

Khandesh College Education Society's
Institute of Management and Research, Jalgaon
(An Autonomous Institute affiliated to Kavayitri Bahinabai Chaudhari North Maharashtra University,
Jalgaon and Recognized by AICTE, New-Delhi)

NEP-2020 Based CBCS
PROGRAM STRUCTURE AND SYLLABUS
Of
Bachelor of Computer Applications (BCA)
(2024-2028)

Department of BCA
School of Computer Applications

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Eligibility Criteria:

Candidate must have passed 10+2 H.S.C. (from any stream) exam of Maharashtra State or its equivalent Examination

Or

Candidate must have passed 10+2 M.C.V.C. course from Maharashtra State Education Board.

Only candidates who have appeared for MAHB- BBA/BCA/BMS/BBM are eligible for admission process to this course.

Admission Process:

1. A Common Entrance Examination procedure will be adopted for admission to BCA First Year Course.
 - a. **Eligibility for Appearing for Appearing MAH-B.BCA/BBA/BMS/BBM –CET.**
 - Passed 10 + 2 (HSC) or its equivalent examination (As per the AICTE APH 2024 - 2027)
 - Candidates appearing for 10 + 2 (HSC) or its equivalent examination are also eligible to appear for CET
 - b. Online registration of application and uploading of required documents by the Candidate for admission on website
2. Documents verification and confirmation of Application Form for Admission by online mode.
3. Display of the provisional merit list for Maharashtra State/All India candidates on website.
4. Submission of grievances if any, for all type of Candidates
5. Display of the Final Merit lists of Maharashtra State/All India candidates on website

PROGRAMME STRUCTURE & CREDIT DISTRIBUTION

Vision

To be a leading institution recognized for excellence in educating students with a strong foundation in state-of-the-art computer application courses, preparing them to contribute to technological advancements and socio-economic development worldwide.

Mission

1. Deliver top-tier education in computer applications, seamlessly integrating theoretical knowledge with practical expertise.
2. Facilitate global industry exposure for students through robust linkages with diverse organizations.
3. Instill professional ethical values and a sense of corporate social responsibility in students.
4. Provide a dynamic platform for skill development through extracurricular activities and workshops focused on modern tools and techniques.
5. Foster a research-oriented mindset and nurture innovation by encouraging students to undertake pioneering projects that address real-world challenges.

Name of the Programmes:

Bachelor in Computer Applications(BCA),

Bachelor in Computer Applications (BCA-Honours) and

Bachelor in Computer Applications (BCA-Honours with Research)

Objective of the program:

1. Develop a deep understanding of computer science and its real-world applications, including programming languages, data structures and algorithms, computer networks, databases, and software engineering.
2. Gain practical experience in software development by designing, implementing, and testing software systems using industry-standard tools and technologies.
3. Build critical thinking and problem-solving skills to tackle complex challenges in computer science and develop innovative solutions with cutting-edge technologies.
4. Develop effective communication, collaboration, and teamwork skills to work effectively in diverse and interdisciplinary environments.
5. Acquire knowledge and skills in emerging areas of computer science, such as artificial intelligence, machine learning, computer vision, cybersecurity, and big data analytics, to stay current with the rapidly evolving technological landscape.

Description of the Programme:

The Bachelor of Computer Applications (BCA) program is designed to provide students with a comprehensive understanding of the field of computer science and its applications in various industries. BCA program incorporates the recently implemented National Education Policy (NEP) of 2020, which aims to transform the Indian education system and promote holistic development among students.

- BCA program is structured to equip students with the necessary knowledge and skills in computer science, programming, software development, and information technology. It offers a blend of theoretical concepts and practical training, enabling students to apply their learning to real-world scenarios.
- The Programme will be of 3 or 4 years' duration with multiple exit and entry options. Students of this Programme can exit after 1st year with a certificate, after 2nd year with an Diploma, after 3rd year with a Bachelor's Degree. After 4th year, a student can be awarded with Bachelor's Degree (Honors). Bachelor's Degree (Honors) with Research will be awarded, in case a student secures 75% and above in all semesters.
- Students will be given opportunities for multidisciplinary and interdisciplinary education through options to choose courses of their interests from other schools/departments within the institute.
- The total credits for 3-year BCA will be 132 credits and that for 4-year BCA (Hons with Research) degree, the credits will be 176.
- 20% of the courses may be offered online from SWAYAM.
- Academic Bank of Credits (ABC) will be established to facilitate Transfer of Credits. The credits earned at various levels will get credited into a digitalized ABC. Students can use their earned credits to take admission in another institution to further continue their studies for the remaining year/s of their graduation.
- The Academic Calendar for this Programme of the institute will be synchronized to allow students of a particular UG Programme to study a course or courses from another UG Programme to meet the credit requirement of a semester. The commencement and closure of semesters and examinations for UG Programme will be planned in a uniform manner for declaration of results and awarding grades after a semester/year.

The Programme Highlights:

Program Highlights: Bachelor of Computer Applications (BCA) Program:

- **Discipline-Specific Courses (Core Major Courses):** The BCA program places a strong emphasis on core major courses that form the foundation of computer science and applications. These courses provide in-depth knowledge and understanding of essential subjects such as programming languages, database management, software engineering, web development, data structures, algorithms, and computer networks.
- **Interdisciplinary Minor Courses (IDC):** The BCA program recognizes the importance of interdisciplinary learning and offers students the opportunity to explore other related fields. Through eight interdisciplinary minor courses, students can broaden their horizons and gain insights from areas

such as mathematics, statistics, business management, or communication.

- **Generic/Open Elective Course (OE):**

- 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. Further, Students will be able to earn maximum 4 Credits in this Vertical through International/National/Zone/State/University level participation and achievements in co-curricular and academic activities.

- **Vocational Skill Course (VSC):** Wherever applicable vocational courses will include skills based on advanced laboratory practical of Major and/or Minor. A student is required to successfully complete the 'vocational skill course' as mentioned in the schemes of teaching, learning and evaluation, examination. This course must be a course corresponding to the major and/ or Minor subject selected by a student.

- **Ability Enhancement Courses (AEC):** AEC courses are designed to enhance students' abilities and competencies beyond their core subject knowledge. In the BCA program, students will engage in three AEC courses, which focus on areas such as communication skills, logical reasoning, analytical thinking, and entrepreneurial skills. These courses consist of eight hours of instruction each.

- **Skill Enhancement Courses (SEC):** In the rapidly evolving field of computer applications, it is essential for students to acquire industry- relevant skills. The BCA program offers three skill enhancement courses to help students develop specific technical skills in areas such as programming frameworks, software tools, data analytics, or cybersecurity. Each SEC course involves nine hours of instruction.

- **Common Value-Added Courses (VAC):** The BCA program recognizes the importance of holistic development and incorporates three common value- added courses. These courses cover topics such as personality development, ethics, sustainability, and social responsibility. By participating in these courses, students cultivate a sense of social consciousness and ethical decision-making. Each VAC course comprises six hours of instruction.

- **Value Education Course (VEC):** A student is required to undergo and successfully complete the Value Education Courses like yoga, environment, cleanliness etc.

- **Field Project (FP) / On the Job Training (OJT) /Community Engagement Project (CEP) / Research Project (RP):** A student is required to undergo and successfully complete this course under the guidance of supervisor/mentor assigned by the HEI. This course must be corresponding to the major. This course must be completed at the HEI where the student has taken admission and transfer of credit is not permissible for this type of course. The project and internship component consists of 16 weeks, ensuring students gain practical industry experience.

- **Department Electives (DSE):** To cater to individual interests and specialization within the field

of computer applications, the BCA program offers four department electives. These elective courses allow students to delve deeper into specific areas of computer science, such as artificial intelligence, mobile app development, cloud computing, or data science. The number of hours of instruction for each DSE course may vary based on the chosen elective.

- **Indian Knowledge System (IKS):** Gain an understanding of Indian Knowledge System. Develop an ability to apply the IKS to societal challenges faced today in areas such as holistic health, governance, public administration and sustainable living.
- **Co-Curricular Course (CC):** A student is required to select a Co-Curricular Courses like NSS, Sports, Cultural etc. This course must be completed at the Higher Education Institute (HEI) where the student has taken admission and transfer of credit is not permissible for this type of course.
- **Community engagement and service (CEP):**
By incorporating these diverse components into the BCA program, aim to provide students with a well-rounded education, equipping them with the necessary knowledge, skills, and practical experience to excel in the field of computer applications

Pedagogy for BCA Program:

The Bachelor of Computer Applications (BCA) program adopts a student-centered and practical approach to learning, ensuring that students actively engage in the learning process and develop a strong foundation in computer science and applications. The pedagogy is designed to be simple yet effective, promoting holistic development and preparing students for successful careers in the field of computer applications.

- **Interactive Classroom Sessions:** The program fosters interactive classroom sessions where students actively participate in discussions, ask questions, and engage in problem-solving exercises. The faculty encourages student involvement and creates a supportive learning environment.
- **Hands-on Lab Sessions:** Practical sessions in well-equipped computer labs are an integral part of the BCA program. Students get hands-on experience with programming languages, software development tools, and other technologies. Lab exercises and projects allow them to apply theoretical concepts and gain practical skills.
- **Case Studies and Real-world Examples:** The pedagogy includes the use of case studies and real-world examples to demonstrate the application of concepts. By analyzing real-life scenarios and exploring practical solutions, students develop critical thinking and problem-solving skills.
- **Project-based Learning:** The BCA program incorporates project-based learning, where students work on individual or group projects that simulate real-world scenarios. This approach enhances their teamwork, communication, and project management abilities while applying their knowledge to solve complex problems.
- **Industry Interaction:** The program encourages industry interaction through guest lectures, workshops, and industry visits. Professionals from the IT industry share their experiences, insights,

and current trends, giving students a glimpse into the practical aspects of the field.

