lecture: - 30

Unit	Name and Contents	Number of Lectures
Unit 1	Post Office Financial Services	10
	1.1 Post office Savings Schemes: Savings Bank, Recurring Deposit, Term Deposit, Monthly Income Scheme, Kishan Vikas Patra, Senior Citizen Savings Scheme (SCSS), Sukanya Samriddhi Yojana/ Account (SSY/SSA); I	
	1.2 India Post Payments Bank (IPPB). Money Transfer: Money Order, E-Money order. Instant Money Order, collaboration with the Western Union Financial Services; MO Videsh, International Money Transfer Service, Electronic Clearance Services (ECS), Money gram International Money Transfer, Indian Postal Order (IPO).	
Unit 2	Protection and Investment Related Financial Services	10
	2.1 Insurance Services: Life Insurance Policies: Life Insurance, Term Life Insurance, Endowment Policies, Pension Policies, ULIP, Health Insurance and its Plans, Property Insurance: Policies offered by various general insurance companies	
	2.2 Post office life Insurance Schemes: Postal Life Insurance and Rural Postal Life Insurance (PLI/RPLI). Housing Loans: Institutions providing housing loans, Loans under Pradhan Mantri Awas Yojana – Rural and Urban.	
	Scams, Fraud Schemes	

Unit 3	3.1 Insider trading, Money laundering; Consumer protection and Redressal mechanism, Rights of Consumers,	10
	3.2 Filing a complaint, complain to entity concerned, Regulators, Arbitration, Consumer courts, Govt. Websites, Investor Associations.	

➤ Course Learning Outcomes;-

At the end of the course the learner will have ability –

CO 1: Students will be able to understand the various aspects of Post Office Financial Services.

CO 2: The students will be able to acquire the practical knowledge of Investment Related Financial Services

CO 3: The students will understand the challenges before Indian Financial System.

CO 4: To help the students to prepare for varied banking competitive examinations.

➤ Course Objective:-

1. Understand the structure, functions, and components of the Financial Services.
2. Explore the operations and roles of the Post Office Financial Services.
3. Analyse the functions and significance of various Indian postal savings schemes and accounts
4. Examine the role and impact of India Post Payments Bank (IPPB) in the financial system.

➤ Reference ;-

1. Indian Banking: Evolution and Developments" by S. K. Bhatia. **Publication:** Kanishka Publishers, 2020.
2. Banking Theory and Practice" by K. C. Shekhar and Lekshmy Shekhar **Publication:** Vikas Publishing House, 2018
3. Indian Financial System" by M. Y. Khan **Publication:** McGraw-Hill Education, 2020.
4. Principles of Banking" by G. J. B. Wright **Publication:** Pearson Education, 2019.
5. Modern Banking: Theory and Practice" by J. M. C. Goel **Publication:** Atlantic Publishers & Distributors, 2018

➤ Journal & Magazine :-

1. Journal of Banking & Finance **Publisher:** Elsevier **Website:** Journal of Banking & Finance.
2. Reserve Bank of India Bulletin **Publisher:** Reserve Bank of India **Website:** RBI Bulletin
3. Indian Journal of Economics and Business. **Publisher:** Indian Economic Association **Website:** [Indian Journal of Economics and Business](#)
4. Banking and Finance Review **Publisher:** BAFI Publications **Website:** [Banking and Finance Review](#)

SEMESTER I**ECGET 112- BASIC COURSE IN STOCK MARKET- I****No. of Credit- 02****Lecture: - 30**

Unit	Name and Contents	Number of Lectures
Unit 1	Developments in the Indian Stock Market	10
	1.1 Domestic savings & investments Investing during these challenging times	
	1.2 Disinvestments, FDI & Foreign Portfolio Investment (FPI)	
	1.3 Role of Retail Investors Share Price & Share Price Volatility Role of SEBI	
Unit 2	Dealings in Stock Exchanges	10
	2.1 Indian Economy on path of 5 Trillion Economy	
	2.2 Risk Management in the stock market	
	2.3 Role of Brokers Stock Market Quotations	
	2.4 Procedure for buying & selling	
	2.5 Financial Planning	
Unit 3	Overviews of capital market	10
	3.1 Working of stock Market	
	3.2 Fundamental Analysis	
	3.3 Mutual Fund	

➤ **Course Learning Outcomes; -**

At the end of the course the learner will have ability –

CO 1: Students will be able to understand the various aspects of Indian Stock Market.

CO 2: The students will be able to acquire the practical knowledge of Indian Stock

Market. CO 3: The students will understand the challenges before Indian Stock Market.

CO 4: To help the students to prepare for varied banking competitive examinations.

➤ **Course Objective:-**

1. Understand the structure, functions, and components of the Indian Stock market
2. Explore the operations and roles of the Indian Stock market.
3. Analyse the functions and significance of various Indian Stock market.
4. Examine the role and impact of new developments in Indian Stock market system.

➤ **Reference :-**

1. Indian Stock Market: An Introduction (2019) – Dr. R. P. Rathi
2. The Indian Financial System (2020) – Dr. S. Gurusamy
3. Stock Market and Investment Management (2019) – P. K. Jain
4. Investment Management (2020) – V. A. Avadhani
5. Security Analysis and Portfolio Management (2021) – R. K. Gupta

➤ **Journal & Magazine :-**

1. Journal of Indian Finance
2. The Economic Times
3. Business Today
4. Money control
5. The Financial Express
6. Vikalpa - The Journal for Decision Makers
7. Capital Market Magazine

Prof. Ramkrishna More Arts, Commerce & Science College Akurdi, Pune-

411044

Affiliated to

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F.Y. B.A. Economics Syllabus

CBCS Semester Pattern

Under Autonomy and NEP-2020 To Be Implemented from Academic Year 2023-2024

SEMESTER II

ECGET 122- ADVANCE COURSE IN STOCK MARKET-II

No. of Credit- 02

Lecture: - 30

Unit	Name and Contents	Number of Lectures
Unit 1	Fundamental Analysis	10
	1.1 Meaning of Fundamentals Analysis, Types of Fundamentals – Qualitative Method	
	1.2 Quantitative Method - (Ratio Analysis), Uses of Fundamentals in any Share of Section	
	1.3 Basic Concept of Fundamentals	
Unit 2	Technical Analysis	10
	2.1 Meaning of Technical Analysis	
	2.2 Types of Chart, Types of Trend, Volume	
	2.3 Pivot Point – (Support and Resistance), Moving Average	
	2.4 RSI Indicator and Bollinger Band,	
	2.5 Practical Trading - (Live Market Trading)	
Unit 3	Mutual Fund	10
	3.1 Meaning and Introduction of Mutual Fund,	
	3.2 Types of Mutual Fund - Equity Mutual Funds, Debt Funds, Hybrid Mutual Funds and Index Mutual Funds	
	3.3 Equity Mutual Fund – Small Cap, Mid Cap, Large Cap, Systematic Investment Plan (SIP)	

➤ **Course Learning Outcomes; -**

At the end of the course the learner will have ability –

CO 1: Students will be able to understand the various aspects of Indian Stock Market.

CO 2: The students will be able to acquire the practical knowledge of Indian Stock Market. CO 3: The students will understand the challenges before Indian Stock Market.

CO 4: To help the students to prepare for varied banking competitive examinations.

➤ **Course Objective:-**

5. Understand the structure, functions, and components of the Indian Stock market
6. Explore the operations and roles of the Indian Stock market.
7. Analyse the functions and significance of various Indian Stock market.
8. Examine the role and impact of new developments in Indian Stock market system.

➤ **Reference ;-**

1. Indian Stock Market: An Introduction (2019) – Dr. R. P. Rathi
2. The Indian Financial System (2020) – Dr. S. Gurusamy
3. Stock Market and Investment Management (2019) – P. K. Jain
4. Investment Management (2020) – V. A. Avadhani
5. Security Analysis and Portfolio Management (2021) – R. K. Gupta

➤ **Journal & Magazine :-**

1. Journal of Indian Finance
2. The Economic Times
3. Business Today
4. Money control
5. The Financial Express
6. Vikalpa - The Journal for Decision Makers
7. Capital Market Magazine



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**B.A Economics / B.A. Honors Economics
(Three Years B.A and Four Years B.A Honors Program)**

**2023 Pattern
Choice Based Credit System(CBCS)**

Under Autonomy and NEP-2020 To Be Implemented

From Academic Year 2024 -

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Syllabus

Second Year Graduate (S.Y.B.A) Economics

Board of Studies Economics



Prof. Ramkrishna More Arts, Commerce & Science College Akurdi,



Pune-411044

Affiliated to

Savitribai Phule Pune University, Pune.