- **Internships and Practical Training:** The BCA program emphasizes internships and practical training opportunities. Students have the chance to work with industry partners, gaining hands-on experience, and applying their skills in real work environments. This exposure enhances their understanding of industry practices and prepares them for future employment.
- **Continuous Assessments:** Regular assessments, including quizzes, assignments, and presentations, help evaluate students' progress and understanding of the subject matter. Feedback is provided to guide their learning and address any gaps in understanding.
- **Technology Integration:** The program leverages technology as a learning tool. Online resources, educational software, and virtual labs are utilized to enhance students' understanding of concepts and provide additional learning opportunities.
- **Mentoring and Guidance:** Faculty members act as mentors, providing individual guidance and support to students. They assist in setting academic goals, clarifying doubts, and offering career advice to ensure students' overall growth and success.
- **Collaborative Learning:** The BCA program promotes collaborative learning through group projects, discussions, and peer-to-peer interactions. Students learn from each other, exchange ideas, and develop teamwork and communication skills.

The pedagogy of the BCA program aims to create a dynamic and engaging learning environment, enabling students to acquire theoretical knowledge, practical skills, and a problem-solving mindset. By incorporating these simple yet effective teaching strategies, the program equips students with the necessary competencies to thrive in the field of computer applications.

Three Year BCA Programme:

The total credits for 3-year BCA will be 132. Following types of courses will be offered for a 3-Year BCA Programme.

- 14 Discipline-specific Major Courses (48 credits)
- 2 Discipline Specific Electives (8 credits)
- 5 Minor Courses (18 credits)
- 6 Open Electives (12 credits)
- 4 Ability Enhancement Courses (8 credits)
- 3 Skills Enhancement Courses (6 credits)
- 2 Value Education Courses (4 credits)
- 4 Vocational Skill Courses (8 credits)
- 1 Indian Knowledge System (2 credits)
- 4 Co-curricular courses (8 credits)
- 1 Community Engagement and Project (2 credits)
- 1 On Job Training (4 credits)

- 2 Field Project (4 credits)

Four Year BCA (Hons./ Hons. with Research) Programme

The 4-year BCA (Hons with Research) degree will be 176 credits. Following types of courses will be offered for a 4-Year BCA(H) Programme:

- 22/20 Discipline-specific Major Courses (76 credits)
- 4 Discipline Specific Electives (16 credits)
- 1 Research Methodology (4 credit)
- 5 Minor Courses (18 credits)
- 6 Open Electives (12 credits)
- 4 Ability Enhancement Courses (8 credits)
- 3 Skills Enhancement Courses (6 credits)
- 2 Value Education Courses (4 credits)
- 4 Vocational Skill Courses (8 credits)
- 1 Indian Knowledge System (2 credits)
- 4 Co-curricular courses (8 credits)
- 1 Community Engagement and Project (2 credits)
- 2 On Job Training (8 credits)
- 2 Field Project (4 credits)
- 2 Research Project (12 credits) {For only Hons. with Research}

Outcome Based Approach to Education (OBE):

As per the National Higher Education Qualification Frameworks (NHEQF), students are expected to possess the quality & characteristics of the graduate of a Programme of the study, including learning outcomes relating to the disciplinary areas, learning generic outcomes that are expected to be acquired by a graduate on completion of the Programme.

OBE is an educational model that forms the base of a quality education system. There is no specified style of teaching or assessment in OBE. All educational activities carried out in OBE should help the students to achieve the set goals. The faculty may adapt the role of an instructor, trainer, facilitator, and/or mentor based on the outcomes targeted. OBE enhances the traditional methods and focuses on what the institute provides to the students. It shows the success by making or demonstrating outcomes using statements 'able to do' in favor of students. It provides clear standards for observable and measurable outcomes.

Four Levels of Outcomes from OBE

1. Programme Educational Objectives (PEOs)
2. Programme Outcomes (POs)
3. Programme Specific Outcomes (PSOs)

4. Course Outcomes (COs)

Graduate Attributes

The graduate attributes include the learning outcomes that are specific to disciplinary areas relating to the chosen field(s) of learning within the broad multidisciplinary & interdisciplinary learning outcomes that graduates of all Programmes should acquire & demonstrate.

<u>Graduate Attributes</u>	
1.	Disciplinary Knowledge
2.	Critical Thinking & Problem Solving
3.	Creativity & Innovation
4.	Effective Communication
5.	Research-related skills
6.	Cooperation & Team Work
7.	Global/Multicultural Competence
8.	Ethics & Human Values
9.	Lifelong Learning
10.	Leadership Readiness
11.	Community Engagement & Social Responsibilities
12.	Digital literacy

Programme Educational Objectives (PEOs):

Programme Educational Objectives (PEOs) are defined for the aspiring students about what they will achieve once they join the Programme. PEOs are about professional and career accomplishment after 3 or 4 years of graduation. PEOs are the written statements taken from different aspects like Knowledge, Skills & Ethics with focus on Career, Competency and Behavior. Three PEOs are recommended for BCA(H) Programme.

<u>Program Educational Objectives (PEOs):</u>	
PEO1.	Foundational Expertise: Graduates will develop a comprehensive understanding of computer science principles, equipping them to apply their knowledge effectively in solving complex real-world problems.
PEO2.	Professional Skills: Graduates will cultivate strong communication abilities, teamwork skills, and adaptability, enabling them to work effectively in diverse and dynamic professional environments.
PEO3.	Ethical and Social Responsibility: Graduates will be committed to upholding high ethical standards and social responsibility, using their expertise to contribute positively to the community and society at large.

PEO4.	Lifelong Learning: Graduates will be motivated to pursue continuous learning and professional development, staying current with technological advancements and adapting to changes in their field.
PEO5.	Leadership and Innovation: Graduates will be prepared to take on leadership roles, demonstrating creativity and innovation in their approach to challenges in the technology sector.

Programme Outcomes (POs):

A Programme outcome is broad in scope and defines what the students will be able to do at the end of the Programme. POs are defined in line with the graduate attributes as specified above. POs are to be specific, measurable and achievable.

<u>Programme Outcomes (POs):</u>	
PO1	At the end of the program students understand, analyse and develop computer programs in the areas like Web Design, Database manipulation, Windows & Mobile Application.
PO2	At the end of the program students understand, object-oriented programming features through various programming languages.
PO3	At the end of the program students are able to create dynamic, Interactive webpage's using various web technologies.
PO4	At the end of the program students understand the use of structured query language and its syntax, transactions, database recovery and techniques for query optimization.
PO5	At the end of the program students are able to work in the IT sector as system engineer, software tester, junior programmer, web developer, system administrator, software developer etc.
PO6	If chosen particular elective at the end of the program students are able to analyze very large data sets in the context of real world problems using various data analytical tools.
PO7	If chosen particular elective it will help students to develop in depth understanding of the key technologies in AI, data mining & machine learning.

Mapping of PEOs with POs:

MAPPING OF PEO WITH PO							
PEO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
PEO1	3	3	3	3	3	3	3
PEO2	2	2	2	2	3	2	2
PEO3	1	1	1	1	2	2	2
PEO4	3	3	3	3	3	3	3
PEO5	2	2	2	2	3	3	3

Level of correlation: 3-High, 2-Medium, 1-Low

Program Specific Outcomes (PSOs)

Programme Specific Outcomes (PSOs) are statements that describe what the graduates of a specific Programme should be able to do. Three PSOs have been defined for the BCA(H) Programme.

<u>Programme Outcomes (PSOs):</u>	
PSO1	Analyze real-world problems and computing requirements to develop appropriate software solutions.
PSO2	Apply core concepts and technical abilities to address computational challenges effectively.
PSO3	Demonstrate effective communication, teamwork, and professional ethics through technical documentation, presentations, and collaborative work

Semester Wise Credit Distribution of Proposed BCA /BCA (Honours) And BCA (Honours with Research) Program:

KCES's Institute of Management & Research
Proposed Structure for BCA
AY-2024-25

GENERAL COURSE STRUCTURE & THEME

A. Definition of Credit:

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
1 Hr. Practical (P) per week	0.5 Credit
2 Hours Practical (P) per week	1 Credit

B. Course code and definition:

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
DSC	Discipline Specific Core Course
OE	Open Elective
VSC	Vocational Skill Courses
SEC	Skill Enhancement courses
AEC	Ability Enhancement Courses

VEC	Value Education Courses
IKS	Indian Knowledge System
CC	Co-curricular Course
Minor	Minor subject
FP	Field Project
CEP	Community Engagement and Project
DSE	Discipline Specific Elective
OJT	On Job Training: Internship/ Apprenticeship
RM	Research methodology
RP	Research Project
MOOCs	Massive Open Online Course

Course Level/Duration/System: Undergraduate / Three or Four years/6 or 8 Semesters with multiple entry and exit. The following option will be made available to the students joining BCA Research Program:

- a. **One year:** Under Graduate Certificate in Computer Applications
- b. **Two years:** Under Graduate Diploma in Computer Applications
- c. **Three years:** Bachelor in Computer Applications (BCA)
- d. **Four years:**
 - Bachelor in Computer Applications (BCA-Honours) and
 - Bachelor in Computer Applications (BCA-Honours with Research)

Note: The students who are eligible for BCA (Honours with Research) shall have choice to pursue either BCA (Honours) or BCA (Honours with Research).

C. Credit distribution:

Ye ars	Le vel	Sem	Major(Core) Subjects		Minor	OE	VSC, SEC (VSEC)	AEC, VEC, IKS	OJT,F P,CEP ,CC,R P	Cum . Cr/ Sem ester	Degree/ Cumulat ive Credit
			Mandat ory (DSC)	Elective (DSE)							
I	4.5	I	4 – 6 (4+2)			2+2	VSC-2 SEC-2	AEC-2 VEC-2 IKS-2	CC-2	20- 22	40-44
		II	4 – 6 (4+2)		2	2+2	VSC-2 SEC-2	AEC-2 VEC-2	CC-2	20- 22	
		Cum. Cr.	8 - 12		2	8	8	10	4	40- 44	
Credit After I st Year			8-12		2	8	8	10	4	40	40 - 44
II	5	III	6 (4+2) – 8(2*4)		4	2	VSC-2	AEC-2	FP-2 CC-2	20- 22	40-44
		IV	6		4	2	SEC-2	AEC-2	CEP-2 CC-2	20- 22	
		Cum. Cr.	8-12		8	4	4	4	8	40- 44	
Credit After II nd Year			20-22		10	12	12	14	12	80- 88	80 - 88
III	5.5	V	8(2*4) – 10(2*4+ 2)	4	4-6		VSC- 2-4		FP/CE P-2	20	40-44
		VI	8(2*4) – 10(2*4+ 2)	4	4				OJT-4	20	
		Cum. Cr.	16-20	8	8-10		2		6	40- 44	
Credit After III rd Year			36-48	8	18-20	12	14	14	18	120- 132	120-132
IV	6	VII	12- 14(2*4+ 2*2 or 3*4+2)	4	RM:4					20- 22	UG Honors Degree 40-44
		VIII	12- 14(2*4+ 2*2 or 3*4+2)	8					OJT:4	20- 22	
		Cum. Cr.	28	12					4	40- 44	
Credit After IV th Year			64	16	18- 20+4	12	8-10+6	8+4+2	22	160- 176	160-176
IV	6	VII	8-10 (2*4+2 or 2*4)	4	RM:4				RP:4	20- 22	UG Honors with Research Degree 40-44
		VIII	8-10 (2*4+2 or 2*4)	4					RP:8	20- 22	
		Cum. Cr.	16-20	8	4				12		
Credit After V th Year			52-68	16	18- 20+4	12	8-10+6	8+4+2	8+6+4 +12	160- 176	160-176

D. Category- wise distribution*

Description	DSC	DSE	OE	Minor	VSC	SEC	AEC	VEC	IKS	OJT	FP	CEP	CC	RM	RP	Total
BCA	48	8	12	18	8	6	8	4	2	4	4	2	8	--	--	132
BCA (Honours)	76	16	12	18	8	6	8	4	2	8	4	2	8	4	--	176
BCA (Honours with Research)	68	16	12	18	8	6	8	4	2	4	4	2	8	4	12	176

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An Autonomous Institute, Affiliated to KBC, North Maharashtra University, Jalgaon										
Course: Bachelor of Computer Application										
Academic Year: 2024-25										
Class	Sem	Type	Course Code	Title	Credit	Teaching Hours per week		Marks (Total 100)		Exam Panel
						T	P	Internal	External	
BCA – First Year, SEMESTER – I, Level – 4.5										
FY BCA	I	DSC	BCA-DSC- 111	Programming in C	4	4	--	40	60	
		DSC	BCA-DSC- 112	Lab on Programming in C	2	--	2	20	30	
		OE	BCA-OE-113-A	Principles of Management	2	2	--	20	30	
			BCA-OE-113-B	Principles of Accounting-I						
		OE	BCA-OE-114-A	Digital Marketing I	2	2	--	20	30	
			BCA-OE-114-B	Personals Financial Planning-I						
		VSC	BCA-VSC-115	Web Technology-I	2	--	2	20	30	
		SEC	BCA-SEC- 116	Essentials of Information Technology	2	2	--	20	30	
		AEC	BCA-AEC-117	Professional Communication – I	2	2	--	20	30	
		VEC	VEC-101	Environment Science and Sustainability	2	2	--	20	30	Common Subject as BBA/MC A(Integrated)
		IKS	IKS-102	Indian Knowledge System	2	2	--	20	30	
		CC	CC-100	NSS/ Sports/Cultural Activities	2	--	2	50	--	
				Total Credits	22			550		
BCA – First Year, SEMESTER – II, Level – 4.5										
FY BCA	II	DSC	BCA-DSC- 121	OOPS with C++	4	4	--	40	60	
		DSC	BCA-DSC- 122	Lab on OOPs with C++	2	--	2	20	30	
		Minor	BCA-MIN-123	System Analysis and Design	2	2	--	20	30	
		OE	BCA-OE-124-A	Marketing Management	2	2	--	20	30	
			BCA-OE-124-B	Principles of Accounting-II						
		OE	BCA-OE-125-A	Digital Marketing II	2	2	--	20	30	
			BCA-OE-125-B	Personals Financial Planning-II						
		VSC	BCA-VSC-126	Web Technology-II	2	--	2	20	30	
		SEC	BCA-SEC-127	Operating System Concepts with Linux OS	2	2	--	20	30	
		AEC	BCA-AEC-128	Professional Communication – II	2	2	--	20	30	
		VEC	VEC-201	Indian Constitution	2	2	--	20	30	Common Subject as BBA/MC A(Integrated)
		CC	CC-200	NSS/ Sports/Cultural Activities	2	--	2	50	--	
			Total Credits	22			550			
	Total Credit : 44									
	Exit Option with UG Certificate									

Exit Criteria after First Year of BCA Programme

The students shall have an option to exit after 1st year of BCA Program and will be awarded with a **UG Certificate in Computer Applications**. The exiting students will complete 44 credits as per the University/AICTE schedule

Re-entry Criteria in to Second Year (Third Semester)

The student who takes an exit after one year with an award of certificate may be allowed to re-enter in to Third Semester for completion of the BCA Program as per the respective University /Admitting Body schedule after earning requisite credits (44 Credits) in the First year.

KCES's Institute of Management and Research, Jalgaon An Autonomous Institute, Affiliated to KBC, North Maharashtra University, Jalgaon										
Course: Bachelor of Computer Applications										
Academic Year: 2025-26										
Class	Sem	Type	Course Code	Title	Credit	Teaching Hours per week		Marks (Total 100)		Exam Panel
						T	P	Internal	External	
BCA – Second Year, SEMESTER – III, Level – 5.0										
SY BCA	III	DSC	BCA-DSC-231	Data & File Structures	2	2	--	20	30	
		DSC	BCA-DSC-232	Lab on Data & File Structures	2	--	2	20	30	
		DSC	BCA-DSC-233	Mathematical Foundation - I	4	4	--	40	60	
		Minor	BCA-MIN-234	Management Information System-I	4	4	--	40	60	
		OE	BCA-OE235-A	Entrepreneurship Development	2	2	--	20	30	
			BCA-OE235-B	Ecommerce & M-Commerce						
		VSC	BCA-VSC-236	Lab on Web Technology-III	2	--	2	20	30	
		AEC	BCA-AEC-237	Personality Development - I	2	2	--	20	30	
		FP	BCA-FP-238	Field Project	2	--	2	20	30	
		CC	CC-300	NSS/ Sports/Cultural Activities	2	--	2	50	--	Common Subject as BBA/ MCA(Integrated)
Total Credits					22			550		
BCA – Second Year, SEMESTER – IV, Level – 5.0										
SY BCA	IV	DSC	BCA-DSC-241	Database Management Systems	2	2	--	20	30	

		DSC	BCA-DSC-242	Lab on DBMS	2	--	2	20	30	
		DSC	BCA-DSC-243	Mathematical Foundation - II	4	4	--	40	60	
		Minor	BCA-MIN-244	Management Information System-II	4	4	--	40	60	
		OE	BCA-OE245-A	Basics of Tally	2	2	--	20	30	
			BCA-OE245-B	Advanced Excel						
		SEC	BCA-SEC-246	Networking Concepts	2	2	--	20	30	
		AEC	BCA-AEC-247	Personality Development - II	2	2	--	20	30	
		CEP	CEP-401	Community Engagement and Service	2	2	--	20	30	Comm on Subject as BBA/ MCA(Integrated)
		CC	CC-400	NSS/ Sports/Cultural Activities	2	--	2	50	--	
				Total Credits	22			550		
Total Credit : 88										
Exit Option with UG Diploma										

Note:

In the third Semester every student shall undergo minor field project.

Exit Criteria after Second Year of BCA Programme

The students shall have an option to exit after 2nd year of BCA Program and will be awarded with a **UG Diploma in Computer Application**. The exiting students will complete 88 credits per the University / Admitting Body schedule.

Re-entry Criteria in to Third Year (Fifth Semester)

The student who takes an exit after second year with an award of Diploma may be allowed to re-enter in to fifth Semester for completion of the BCA Program as per the respective University / Admitting Body schedule after earning requisite credits (88 Credits) in the Second year.