S. Y. B. A. Economics Syllabus

2023 CBCS Semester Pattern

2023 Pattern

Under Autonomy and NEP-2020 To Be Implemented from Academic Year 2024 – 2025

OPEN ELECTIVE

**ECGET- 231- DIGITAL BANKING-I
SEMESTER -III**

Note: Each lecture is of 1 hour

Credit-02:

No. of Lectures-30 L

Unit	Name and Contents	Number of Lectures
Unit 1	DIGITAL BANKING	10
	1.1 Introduction, Definition and meaning, of Digital Banking,	
	1.2 Imports Nature and Objective of Digital Banking,	
	1.3 Scope and Futures of Digital Banking	
Unit 2	PAYMENT SYSTEMS of DIGITAL BANKING	10
	2.1 Overview of global payment systems, Overview of domestic payment systems	
	2.2 RuPay and Repays Secure Immediate Payment Service (IMPS),National Unified USSD Platform (NUUP)	
	2.3 Aadhaar Enabled Payment System (AEPS) e-KYC National Unified USSD Platform (NUUP)	
Unit 3	INTERNET BANKING	10
	3.1 Overview and Brief History Product Features	
	3.2 Corporate and Individual Internet Banking Integration with e-Commerce Merchant sites Back End Operations and Technology	

	3.3 Profitability of Internet Banking, Back End Operations and Technology	
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➤ **Course Learning Outcomes: -**

At the end of the course the learner will have ability-

CO-1 Understand the concept, nature, and objectives of digital banking.

CO-2 Explore the scope and future trends of digital banking in the global financial landscape.

CO-3 Familiarize with global and domestic payment systems in digital banking, including Repay, IMPS, and AEPS.

CO-4 Gain insights into internet banking, its historical background, product features, and

➤ **Objective: -**

1. To define digital banking, analyze its nature, and outline its objectives in modern banking.
2. To evaluate the scope of digital banking and predict future trends to adapt to evolving customer needs and technological advancements.
3. To compare and contrast global and domestic payment systems, and comprehend the functionalities of RUPAY, IMPS, AEPS, and NUUP.
4. To examine the history, features, and profitability of internet banking, and explore its integration with e-commerce platforms and backend operations.
5. To analyze the integration of digital banking with e-commerce platforms, merchant sites, and backend operations, focusing on technological advancements and operational efficiency.

➤ **Reference Books:**

1. "Digital Banking: Transforming India" by V. Srinivasan and Radhika Pandey
2. "Digital Banking and Payments: The Revolution" by Jai Raj Nair
3. "Digital Banking: Evolution, Challenges and Opportunities" by M. S. Sahoo
4. "Digital Banking in India: Trends, Challenges and Opportunities" by Arindam Banerjee and Partha Chatterjee
5. "The Digital Bank: Strategies to Launch or Become a Digital Bank" by Vishnu Sharma



**Prof. Ramkrishna More Arts, Commerce & Science College
Akurdi, Pune-411044**

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S. Y. B. A. Economics
Syllabus CBCS Semester
Pattern

**Under Autonomy and NEP-2020 To Be Implemented from Academic
Year 2024 – 2025**

OPEN ELECTIVE

ECGET- 241- DIGITAL BANKING-II

SEMESTER - IV

Note :- Each Lecture is of 1 hour

Credit :- 02

No. Lecture :- 30L

Unit	Name and Contents	Number of Lectures
Unit 1	BRANCHLESS BANKING	10
	1.1 Introduction ,Objectives	
	1.2 Financial Inclusion – Logic and logistics, Vehicles for Financial Inclusion	
	1.3 Business Correspondents/ Business facilitators f. Digital Banking Products for Financial Inclusion	
Unit 2	MOBILE BANKING	10
	2.1 Overview and brief history of Mobile Banking,	
	2.2 Product features & diversity of Mobile Banking	
	2.3 RTGS, NEFT , Innovative Banking & Payment Systems	
Unit 3	NEW DEVELOPMENTS IN DIGITAL BANKING	10
	3.1 Fintechs, Business ecosystems Block chain, Crypto Currencies	
	3.2 Cloud , Virtualization, Analytics	
	3.3 Artificial Intelligence, Machine Learning Internet of things (IoT)	

➤ **Course Learning Outcomes: -**

At the end of the course the learner will have ability-

CO-1 Understand the concept and objectives of branchless banking and its role in financial inclusion.

CO-2 Explore the evolution, features, and diversity of mobile banking, including real-time gross settlement (RTGS), national electronic funds transfer (NEFT), and innovate banking/payment systems.

CO-3 Familiarize with new developments in digital banking, including fintechs, block chain, cloud computing, artificial intelligence (AI), and internet of things (IOT).