KCES's Institute of Management and Research, Jalgaon										
An Autonomous Institute, Affiliated to KBC, North Maharashtra University, Jalgaon										
Course: Bachelor of Computer Application										
Academic Year: 2024-25										
Class	Sem	Type	Course Code	Title	Credit	Teaching Hours per week		Marks (Total 100)		
						T	P	Internal	External	
BCA – Third Year, SEMESTER – V, Level – 5.5										
TY BCA	V	DSC	BCA-DSC-351	Java Programming	2	2	--	20	30	
		DSC	BCA-DSC-352	Lab on Java Programming	2	--	2	20	30	

		DSC	BCA-DSC-353	Python Programming	4	4	--	40	60	
		DSC	BCA-DSC-354	Lab on Python Programming	2	--	2	20	30	
		DSE	BCA-DSE-355(A)	Artificial Intelligence	2	2	--	20	30	
			BCA-DSE-355(B)	Data Analytics-I						
		DSE	BCA-DSE-356(A)	Lab on Artificial Intelligence	2	--	2	20	30	
			BCA-DSE-356(B)	Lab on Data Analytics-I						
		Minor	BCA-MIN-357	Software Engineering	4	4	--	40	60	
		VSC	BCA-VSC-358	Lab on Web Technology-IV	2	--	2	20	30	
		FP /CEP	BCA-FP-359	Field Project	2	--	2	20	30	
				Total Credits	22			550		
BCA – Third Year, SEMESTER – VI, Level – 5.5										
TY BCA	VI	DSC	BCA-DSC-361	Mobile Application development	2	2	--	20	30	
		DSC	BCA-DSC-362	Lab on Mobile Application development	2	--	2	20	30	
		DSC	BCA-DSC-363	Cloud Computing	4	4	--	40	60	
		DSC	BCA-DSC-364	Lab on Cloud Computing	2	--	2	20	30	
		DSE	BCA-DSE-365(A)	Machine Learning	2	2	--	20	30	
			BCA-DSE-365(B)	Data Analytics-II						
		DSE	BCA-DSE-366(A)	Lab on Machine Learning	2	--	2	20	30	
			BCA-DSE-366(B)	Lab on Data Analytics-II						
		Minor	BCA-MIN-367	Enterprise Resource Planning	4	4	--	40	60	
		OJT	BCA-OJT-368	Industrial Training	4	--	4	40	60	
		Total Credits	22			550				
Total Credit : 132										
Exit Option with Bachelor of Computer Applications										

Note: Discipline Elective in Artificial Intelligence / Data Analytics-I in sem V.
Discipline Elective in Machine Learning / Data Analytics-II in sem VI

Note:

Bachelor of Computer Applications Degree will be awarded, if a student wishes to exit at the end of Third year.

Exit Criteria after Third Year of BCA Programme

The students shall have an option to exit after 3rd year of BCA Program and will be awarded with a Bachelor of Computer Applications.

Re-entry Criteria in to Fourth Year (Seventh Semester)

The student who takes an exit after third year with an award of BCA may be allowed to re-enter in to Seventh Semester for completion of the BCA (Honours) or BCA (Honours with Research) Program as per the respective University / Admitting Body schedule after earning requisite credits (132) in the Third year.

Minimum eligibility criteria for opting the course in the fourth year will be as follows:

- **BCA (Honours with Research):** Minimum 75% marks or equivalent CGPA in BCA Degree up to Sixth Semester.
- For **BCA (Honours):** BCA Degree

KCES's Institute of Management and Research, Jalgaon										
An Autonomous Institute, Affiliated to KBC, North Maharashtra University, Jalgaon										
Course: Bachelor of Computer Application										
BCA (Honours)										
Clas s	Sem	Type	Course Code	Title	Credit	Teaching Hours per week		Marks (Total 100)		
						T	P	Int er nal	Ex ter nal	
BCA (Honours) – Forth Year, SEMESTER – VII, Level – 6.0										
BCA	VII	DSC	BCA-DSCH-471	Design and Analysis of Algorithm	4	4	--	40	60	
		DSC	BCA-DSCH-472	Lab on Design and Analysis of Algorithm	4	--	4	40	60	
		DSC	BCA-DSCH-473	Software Development Methodologies	4	4	--	40	60	
		DSC	BCA-DSCH-474	Lab on 476(A) or 476(B)	2	--	2	20	30	
		RM	BCA-RMH- 475	Research Methodology	4	4		40	60	
		DSE	BCA-DSEH-476(A)	Natural Language Processing	4	4	--	40	60	
			BCA-DSEH-476(B)	Digital Image Processing - I						
					Total Credits		22		550	
BCA (Honours) – Forth Year, SEMESTER – VIII, Level – 6.0										
BCA	VIII	DSC	BCA-DSCH-481	Data Warehousing and Mining	4	4	--	40	60	
		DSC	BCA-DSCH-482	Lab on DWDM	4	--	4	40	60	
		DSC	BCA-DSCH-483	Compiler Construction	4	4	--	40	60	
		DSC	BCA-DSCH-484	Lab on 485(A) or 485(B)	2	--	2	20	30	
		DSE	BCA-DSEH-485(A)	Generative AI	4	4	--	40	60	
			BCA-DSEH-485(B)	Digital Image Processing - II						

		OJT	BCA-OJTH-486	On Job Training	4	--	4	40	60	
				Total Credits	22			550		
Total Credit : 176										
Exit Option with UG Honours Degree										

KCES's Institute of Management and Research, Jalgaon										
An Autonomous Institute, Affiliated to KBC, North Maharashtra University, Jalgaon										
Course: Bachelor of Computer Application										
BCA (Honours with Research)										
Class	Sem	Type	Course Code	Title	Credit	Teaching Hours per week		Marks (Total 100)		
						T	P	Internal	External	
BCA (Honours with Research) – Forth Year, SEMESTER – VII, Level – 6.0										
BCA	VII	DSC	BCA-DSCR-471	Research Domain 1 (Recent trends in NLP etc.)	4	4	--	40	60	
		DSC	BCA-DSCR-472	Research Domain 2 (DIP etc.)	4	4	--	40	60	
		DSC	BCA-DSCR-473	Lab on Tensorflow/ Matlab/ Weka / SPSS etc.	2	--	2	20	30	
		DSE	BCA-DSE-474(A)	Research Problem Formulation, Literature Survey, Data Collection Domain 1	4	4	--	40	60	
			BCA-DSE-474(B)	Research Problem Formulation, Literature Survey, Data Collection Domain 2						
		RM	BCA-RMR-475	Research Methodology	4	4	--	40	60	
		RP	BCA-RPR-476	Minor Research Project(Paper publication in international conference)	4	--	4	40	60	
				Total Credits	22			550		
BCA (Honours with Research) – Forth Year, SEMESTER – VIII, Level – 6.0										
BCA	VIII	DSC	BCA-DSCR-481	Research Domain 1 (Recent trends in NLP etc.)	4	4	--	40	60	
		DSC	BCA-DSCR-482	Research Domain 2 (DIP etc.)	4	4	--	40	60	
		DSC	BCA-DSCR-483	Lab on Tensorflow/Matlab/Weka/SPSS etc.	2	--	2	20	30	
		DSE	BCA-DSE-484(A)	Research Problem Formulation, Literature Survey, Data Collection , Model Development for Domain 1	4	4	--	40	60	
		DSE	BCA-DSE-484(B)	Research Problem Formulation, Literature						

			Survey, Data Collection , Model Development for Domain 2					
	RP	BCA-RPR-486	Major Research Project(Paper publication in journals/Patent)	8	--	8	80	120
			Total Credits	22			550	
Total Credit : 176								
Exit Option with UG Research Degree								

The Dissertation work will start from the beginning of fourth year of BCA (Honours with Research) Program. Students of Fourth Year shall be assessed for Project Work and Research Internship Report and Viva –Voce and Dissertation (For Research Track).

3 Years BCA Program	Total Credits = 132
4 Years BCA (Honours) and BCA (Honours with Research)	Total Credits = 176

Note:
Students
can take
extra

credit course from their own department or from other department as per the Admitting Body / University norms.

Semester I

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: I

BCA-DSC-111 Programming in C

Course Title: Programming in C

Course Type: DSC

Course Code: BCA-DSC-111

Total Credits: 04

Lectures: Tutorials: Practical: 4:0:0

CIE Marks: 40

Lecture Hours: 48 Hours

ESE Marks: 60

Course Description:

The "Programming in C" course introduces students to the fundamental concepts of programming using the C language. It covers topics such as data types, operators, control structures, functions, arrays, pointers, and file handling. The course emphasizes problem-solving techniques and algorithmic thinking, providing a strong foundation for developing efficient and structured programs. Students will gain hands-on experience through practical exercises and projects, preparing them for more advanced programming courses and real-world applications.

Course Objectives:

- The objective of this course is to provide a broad overview of problem solving techniques and use of c language programming to solve these problems.
- To Know the Basics of Programming and to Understand how to use programming in day to day Applications.
- Explain use of appropriate data types, control statements.
- Demonstrate ability to use top-down program design.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	--	--	✓	--	✓	✓

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

CO1	Recall fundamental concepts of C programming, including syntax, data types, operators
CO2	Apply appropriate control structures to solve problems such as decision making and repetitive tasks.
CO3	Analyze the concept of function scope, recursion, and the importance of modular programming.
CO4	Evaluate the effectiveness of different data handling techniques (e.g., arrays, pointers, string) in solving particular problems.
CO5	Explain the difference between structures and unions and their memory allocation
CO6	Design and implement complex C programs that integrate multiple concepts, such as file handling.