➤ **Objective: -**

1. Define branchless banking, analyze its objectives, and evaluate its contribution to financial inclusion through business correspondents and digital banking products.
2. To evaluate the scope of digital banking and predict future trends to adapt to evolving customer needs and technological advancements.
3. Analyze the impact of fintech innovations, block chain technology, and AI-driven solutions on the digital banking landscape, and explore the potential of cloud computing and IoT in enhancing banking services.
4. Examine the rationale behind financial inclusion efforts, analyze the logistical challenges, and identify effective digital banking solutions for reaching unbanked populations.
5. Understand the interconnected nature of fintech ecosystems, explore the benefits of virtualization in banking operations, and analyze the role of analytics in optimizing digital banking services.

➤ **Reference Books:**

1. "Digital Banking: Transforming India" by V. Srinivasan and Radhika Pandey
2. "Digital Banking and Payments: The Revolution" by Jai Raj Nair
3. "Digital Banking: Evolution, Challenges and Opportunities" by M. S. Sahoo
4. "Digital Banking in India: Trends, Challenges and Opportunities" by Arindam Banerjee and Partha Chatterjee
5. "The Digital Bank: Strategies to Launch or Become a Digital Bank" by Vishnu Sharma

NEP-2020 First Year UG Introduction to Geographical Information System (Theory)**Course Code - GGGET-111****Course Type-Theory****No. of Credits: 02****No. of Periods: 30****Course Outcome:**

After the completion of course, the students will have ability to:

1. Understand various components and principles of GIS
2. Construct the thematic maps using different digital layers
3. Understand the Principles and Uses of Global Positioning System (GPS).
4. Describe GIS Data Structures and apply the Knowledge of GIS Data Analysis.
5. Construct the thematic maps using different digital layers
6. Apply GIS in various geographical studies

Module	Topic	Subtopics	No of Periods
Module-1	Geographical Information System (GIS)	Geographical Information System (GIS): Definition and Components.	6
	Global Positioning System (GPS)	Global Positioning System (GPS): Principles and Uses.	6
Module-2	GIS Data Structures	GIS Data Structures: Types (spatial and non-spatial), Raster and Vector Data Structure.	6
	GIS Data Analysis	GIS Data Analysis: Input; Geo-Referencing	6
	Application of GIS	Application of GIS: Land Use Mapping, Forests Monitoring and Natural disasters.	6

References:

1. Bhatta, B., (2010): Analysis of Urban Growth and Sprawl from Remote Sensing, Springer, Berlin Heidelberg.41
2. Burrough, P.A., and McDonnell, R.A. (2000): Principles of Geographical Information System-Spatial Information System and Geo-statistics. Oxford University Press
3. Chauniyal, D.D. (2010): Sudur Samvedan evam Bhogolik Suchana Pranali, Sharda Pustak Bhawan, Allahabad
4. Gomasca, M. A. (2009) Basics of Geomatics, Springer Science, New York
5. Heywoods, I., Cornelius, S and Carver, S., (2006): An Introduction to Geographical Information system. Prentice Hall.
7. Jha, M.M. and Singh, R.B., (2008) Land Use: Reflection on Spatial Informatics Agriculture and Development, New Delhi: Concept.
8. Kumar, Dilip, Singh, R.B. and Kaur, Ranjeet (2019): Spatial Information Technology for Sustainable Development Goals, Springer.
9. Nag, P. (2008) Introduction to GIS, Concept India, New Delhi.
10. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
11. Singh, R.B. and Murai, S. (1998) Space Informatics for Sustainable Development, Oxford and IBH, New Delhi.

Geography GE/OE F.Y 2023 Pattern**NEP-2020 First Year UG Introduction to Geographical Information System (Practical)****Course Code - GGGEPI-112****Course Type-Practical****No. of Credits: 02****No. of Practical: 15****Course Outcomes:**

After the completion of course, the students will have ability to:

1. Understand various components and principles of GIS
2. Construct the thematic maps using different digital layers
3. Understand the Principles and Uses of Global Positioning System (GPS).
4. Describe GIS Data Structures and apply the Knowledge of GIS Data Analysis.
5. Construct the thematic maps using different digital layers
6. Apply GIS in various geographical studies

Module	Topic	Subtopics	Practicals
Module- 1	Geographical Information System (GIS)	Geographical Information System (GIS): Definition and Components.	3
	Global Positioning System (GPS)	Global Positioning System (GPS): Principles and Uses.	3
Module- 2	GIS Data Structures	GIS Data Structures: Types (spatial and non- spatial), Raster and Vector Data Structure.	3
	GIS Data Analysis	GIS Data Analysis: Input; Geo-Referencing	3
	Application of GIS	Application of GIS: Land Use Mapping, Forests Monitoring and Natural disasters.	3

References:

1. Bhatta, B., (2010): Analysis of Urban Growth and Sprawl from Remote Sensing, Springer, Berlin Heidelberg.41
2. Burrough, P.A., and McDonnell, R.A. (2000): Principles of Geographical Information System- Spatial Information System and Geo-statistics. Oxford University Press
3. Chauniyal, D.D. (2010): Sudur Samvedan evam Bhogolik Suchana Pranali, Sharda Pustak Bhawan, Allahabad
4. Gomarasca, M. A. (2009) Basics of Geomatics, Springer Science, New York
5. Heywoods, I., Cornelius, S and Carver, S., (2006): An Introduction to Geographical Information system. Prentice Hall.

6. Jha, M.M. and Singh, R.B., (2008) Land Use: Reflection on Spatial Informatics Agriculture and Development, New Delhi: Concept.
7. Kumar, Dilip, Singh, R.B. and Kaur, Ranjeet (2019): Spatial Information Technology for Sustainable Development Goals, Springer.
8. Nag, P. (2008) Introduction to GIS, Concept India, New Delhi.
9. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
10. Singh, R.B. and Murai, S. (1998) Space Informatics for Sustainable Development, Oxford and IBH, New Delhi.

NEP-2020 First Year UG Introduction to Remote Sensing

Course Code - GGGE-121

Course Type-Theory

No. of Credits: 02

No. of Periods: 30

Course Outcomes:

After the completion of course, the students will have ability to:

1. Understand the basic concept of Remote Sensing.
2. Explain Digital and manual Image Processing.
3. Develop the skill so as to use digital satellite data using software.
4. Prepare the maps based with satellite data to compare with the ground realities.
5. Classify digital data for the land use/land cover and urban studies.
6. Apply the Knowledge of Remote Sensing in Various field.

Module	Topic	Subtopics	No of Periods
Module-1	Image Processing (Digital and Manual)	Pre-processing (Radiometric and Geometric Correction); Enhancement (Filtering); Classification (Supervised and Un-supervised)	15
Module-2	Application of Digital Remote Sensing	Application of Digital Remote Sensing- Land Use /Land Cover	6
		Application of Digital Remote Sensing in Urban Studies.	4
		Application of Remote Sensing in weather (cyclones) studies and natural hazards (e.g. floods)	5

References:

1. Bhatta , B., (2008): Remote Sensing and GIS, Oxford University Press, New Delhi.
2. Campbell, J. B., (2007): Introduction to Remote Sensing, Guildford Press

3. Hord R.M.,(1989): Digital Image Processing of Remotely Sensed Data, Academic, New York.
4. Jensen, J. R., (2005): Introductory Digital Image Processing: A Remote Sensing Perspective, Pearson Prentice-Hall.
5. Jensen, J. R.,(2007): Remote Sensing of the Environment: An Earth Resource Perspective, Prentice-Hall Inc, New Jersey.
6. Joseph, G.,(2005): Fundamentals of Remote Sensing, United Press India.
7. Kumar, Dilip, Singh, R.B. and Kaur, Ranjeet.,(2019): “Spatial Information Technology for Sustainable Development Goals”, Springer.
8. Li, Z., Chen, J. and Batsavias, E., (2008): Advances in Photogrammetry, Remote Sensing and Spatial Information Sciences, CRC Press, Taylor and Francis, London
9. Lillesand, T. M., Kiefer R. W. and Chipman, J. W., (2004): Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).
10. Mukherjee, S. (2004): Textbook of Environmental Remote Sensing, Macmillan, Delhi.
11. Nag, P. and Kudra, M., (1998): Digital Remote Sensing, Concept, New Delhi.
12. Richards, J. A. and JiaXiuping., (2005): Remote Sensing Digital Image Analysis: An Introduction, 4th Edition, Springer, Verlag, Berlin.

NEP-2020 First Year UG Introduction to Remote Sensing

Course Code - GGGE-121

Course Type-Practical

No. of Credits: 02

No. of Periods: 15

Course Outcomes:

After the completion of the course, the students will have the ability to:

1. Understand the basic concept of Remote Sensing.
2. Differentiate different types of colour composite images.
3. Identify ground features and develop the skill of image interpretation.
4. Create maps based on satellite data to compare with the ground realities.
5. Classify digital data for the land use/land cover and urban studies.
6. familiarize students with different methods of determining aerial photograph scale, determination of object height and satellite data formats.
7. Handle/ Evaluate satellite data with Image Processing Software
8. Apply the Knowledge of Remote Sensing and Aerial Photography in Various fields.