SN	Contents of Module	Hrs	COs
1	UNIT -I Introduction to Programming in C 1.1 History 1.2 Compilers and Interpreters 1.3 Structures of 'C' Programming	10	CO1

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	1.4 C Tokens, Keywords, Identifiers, Variables 1.5 Constant, Data Types, Variables and constants 1.6 Precedence and Associativity 1.7 Types of operators- arithmetic operators, relational operators, logical operators, Bit wise operators, increment, decrement operators, assignment operators, compound assignment operator, conditional expression, special operators. 1.8 Input and Output 1.9 Pre-processor directives in C		
2	UNIT –II Control structures 2.1 Decision making structures 2.2 If, if else 2.3 Nested If –else 2.4 Switch 2.5 Control structures 2.6 While 2.7 Do-while 2.8 For 2.9 Nested for loop 2.10 Other statements: break, continue. Goto and exit.	08	CO2
3	UNIT –III FUNCTIONS 3.1 Basic types of Function-Built in Functions, User Define Functions 3.2 Declaration and Definition 3.3 Return Keyword 3.4 Function argument (formal arguments, local arguments) 3.5 Function with default argument 3.6 Parameter passing, Call by value, Call by reference 3.7 Storage classes 3.8 Recursion	08	CO3
4	UNIT-IV ARRAY, POINTERS AND STRING 4.1 Array declaration, initialization 4.2 Types – one, two and multidimensional 4.3 What is Pointer? Pointer declaration, initialization. 4.4 Pointers arithmetic, Pointer to pointer, Arrays of pointers, pointer to function. STRING 4.5 Declaration and initialization 4.6 Standard library functions 4.7 Manipulating Strings 4.8 Strings and pointers 4.9 Array of strings	08	CO4
5	UNIT-V STRUCTURE AND UNION 5.1 Structure Basics 5.2 Creating structures 5.3 Accessing structure members (dot Operator) 5.4 Array of structures	08	CO5

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	5.5 Nested structures 5.6 Pointer to structure 5.7 Self-referential structure 5.8 Union 5.9 Difference between structure and union.		
6	UNIT - VI FILE HANDLING 6.1 Types of Files 6.2 Random Access to File 6.3 File handling functions in C 6.4 Operations on files 6.5 File opening modes 6.6 File reading mode 6.7 Writing to file	06	CO6

REFERENCE BOOKS:

1. Structured Programming approach using C – Forouzan and Gilberg, Thomson learning Publications
2. Programming in C – E Balaguruswamy, McGraw Hill Education publication.
3. The C Programming language – 2nd Edition Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall
4. Complete C Reference – Herbert Schildt, McGraw Hill Education publication.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	1	1
CO2	3	2	1	1	2	1	1
CO3	3	3	1	1	3	1	1
CO4	3	2	1	1	2	1	1
CO5	3	3	1	1	3	2	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓			✓
End Semester Examination (60)	✓	✓	✓	✓		✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-27

SEMESTER: I

BCA-DSC-112 Lab on Programming in C

Course Title: Lab on Programming in C

Course Type: DSC

Course Code: BCA-DSC-112

Total Credits: 02

Lectures: Tutorials: Practical: 0:0:2

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

The "Programming in C" course introduces students to the fundamental concepts of programming using the C language. It covers topics such as data types, operators, control structures, functions, arrays, pointers, and file handling. The course emphasizes problem-solving techniques and algorithmic thinking, providing a strong foundation for developing efficient and structured programs. Students will gain hands-on experience through practical exercises and projects, preparing them for more advanced programming courses and real-world applications.

Course Objectives:

- The objective of this course is to provide a broad overview of problem solving techniques and use of c language programming to solve these problems.
- To Know the Basics of Programming and to Understand how to use programming in day to day Applications.
- Explain use of appropriate data types, control statements.
- Demonstrate ability to use top-down program design.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	--	--	✓	--	✓	✓

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

CO1	Understand fundamental concepts of C programming, including syntax, data types, operators
CO2	Develop C programs using control structures for decision-making and iteration
CO3	Analyze the concept of function scope, recursion, and the importance of modular programming.
CO4	Evaluate the effectiveness of different data handling techniques (e.g., arrays, pointers, string) in solving particular problems.
CO5	Describe the memory allocation differences between structures and unions.
CO6	Create and execute intricate C programs that combine several ideas, such file handling.

Assignment No. 1 Input-Output ,Variables, Operators and Data Types

1. Write a Simple Program to Take Input from the User and Display Output on the Screen.
2. Declaring and Using Different Types of Variables in C and Demonstrate the Scope and Lifetime of Local and Global Variables
3. Create a program that demonstrates the use of arithmetic and relational operators by comparing two user-provided numbers and displaying the results of various operations.
4. Write and Execute a Program on Use of Bitwise Operators

Assignment No. 2 Decision Making and Looping Structures

1. W.A.P to check the number is even or odd. 2. W.A.P to find greatest number from given three numbers. 3. W.A.P to check the given number is prime number or not. 4. W.A.P to demonstrate Sum of Natural Numbers. 5. W.A.P to check given number is Armstrong number or not.
Assignment No. 3 Functions
1. W.A.P to find factorial of given number by using user defined function. 2. Write a program to define a function that takes two numbers and returns their sum, difference and multiplication 3. Implement a function that takes two integers as input and returns the greatest common divisor (GCD) of the two numbers. 4. Create a function that calculates the area of a rectangle. The dimensions (length and width) are passed as formal arguments, while the area is calculated using a local variable. 5. Write a program that swaps two numbers using call by value and another using call by reference. 6. Write and Execute a Program on Recursive functions that returns Fibonacci series of given range.
Assignment No.4 Array and Pointer
1. Write a C program that adds the elements of an array and displays the sum. 2. Create a program that takes an array of integers, calculates the sum and average of its elements using pointers, and prints the results. 3. Write C program that includes a function to find the maximum element in a 2D matrix and returns its value along with its position (row and column indices) 4. Write a program that demonstrates pointer arithmetic by accessing and modifying array elements using pointer expressions. 5. Write a program where a pointer points to the first element of an array. Use pointer arithmetic to access and modify elements of the array. 6. Create a function that accepts an array and its size as arguments, and prints the elements of the array. 7. Write a C Program to demonstrate all the string functions.
Assignment No.5 Structure and Union
1. Define a structure to represent a student with fields for name, age, and grade. Write a program to input and display these details. 2. Create a structure to represent a book with fields for title, author (as another structure), and publication year. Implement a program to input and display the book details. 3. Define a union that can store an int, float, or char. Create an instance of this union, set a value, and print the value. Demonstrate how setting one member affects the others. 4. Implement a program to print the size of a structure and a union with the same members. Compare and explain the differences in size.
Assignment No.6 File Handling
1. Write a program to open a file for writing, write a few lines of text to it, close the file, and then reopen it to read and display the contents.

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓		✓	✓
End Semester Examination (60)	✓	✓	✓	✓	✓	✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: I

BCA-OE-113-A Principles of Management

Course Title: Principles of Management

Course Type: OE

Course Code: BCA-OE-113-A

Total Credits: 02

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

The course provides a comprehensive introduction to the fundamental concepts and practices of management. It explores the essential functions of management, including planning, organizing, leading, and controlling, and examines how these functions are applied in various organizational settings. Students will learn about key management theories, decision-making processes, and the roles and responsibilities of managers.

Course Objectives:

The subject aims to provide the student with:

- To be able to understand the Foundations of Management
- To learn the Processes of Forecasting, Planning, and Organizing.
- To develop Skills in Coordination and Decision-Making.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓	--	--	--	✓	--

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

CO1	Students will be able to define and describe the nature, features, and functions of management, and critically assess whether management is a science, art, or profession.
CO2	Students will demonstrate the ability to effectively forecast, plan, and organize by applying the principles and processes learned to real-world management scenarios.
CO3	Students will develop the ability to coordinate activities and make informed decisions within an organizational context, ensuring alignment with strategic goals and efficient management operations.

SN	Contents of Module	Hrs	COs
1	Unit 1. Nature and Process of Management 1.1. Definition, Nature and Features of Management 1.2. Management-Science or Art 1.3. Management as Profession 1.4. Functions of Management 1.5. Nature of Management Functions 1.6 Functions at Various Management Levels	8	CO1
2	Unit 2. Planning & Organizing 2.1. Meaning, Definition & Importance of Planning 2.2. Essentials of Effective Planning 2.3. Steps of Planning 2.4. Meaning, Objectives of organizing	8	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	2.5. Meaning, Definition & Importance Staffing, Directing and Controlling		
3	Unit 3. Co-ordination & Decision making 3.1. Co-Ordination 3.2. The Essence of Management 3.3. Techniques of Effective Co-Ordination 3.4. Meaning of decision making 3.5. Process of decision making	8	C03

REFERENCE BOOKS:

1. Principles of Management: T. Ramasamy, Himalaya.
2. Principles of Management: Dr. K Natarajan & Dr. K. P. Ganeshan. Himalaya.
3. Management Process: Koontz & O'Donnell, Tata-McGraw-Hill publishers Delhi.
4. Management of System: By A. K. Gupta & J. K. Sharma, Mac-Millan Publication, Delhi.
5. Principles of Management: Prakash Kothari, B. J. Lathi, Atharv Publication, Jalgaon.
6. Management & Organizational Behavior–By P. SubbaRao, Himalaya publication.
7. Business Organization & Management–By R.N. Gupta, Sultan Chand & Sons publication, Delhi

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	1	1	2	1	1
CO2	2	2	3	2	3	1	1
CO3	2	2	3	2	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation.	✓	✓	✓			✓
End Semester Examination (60)	✓	✓	✓			✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: I

BCA-OE-113-B Principles of Accounting-1

Course Title: Principles of Accounting-I

Course Type: OE

Course Code: BCA-OE-113-B

Total Credits: 02

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

An accountant is a financial expert specializing in personal and commercial finances. Accountant training teaches the measurement and management of economic data to assist investors, managers, business owners, and other persons in making informed financial decisions. An accounting system is a system that is employed in a company to organize financial information. It can be either manual or computerized. The main reason why you should be using an accounting system is to keep track of expenses, income, and other activities. The course will review foundational accounting principles and concepts that account for current assets, current liabilities, long-term liabilities, and owners' equity. Students will also complete a basic journal statement analysis.