Module	Topic	Subtopics	Practicals
Module-1	Aerial Photograph	Geometry of Aerial Photograph, Determination of Scale of Aerial Photograph – Different Methods Interpretation of Aerial Photograph: Stereo pair and Single Image, Estimation of Object Height from Single Vertical Aerial Photograph and Stereo-pair	4
	Interpretation of Satellite Image	Interpretation of Satellite Image, Identification of Ground Features, Deriving Land Use and Land Cover Map	5

Module-2	Satellite Data	Procurement of Satellite Data, Satellite Data Products and Formats	3
	Onscreen Demonstration of Handling Satellite Data	Onscreen Demonstration of Handling Satellite Data with Image Processing Software	3

References:

1. Bhatta, B., (2008): Remote Sensing and GIS, Oxford University Press, New Delhi.
2. Campbell, J. B., (2007): Introduction to Remote Sensing, Guildford Press
3. Hord R.M.,(1989): Digital Image Processing of Remotely Sensed Data, Academic, New York.
4. Jensen, J. R., (2005): Introductory Digital Image Processing: A Remote Sensing Perspective, Pearson Prentice-Hall.
5. Jensen, J. R.,(2007): Remote Sensing of the Environment: An Earth Resource Perspective, Prentice-Hall Inc, New Jersey.
6. Joseph, G.,(2005): Fundamentals of Remote Sensing, United Press India.
7. Kumar, Dilip, Singh, R.B. and Kaur, Ranjeet.,(2019): "Spatial Information Technology for Sustainable Development Goals", Springer.
8. Li, Z., Chen, J. and Batsavias, E., (2008): Advances in Photogrammetry, Remote Sensing and Spatial Information Sciences, CRC Press, Taylor and Francis, London
9. Lillesand, T. M., Kiefer R. W. and Chipman, J. W., (2004): Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).
10. Mukherjee, S. (2004): Textbook of Environmental Remote Sensing, Macmillan, Delhi.
11. Nag, P. and Kudra, M., (1998): Digital Remote Sensing, Concept, New Delhi.
12. Richards, J. A. and JiaXiuping., (2005): Remote Sensing Digital Image Analysis: An Introduction, 4th Edition, Springer, Verlag, Berlin.

Geography S.Y.GE/OE 2023 Pattern**GGGET-231 Course: Introduction to Disaster Management****No. of Credits: 02****No. of Periods: 30****Course Outcomes:**

1. Describe concepts of Disaster and its relations with Geography.
2. Explain terminology and concepts of Disaster Management.
3. Implement concepts of hazards in different areas and its Management.
4. Explain important local level disasters i.e., cyclone, flood, landslide and flood.
5. To make the students aware of the need of protection & disaster management.
6. Demonstrate Disaster Management at local level.
7. Suggest methods of protection from disaster and will be able to do disaster management.

Modules	Topic	Subtopics	Periods
1	Hazards, Risk, Vulnerability and Disasters: Definition and Concepts.	i. Meaning and definition of Hazards and Disasters ii. Geographical conditions and disasters iii. Classification of Disasters. iv. Disasters in India: (a) Causes, Distribution, Impact, Mapping: Flood, Landslide, Drought Earthquake, Tsunami and Cyclone. v. Human induced disasters: Causes, Impact, Distribution and Mapping.	10

2	Concepts in disaster management	Concepts in disaster management i. Concept of disaster management ii. Aims and objectives. iii. Pre-disaster management and Post – disaster management.	06
3	Response and Mitigation to Disasters	Mitigation and Preparedness, NDMA and NIDM; Indigenous Knowledge and Community-Based Disaster Management; Do's and Don'ts During Disasters. Structure of disaster management - Preparedness, Response, Recovery, Mitigation, Rehabilitation. Role of media	08
4	Case Studies of disaster management in India with example of Maharashtra.	Case Studies of Disaster Management i. Cyclone ii. Floods iii. Droughts iv. Landslide	06

Reference Books:

1. Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012).
2. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
3. Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
4. Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.
5. Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD.
6. Mrinalini Pandey (2017) Disaster Management, Wiley India Pvt. Ltd.
7. Tushar Bhattacharya (2018) Disaster Science and Management, McGraw Hill Education (India) Pvt. Ltd.

GGGEP -241 Practicals in Disaster Management**No. of Credits: 02****No. of Practicals: 15****Course Outcomes:**

After the completion of the course, the students will have the ability to:

1. Understand processes and impact of disaster
2. Understand both natural and man-made disaster and human negligence in the context of the environment
3. Write a fieldwork-based report on Disaster Management to minimize the disaster risk/
Risk from Disaster.