Course Objectives:

- To familiarize students with the mechanics of preparation of financial statements, understanding
- Corporate financial statements, their analysis and interpretation, role of IFRS in accounting
- Discipline, and the concept of management quality analysis and wealth creation.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	--	✓	--	--	--	✓	--

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

CO1	Understand the meaning, features and the importance of accounting. Basic accounting concepts and terminologies. Analyze the role and benefits of Book-Keeping. Will be able to know the latest accounting standards.
CO2	Understand fundamental concepts of financial accounting.
CO3	Create accounting documents. And Analyze the effect of each transaction. Become familiar with the standard form and arrangement of Journal entries. Calculate GST on purchase of goods. And GST on sale of goods. Prepare Journal Entries correctly.

SN	Contents of Module	Hrs.	COs
1	Unit – I Introduction to Book-keeping and Accountancy 1.1 Meaning, Definition and Objectives 1.2 Importance of Book-keeping. 1.3 Difference between Book-keeping and Accountancy. 1.4 Meaning and Definition of Accountancy 1.5 Basis of Accounting System. Advantages of Financial Accounting, Limitations of Financial Accounting, Users of accounting information. 1.6 Qualitative characteristics of accounting information. 1.7 Basic Accounting Terminologies.	10	CO1

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs.</i>	<i>COs</i>
	1.8 Accounting Concepts, Conventions and Principles. 1.9 Accounting Standards (AS) and IFRS.		
2	Unit – II Meaning and Fundamentals of Double Entry Book-keeping & Fundamentals of accounting. 2.1 Meaning and Definition of Double entry Book-keeping System 2.2 Methods of Recording Accounting Information (Indian, Single, Double) 2.3 Advantages of Double entry Book-keeping system. 2.4 Classification of Accounts. 2.5 Golden Rules of Debit and Credit (Traditional Approach) 2.6 Modern Approach of Rules of Accounts. 2.7 Illustrations. 2.8 Accounting Equations. 2.9 Accounting Concepts – Entity concept- Dual Aspect concept – Accounting Period Concept – Going concern Concept – cost Concept – money Measurement Concept – Matching Concept – Realization – accrual Concept – Rupee Value Concept. 2.10 Terms used in accounting: Debtors, Creditors, Bill Receivable, Bills Payable, Credit Note, Debit Note, Petty Cash, Contra Entry, Trade Discount, Cash Discount, Suspense A/c.	8	CO1, CO2
3	Unit – III Journal 3.1 Meaning, Importance and Utility of Accounting Documents. 3.2 Meaning, Definition, Importance and Utility of Journal. 3.3 Specimen of Journal. 3.4 Recording of Journal entries with GST.	6	CO1, CO3

REFERENCE BOOKS:

1. Robert N. Anthony, David F. Hawkins, Kenneth A. Merchant. Accountancy- text and cases. McGraw Hill Education (India) Private Limited, New Delhi.
2. Fundamentals of Accounting by Dr. S.N. Maheshwari, Dr.S.K. Maheshwari- Vikas Publishing House(ISBN-139788180544491).
3. Financial accounting: By Jane Reimers (Pearson Education) ISBN: 9780136115274.
4. Book - Keeping and Accountancy Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune - 411 004

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	1	1	1	2	2	2
CO2	1	1	1	1	2	2	2

CO3	1	1	1	1	3	2	2
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Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓			✓
End Semester Examination (30)	✓	✓	✓	✓		✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: I

BCA-OE-114-A - Digital Marketing-I

Course Title: Digital Marketing – I

Course Code: BCA-OE-114-A

Lectures: Tutorials: Practical: 2:0:0

Lecture Hours: 24 Hours

Course Type: OE

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This course introduces students to the fundamentals of digital marketing. It focuses on essential concepts and strategies, including search engine optimization (SEO), social media marketing, content marketing, and email marketing, to build a strong digital presence and engage with customers effectively.

Course Objectives:

The course aims to provide a thorough understanding of digital marketing's core principles, including its various components such as SEO, social media, content marketing, and email marketing. Students will learn how to design and manage effective digital marketing campaigns, using real-world examples to apply their knowledge. The course also covers key tools and techniques, such as analytics platforms and SEO tools, to enhance digital marketing efforts. Additionally, students will develop skills to analyze campaign performance using data-driven insights, enabling them to optimize strategies for improved engagement, conversion rates, and return on investment (ROI).

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	--	✓	--	✓	--	✓	--

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

CO1	Understand the core principles of digital marketing.
CO2	TO Gain insights into various digital marketing tools and techniques.
CO3	To Develop skills to analyze digital marketing performance and optimize strategies.

SN	Contents of Module	Hrs	COs
1	Unit – 1 Introduction to Digital Marketing 1.1 Overview of Digital Marketing 1.2 Key Differences between Digital and Traditional Marketing 1.3 The Digital Marketing Landscape 1.4 Importance of Digital Marketing in the Modern Business Environment 1.5 Digital Marketing Channels and Types 1.6 The Digital Consumer and Customer Journey 1.7 Digital Marketing Strategy and Planning	8	CO1
2	Unit – 2 Search Engine Optimization (SEO)	8	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	2.1 Understanding Search Engines 2.2 SEO Strategies and Best Practices 2.3 On-Page SEO Techniques 2.4 Off-Page SEO Techniques 2.5 Tools for SEO Analysis and Monitoring 2.6 Common SEO Mistakes to Avoid 2.7 Future Trends in SEO		
3	Unit – 3 Social Media and Content Marketing 3.1 The Role of Social Media in Digital Marketing 3.2 Content Creation and Curation Strategies 3.3 Social Media Advertising and Analytics 3.4 Building and Engaging an Online Community 3.5 Influencer Marketing on Social Media 3.6 Social Media Listening and Reputation Management 3.7 Future Trends in Social Media and Content Marketing	8	CO3

REFERENCE BOOKS:

1. Vandana, Ahuja; Digital Marketing, Oxford University Press India (November, 2015).
2. Menon, Arpita; Media Planning and Buying; McGraw Hill (1st Edition, 2010)
3. Arnold, George; Media Writer's Handbook: A Guide to Common Writing and Editing Problems; McGraw-Hill Education; (5th edition, 2008)
4. Ryan, Damian; Understanding Digital Marketing: marketing strategies for engaging the digital generation; Kogan Page (3rd Edition, 2014).

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	3	1	2	2	1
CO2	2	2	3	1	2	3	2
CO3	2	2	3	1	3	3	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Utilize	Develop
Continuous Internal Evaluation. (20)	✓	✓	✓		✓	✓
End Semester Examination (30)	✓	✓	✓	✓	✓	✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: I**BCA-OE-114-B Personal Financial Planning-I**

Course Title: Personal Financial Planning-I

Course Code: BCA-OE-114-B

Lectures: Tutorials: Practical: 2:0:0

Lecture Hours: 24 Hours

Course Type: OE

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This course will help students organize their financial lives by learning and implementing selected principles of accounting, finance, and management. The course will address value and risk determination by dealing specifically with the analysis of one's financial status, goal setting and planning, and decision-making. Risk analysis, savings and investment principles, taxes, debt management, retirement, and estate considerations are areas, which guide the financial management of individuals and businesses alike.

Course Objectives:

- To provide the student with an understanding of the personal financial planning and its relevance to modern management practices.
- It covers introduction, investment management and risk analysis.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	--	✓	--	✓	--	✓	--

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

CO1	Understand the fundamental concepts of Personal financial planning.
CO2	Analyze and apply knowledge and theories of financial planning.
CO3	Apply skills for effective decision-making in financial planning

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
1	Unit – 1 Introduction to Financial Planning 1.1 Introduction: Meaning and concept of Finance - Meaning of Financial Planning - Importance of Financial Planning - Financial Goals –Types of Financial goals. - Types of Investors - Financial Planning Strategies - Budgeting Income and Payments 1.2 Introduction- Meaning of savings - Benefits of savings - Financial Discipline - Meaning and objectives of Investment - Types of Investment - Steps of Investment Process	8	CO1 & CO2
2	Unit 2- 2.1 Risk and Portfolio Management	8	CO1 &

SN	Contents of Module	Hrs	COs
	- Concept of Risk and Types of Risk - Portfolio Formation - Portfolio Diversification - Benefits of Portfolio Diversification. 2.2 Building and Maintaining Good Credit: - Credit Basics and Debt Management, - Sources of Debt, - Credit Report and Scores.		CO2
3	Unit – 3 Investment Planning 3.1 Basics of Investment: Concept and characteristics of Bond - Gold Bonds - Benefits and drawbacks of Investing in Gold Bond - Real Estate – Meaning and Characteristics - Types of Real Estate - Mutual Funds - Advantages and Disadvantages of Mutual Funds - Mutual Fund Schemes - Investment in Fixed Income Instruments - Digital currency – Types, advantages and disadvantages	8	CO1, CO2 & CO3

REFERENCE BOOKS:

1. Halan, M. “*Let's Talk Money: You've Worked Hard for It, Now Make It Work for You*” Harper Collins Publishers, New York.
2. Indian Institute of Banking & Finance. “*Introduction to Financial Planning*” Taxmann Publication, New Delhi.
3. Keown A.J. “*Personal Finance*” Pearson, New York.
4. Madura, J. “*Personal Finance*”, Pearson
5. Pandit , A. “*The Only Financial Planning Book that You Will Ever Need*” Network 18 Publications Ltd., Mumbai.
6. Sinha, M. “*Financial Planning: A Ready Reckoner*” McGraw Hill Education, New York.
7. Tripathi, V. “*Fundamentals of Investment*” Taxmann Publication, New Delhi.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	1	1	1	2	2	2
CO2	1	1	1	1	2	3	2
CO3	1	1	1	1	3	3	3

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Utilize	Develop
Continuous Internal Evaluation. (20)	✓	✓	✓	✓		
End Semester Examination (30)	✓	✓	✓	✓	✓	✓

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FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor OF Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: I

BCA-VSC-115 Web Technology-I

Course Title: Web Technology-I

Course Type: VSC

Course Code: BCA-VSC-115

Total Credits: 02

Lectures: Tutorials: Practical: 0:0:2

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

This course focuses on the foundational aspects of web development, specifically HTML and CSS. Students will learn to create well-structured, styled web pages, gaining practical skills essential for web design. The course includes hands-on practice to reinforce theoretical knowledge.

Course Objectives:

- **Master HTML Fundamentals:** Understand HTML structure, create semantic documents, and implement forms and tables.
- **Develop Advanced CSS Skills:** Style HTML with CSS, use Flexbox and Grid for layouts, and apply transitions, animations, and transforms.
- **Implement Responsive Design Techniques:** Design responsive web pages with media queries and adaptive layouts.
- **Utilize LESS for Efficient Styling:** Use LESS features like variables, mixins, and nesting to simplify and organize CSS.
- **Apply Sass for Advanced Styling Solutions:** Leverage Sass variables, mixins, and functions for modular and maintainable styling.
- **Integrate LESS and Sass into Workflow:** Compare LESS and Sass, and integrate them into development workflows using build tools.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓	--	✓	--	✓	✓

Course Outcomes:

CO1	Create and style responsive, semantic web pages using HTML, CSS, LESS, and Sass, employing advanced techniques for modern web design.
CO2	Utilize LESS and Sass to write efficient, modular, and maintainable CSS, integrating them effectively into web development workflows.
CO3	Debug, optimize, and apply best practices in web design and development to produce high-quality, performant, and accessible websites.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	2	3	1	1

CO2	3	2	3	2	3	1	1
CO3	3	2	3	2	3	2	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Utilize	Develop
Continuous Internal Evaluation. (20)	✓	✓	✓			
End Semester Examination (30)	✓	✓	✓			

Practical Assignments:

1	Basic HTML Page Creation: Create a simple HTML page with headings, paragraphs, and lists
2	Hyperlink Implementation: Add internal and external links to an HTML document.
3	Image Embedding: Insert and style images And Form within an HTML page.
4	Table Creation: Design a table to display structured data.
5	Style a Web Page with Basic CSS Apply CSS to style text, backgrounds, and margins of a simple HTML page.
6	Create a Box Layout Use CSS to create a layout with multiple boxes (e.g., a three-column layout) with different background colors and padding.
7	Design a Basic Button with Hover Effects Style a button with different states (normal, hover, active) using CSS.
8	Develop a Simple Footer Layout Create a footer with multiple columns and style it with CSS for a clean and organized appearance.
9	Use LESS Variables for Colors Define and apply variables in LESS for colors to standardize the color scheme across multiple elements.
10	Implement a LESS Mixins for Buttons Create a mixin in LESS for button styles and use it to apply consistent button styling.
11	Apply Nesting in LESS Use LESS nesting to write CSS for a simple navigation menu, demonstrating how nested rules are structured.
12	Build a Responsive Layout with LESS

	Develop a basic responsive layout using LESS, with media queries for different screen sizes
13	Create and Use Sass Variables Define variables in Sass for colors, fonts, and sizes, and apply them to style a simple HTML page.
14	Implement Sass Mixins for Reusable Styles Develop mixins in Sass for common styling patterns, such as border-radius or box-shadow.
15	Design a Simple Grid System with Sass Build a basic grid system using Sass, applying it to create a simple layout with columns.
16	Apply a Basic Sass Function for Color Manipulation Use a Sass function to adjust color brightness or contrast and apply it to different elements on a page.

REFERENCE BOOKS:

1. "HTML and CSS: Design and Build Websites" by Jon Duckett
2. "Responsive Web Design with HTML5 and CSS" by Ben Frain
3. "Mastering LESS" by Pradeep Gohil
4. "Sass for Web Designers" by Dan Cederholm (Indian Edition)

SEMESTER: I

BCA-SEC-116-Essentials of Information Technology

Course Title: Essentials of Information Technology

Course Type: SEC

Course Code: BCA-SEC-116

Total Credits: 02

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

Fundamentals of Computer course provides a basics of computer system and data representations. It covers fundamental concepts, theories, and Solving example essential for understanding basic computer knowledge & number system. Students will be understanding the concepts different input, output devices and memory management techniques & Implementing Algorithms & flowchart to solving examples. Also understand different types of transmission media's in networking, Transmission Path and Internet applications as well as different topologies.

Course Objectives:

1. To Understand the basics of computer system, number system.
2. To Understand the concepts different input, output devices and memory concepts & design Algorithms & flowchart.
3. Introduction to the different transmission media's in networking, Transmission Path and Internet applications, LAN, MAN, WAN, Wireless Networks & Switching techniques as well as different topologies

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	--	--	✓	--	✓	--

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

CO1	Understand the basics of computer & Data representation
CO2	Describe concepts different input, output devices and memory & Analyze Algorithms & flowchart.
CO3	Describe concepts of basic Computer Network.

SN	Contents of Module	Hrs	COs
1	Unit – I Introduction to Computer System & Data representation 1.1. History & generation of computer 1.2. Definition of computer 1.3. Computer Language 1.4. Block diagram of computer system 1.5. Types of computers 1.6. Definition- Software, Hardware, Firmware, Translators, Compiler, Interpreter, Loader and Linder, Compiler 1.7. Introduction to Number system: decimal, binary, octal and hexadecimal, Conversion in Number System.	8	CO1
2	Unit – II Memory Management & Designing Algorithm with Flowchart 2.1 What is and Memory Management 2.2 Types of Memory Primary- RAM, ROM, PROM, EPROM 2.3 Secondary- Magnetic Disk, Hard Disk and CD, Pen drive. 2.4 Algorithm, Program Development steps- Algorithms	8	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	2.5 Flowchart, Flowchart symbols ,Examples of Specification for converting Algorithms and flowchart into Programs basic (Minimum 5)		
3	Unit – III Fundamental of Networking and Internet Services 3.1 Computer Net 3.2 work: Definition of Computer Network 3.3 Types of Networks: LAN, MAN, WAN. 3.4 Topologies: Star, Tree, Bus, Ring, Mesh, Fully Connected. 3.5 Wired and Wireless Networks 3.6 Internet: History of Internet 3.7 Working of Internet 3.8 Use of Internet, Applications of Internet	8	CO3

REFERENCE BOOKS:

1. Fundamentals of computer - V. Raja Raman, (PHI Publication)/SBW10:812034011
2. Computer Networks - Andrew S. Tanenbaum , Fourth Edition. /SBWnumber0130661023
3. Computer and studies a first course - Roger Hunt and John Shelley, (PHI Publication)/SBW10:0131646737
4. Cloud Computing for Dummies -Hurwitz Judith S. and Daniel Kirsch.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	3	2	2
CO2	3	2	2	2	3	2	2
CO3	3	2	2	2	3	2	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	-	✓	✓	-
End Semester Examination (60)	✓	✓	-	✓	✓	-

Practical Assignments:

1. To study of Introduction & Installation of Operating System (Linux and Windows).
2. Run different commands of MS DOS - CD, DIR, Date, Time, COPY, REN, CLS, MD, RD, etc.
3. Study different web Browsers- Internet Explorer, Fire fox, downloading of files
4. Study different Various Components of Computer.
5. Study of various computer Network Devices.
6. Create your E-Mail ID on any free E-Mail Server.
7. Login through your E-Mail ID and do the following:
 - a. Read your mail
 - b. Compose a new Mail
 - c. Send the Mail to one person
 - d. Send the same Mail to various persons
 - e. Forward the Mail
 - f. Delete the Mail

- g. Send file as attachment
- 8. Demonstrate the usage of various storage devices (data copying, CD/DVD burning)
- 9. Create and demonstrate of text formatting, tables, shapes, smart-arts, charts.
- 10. Create a spreadsheet which will demonstrate use of aggregate function.
- 11. Create and demonstrate power point presentation with animation
- 12. Prepare a presentation with five slides including animation and documentation report of it.