Modules	Topic	Subtopics	Practicals
1	The Project Report based on any two fields-based case studies among following disasters and one disaster preparedness plan of respective college/locality and district:	1. Flood 2. Drought 3. Cyclone and Hailstorms 4. Earthquake and Volcanoes 5. Landslides 6. Human Induced Disasters: Fire Hazards, Chemical, Industrial accidents	15

References:
1. Carter, N., (1991):
Disaster
Management:

A Disaster Manager's Handbook. Asian Development Bank, Manila.

2. Government of India (2011): Disaster Management in India. Ministry of Home Affairs, New Delhi.

3. Government of India (2008): Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India

4. Kapur, A., (2010): Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.

5. Modh, S., (2010): Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.

Geography OE/GE F.Y 2024 Pattern

NEP-2020 First Year UG Introduction to Geographical Information System (Theory)

Course Code - GGGET-111

Course Type-Theory

No. of Credits: 02

No. of Periods: 30

Course Outcome:

After the completion of course, the students will have ability to:

7. Understand various components and principles of GIS
8. Construct the thematic maps using different digital layers
9. Understand the Principles and Uses of Global Positioning System (GPS).
10. Describe GIS Data Structures and apply the Knowledge of GIS Data Analysis.
11. Construct the thematic maps using different digital layers
12. Apply GIS in various geographical studies

Module	Topic	Subtopics	No of Periods
Module-1	Geographical Information System (GIS)	Geographical Information System (GIS): Definition and Components.	6
	Global Positioning System (GPS)	Global Positioning System (GPS): Principles and Uses.	6
Module-2	GIS Data Structures	GIS Data Structures: Types (spatial and non-spatial), Raster and Vector Data Structure.	6
	GIS Data Analysis	GIS Data Analysis: Input; Geo-Referencing	6
	Application of GIS	Application of GIS: Land Use Mapping, Forests Monitoring and Natural disasters.	6

References:

12. Bhatta, B., (2010): Analysis of Urban Growth and Sprawl from Remote Sensing, Springer, Berlin Heidelberg.41
13. Burrough, P.A., and McDonnell, R.A. (2000): Principles of Geographical Information System-Spatial Information System and Geo-statistics. Oxford University Press
14. Chauniyal, D.D. (2010): Sudur Samvedan evam Bhogolik Suchana Pranali, Sharda Pustak Bhawan, Allahabad
15. Gomasca, M. A. (2009) Basics of Geomatics, Springer Science, New York
16. Heywoods, I., Cornelius, S and Carver, S., (2006): An Introduction to Geographical
17. Information system. Prentice Hall.
18. Jha, M.M. and Singh, R.B., (2008) Land Use: Reflection on Spatial Informatics Agriculture and Development, New Delhi: Concept.
19. Kumar, Dilip, Singh, R.B. and Kaur, Ranjeet (2019): Spatial Information Technology for Sustainable Development Goals, Springer.

20. Nag, P. (2008) Introduction to GIS, Concept India, New Delhi.
21. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
22. Singh, R.B. and Murai, S. (1998) Space Informatics for Sustainable Development, Oxford and IBH, New Delhi.

NEP-2020 First Year UG Introduction to Remote Sensing

Course Code - GGGE-121

Course Type-Practical

No. of Credits: 02

No. of Periods: 15

Course Outcomes:

After the completion of the course, the students will have the ability to:

9. Understand the basic concept of Remote Sensing.
10. Differentiate different types of colour composite images.
11. Identify ground features and develop the skill of image interpretation.
12. Create maps based on satellite data to compare with the ground realities.
13. Classify digital data for the land use/land cover and urban studies.
14. familiarize students with different methods of determining aerial photograph scale, determination of object height and satellite data formats.
15. Handle/ Evaluate satellite data with Image Processing Software
16. Apply the Knowledge of Remote Sensing and Aerial Photography in Various fields.

Module	Topic	Subtopics	Practicals
Module-1	Aerial Photograph	Geometry of Aerial Photograph, Determination of Scale of Aerial Photograph – Different Methods Interpretation of Aerial Photograph: Stereo pair and Single Image, Estimation of Object Height from Single Vertical Aerial Photograph and Stereo-pair	4
	Interpretation of Satellite Image	Interpretation of Satellite Image, Identification of Ground Features, Deriving Land Use and Land Cover Map	5
Module-2	Satellite Data	Procurement of Satellite Data, Satellite Data Products and Formats	3
	Onscreen Demonstration of Handling Satellite Data	Onscreen Demonstration of Handling Satellite Data with Image Processing Software	3

References:

13. Bhatta , B., (2008): Remote Sensing and GIS, Oxford University Press, New Delhi.
14. Campbell, J. B., (2007): Introduction to Remote Sensing, Guildford Press
15. Hord R.M.,(1989): Digital Image Processing of Remotely Sensed Data, Academic, New York.
16. Jensen, J. R., (2005): Introductory Digital Image Processing: A Remote Sensing Perspective, Pearson Prentice-Hall.

17. Jensen, J. R.,(2007): Remote Sensing of the Environment: An Earth Resource Perspective, Prentice-Hall Inc, New Jersey.
18. Joseph, G.,(2005): Fundamentals of Remote Sensing, United Press India.
19. Kumar, Dilip, Singh, R.B. and Kaur, Ranjeet.,(2019): "Spatial Information Technology for Sustainable Development Goals", Springer.
20. Li, Z., Chen, J. and Batsavias, E., (2008): Advances in Photogrammetry, Remote Sensing and Spatial Information Sciences, CRC Press, Taylor and Francis, London
21. Lillesand, T. M., Kiefer R. W. and Chipman, J. W., (2004): Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).
22. Mukherjee, S. (2004): Textbook of Environmental Remote Sensing, Macmillan, Delhi.
23. Nag, P. and Kudra, M., (1998): Digital Remote Sensing, Concept, New Delhi.
24. Richards, J. A. and JiaXiuping., (2005): Remote Sensing Digital Image Analysis: An Introduction, 4th Edition, Springer, Verlag, Berlin.

Geography S.Y.GE/OE 2024 Pattern

GGGET-231 Course: Introduction to Disaster Management

No. of Credits: 02

No. of Periods: 30

Course Outcomes:

8. Describe concepts of Disaster and its relations with Geography.
9. Explain terminology and concepts of Disaster Management.
10. Implement concepts of hazards in different areas and its Management.
11. Explain important local level disasters i.e., cyclone, flood, landslide and flood.
12. To make the students aware of the need of protection & disaster management.
13. Demonstrate Disaster Management at local level.
14. Suggest methods of protection from disaster and will be able to do disaster management.

Modules	Topic	Subtopics	Periods
1	Hazards, Risk, Vulnerability and Disasters: Definition and Concepts.	vi. Meaning and definition of Hazards and Disasters vii. Geographical conditions and disasters viii. Classification of Disasters. ix. Disasters in India: (a) Causes, Distribution, Impact, Mapping: Flood, Landslide, Drought Earthquake, Tsunami and Cyclone. x. Human induced disasters: Causes, Impact, Distribution and Mapping.	10
2	Concepts in disaster management	Concepts in disaster management iv. Concept of disaster management v. Aims and objectives. vi. Pre-disaster management and Post – disaster management.	06
3	Response and Mitigation to Disasters	Mitigation and Preparedness, NDMA and NIDM; Indigenous Knowledge and Community-Based Disaster Management; Do's and Don'ts During Disasters.	08

		Structure of disaster management - Preparedness, Response, Recovery, Mitigation, Rehabilitation. Role of media	
4	Case Studies of disaster management in India with example of Maharashtra.	Case Studies of Disaster Management v. Cyclone vi. Floods vii. Droughts viii. Landslide	06

Reference Books:

8. Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012).
9. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
10. Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
11. Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.
12. Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD.
13. Mrinalini Pandey (2017) Disaster Management, Wiley India Pvt. Ltd.
14. Tushar Bhattacharya (2018) Disaster Science and Management, McGraw Hill Education (India) Pvt. Ltd.

GGGEP -241 Practicals in Disaster Management**No. of Credits: 02****No. of Practicals: 15****Course Outcomes:**

After the completion of the course, the students will have the ability to:

1. Understand processes and impact of disaster
2. Understand both natural and man-made disaster and human negligence in the context of the environment
3. Write a fieldwork-based report on Disaster Management to minimize the disaster risk/
Risk from Disaster.

Modules	Topic	Subtopics	Practicals
1	The Project Report based on any two fields-based case studies among following disasters and one disaster preparedness plan of respective college/locality and district:	1. Flood 2. Drought 3. Cyclone and Hailstorms 4. Earthquake and Volcanoes 5. Landslides 6. Human Induced Disasters: Fire Hazards, Chemical, Industrial accidents	15

References:
1. Carter, N., (1991):
Disaster Management:
A Disaster Manager's

Handbook. Asian Development Bank, Manila.

2. Government of India (2011): Disaster Management in India. Ministry of Home Affairs, New Delhi.
3. Government of India (2008): Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India
4. Kapur, A., (2010): Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
5. Modh, S., (2010): Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan,

Delhi.