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B.C.A. (BACHELOR OF COMPUTER APPLICATION) PROGRAMME BATCH 2024-28

SEMESTER: I

BCA-AEC-117 Professional Communication - I

Course Title: Professional Communication - I

Course Code: BCA-AEC-117

Lectures: Tutorials: Practical: 2:0:0

Lecture Hours: 24 Hours

Course Type: AEC

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This course provides students with a foundational understanding of communication principles, focusing on the essential elements, channels, and processes involved in effective communication. The course explores various types and levels of communication, along with formal and informal channels, emphasizing their advantages and disadvantages. Students will learn to identify and overcome common barriers to communication and apply both interactive and non-interactive techniques to enhance their communication effectiveness. The course also covers the fundamentals of written communication and e-correspondence, including the structure and function of business letters, office memorandums, circulars, and emails, with a focus on technology-enabled communication tools and email etiquette.

Course Objectives:

- To understand the fundamental concepts, nature, and processes involved in communication, including various channels and media, and their significance in professional settings.
- To develop the ability to identify and overcome barriers to communication and apply effective communication strategies in both interactive and non-interactive contexts.
- To master the principles of written communication, with a focus on business correspondence and e-correspondence, including the effective use of technology and adherence to professional etiquette.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
--	✓	✓	--	✓	--	✓	--

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

CO1	Demonstrate a clear understanding of the essential elements and levels of communication, including the advantages and disadvantages of different communication types and channels.
CO2	Apply strategies to enhance communication effectiveness by overcoming barriers, utilizing listening skills, and employing interactive techniques for better professional interaction.
CO3	Create well-structured business letters, memorandums, and emails that adhere to professional standards, using appropriate technology and maintaining proper etiquette in e-correspondence.

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>Cos</i>
1	Unit – I Introduction to essentials of Communication 1.1. Concept, Nature and Process of communication 1.2. Channel and Importance 1.3. Media for Communication 1.4. Types of communication- Advantages and Disadvantages 1.5. Channels: Formal & Informal 1.6. Levels of Communication	9	CO1

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>Cos</i>
	1.7. Direction of Communication: Downward, upward, Lateral & Diagonal		
2	Unit – II Effective Communication: Barriers to Communication and its solutions 2.1 Effective Communication: Barriers to Communication and its solutions 2.2 Interactive and Non-Interactive Techniques of Communication 2.3 Listening as a tool of Communication 2.4 Guidelines for effective communication	5	CO2
3	Unit – III Written Communication and E-Correspondence 3.1 Nature and functions of business correspondence 3.2 Types of correspondence, purpose and use of business correspondence 3.3 Need and Importance of Business Letters 3.4 Parts of Business letters, Layout of business letters 3.5 Technology for Communication 3.6 Office Memorandum, Office Circulars, Notices and Orders 3.7 Effective IT Communication Tools. 3.8 Electronic Mail: Advantages, Safety and Smartness in Email 3.9 Email Etiquettes	10	CO3

REFERENCE BOOKS:

1. Business Communication: Neha Nigam, Digital Publishing House
2. Business Communication: R. C B, Ane Books Pvt. Ltd
3. Text Book of Communication Skills: D. Amutha & S. Vithya, Manglam Publications, 2023

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	1	1	2	1	1
CO2	2	2	2	1	2	1	1
CO3	3	2	3	2	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Utilize	Develop
Continuous Internal Evaluation. (20)	✓	✓		✓		
End Semester Examination (30)	✓	✓	✓	✓		

Semester II

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: II

BCA-DSC-121 OOPS with C++

Course Title: OOPS with C++

Course Type: DSC

Course Code: BCA-DSC-121

Total Credits: 04

Lectures: Tutorials: Practical: 4:0:0

CIE Marks: 40

Lecture Hours: 48 Hours

ESE Marks: 60

Course Description:

This course introduces students to the Object-Oriented Paradigm using C++. It covers essential concepts of OOP, including encapsulation, inheritance, and polymorphism, and how these concepts can be implemented in C++. The course also emphasizes practical programming skills and problem-solving techniques.

Course Objectives:

- To understand the principles and benefits of the Object-Oriented Paradigm.
- To learn the syntax and structure of the C++ programming language.
- To explore the concepts of classes, objects, inheritance, and polymorphism.
- To develop the ability to solve problems using OOP techniques in C++.
- To enhance skills in writing, testing, and debugging C++ programs.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	--	--	✓	--	✓	--

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

CO1	Understanding the Object-Oriented Paradigm.
CO2	Understanding in C++ Controls, Pointers, and Functions
CO3	Demonstration Classes and Objects in C++
CO4	Apply inheritance concepts to solve programming problems
CO5	Explain and apply polymorphism in C++ to enhance code flexibility and functionality.
CO6	Demonstrate the use of Templates & Exception Handling and file handling in C++.

SN	Contents of Module	Hrs	COs
1	Unit 1: Introduction and Basics of OOP 1.1 Introduction to Object-Oriented Paradigm 1.2 Need for Object-Oriented Programming 1.3 Characteristics of Object-Oriented Programming (Encapsulation, Abstraction, Inheritance, Polymorphism) 1.4 Difference between Structured Programming and OOP	6	CO1
2	Unit 2: C++ Controls, Pointers & Functions	8	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	2.1 Input/Output in C++ (cin, cout, iostream) 2.2 Data Types and Operators (Arithmetic, Relational, Logical, Bitwise) 2.3 Control & Conditional Statements (if, else, switch, loops) 2.4 Pointer Variables (Declaration, Initialization, Dereferencing, Arrays), Pointer Arithmetic 2.5 Function and its Components, Parameter Passing Mechanisms (Pass by Value, Reference, Pointer) - Pointer as Function Argument - Recursive Functions		
3	Unit 3: Objects and Classes 3.1 Class Declaration in C++ (Data Members, Member Functions) 3.2 Constructors (Default, Parameterized, Copy) 3.3 Destructors 3.4 Difference between Classes and Structures 3.5 Friend Class and Friend Function	8	CO3
4	Unit 4: Inheritance 4.1 Inheritance: Definition and Concept (Base and Derived Classes) 4.2 Types of Inheritance (Single, Multiple, Multilevel, Hierarchical, Hybrid) 4.3 Visibility Modes (Public, Private, Protected) 4.4 Virtual Base Class 4.5 Benefits of Inheritance (Reusability, Extensibility, Maintenance)	8	CO4
5	Unit 5: Operator Overloading 5.1 Operator Overloading: Definition 5.2 Unary Operator Overloading 5.3 Binary Operator Overloading (+, -, *, ==) 5.4 Rules for Operator Overloading (Precedence, Associativity) 5.5 Operator Overloading using Friend Functions 5.6 Function Overloading	10	CO5
6	Unit 6: Virtual Functions, Templates & Exception Handling & File Handling 6.1 Virtual Functions (Polymorphism, Overriding) 6.2 Pure Virtual Functions (Abstract Classes) 6.3 Function Templates (Generic Programming) 6.4 Exception Handling Constructs (try, catch, throw) 6.5 Introduction to File System (File Modes, File Streams) 6.6 Basic Read and Write File Functions	8	CO6

REFERENCE BOOKS:

1. Object-Oriented Programming in C++ – E. Balagurusamy, Tata McGraw-Hill.
2. C++: The Complete Reference – Herbert Schildt, McGraw-Hill Education.
3. Programming in C++ – Ashok N. Kamthane, Pearson Education.
4. The C++ Programming Language – Bjarne Stroustrup, Addison-Wesley.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	2	3	2	2
CO2	3	3	2	2	3	2	2
CO3	3	3	2	2	3	2	2
CO4	3	3	2	2	3	2	2
CO5	3	3	2	2	3	2	2
CO6	3	3	2	2	3	2	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyse	Evaluate	Create
Continuous Internal Evaluation (40)	✓	✓	-	✓	✓	-
End Semester Examination (60)	✓	✓	-	✓	✓	-

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SEMESTER: II

BCA-DSC-122 Lab on OOPS with C++

Course Title: Lab on OOPS with C++

Course Type: DSC

Course Code: BCA-DSC-122

Total Credits: 02

Lectures: Tutorials: Practical: 0:0:2

CIE Marks: 20

Lecture Hours:

ESE Marks: 30

Course Description:

This course introduces students to the Object-Oriented Paradigm using C++. It covers essential concepts of OOP, including encapsulation, inheritance, and polymorphism, and how these concepts can be implemented in C++. The course also emphasizes practical programming skills and problem-solving techniques.

Course Objectives:

- To understand the principles and benefits of the Object-Oriented Paradigm.
- To learn the syntax and structure of the C++ programming language.
- To explore the concepts of classes, objects, inheritance, and polymorphism.
- To develop the ability to solve problems using OOP techniques in C++.
- To enhance skills in writing, testing, and debugging C++ programs.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	--	--	✓	--	✓	--

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

CO1	Understand the basic programming skills including variables, control structures, functions, and arithmetic operations etc
CO2	Understand and apply OOP principles like encapsulation, inheritance, and polymorphism, including implementing classes with constructors/destructors, function overloading, and operator overloading.
CO3	Learn advanced techniques including dynamic memory management, exception handling, and file operations, enabling effective memory management and error handling.
CO4	Understand basic data structures such as arrays and strings.
CO5	Understand Pointer and Memory Management

Sr. No.	Practical List
1	Write a program to check whether a number is even or odd using if-else.
2	Write a program to calculate the sum and average of three numbers using control structure.
3	Write a program to determine whether a number is prime or composite.
4	Write a program to calculate the sum, difference, product, and quotient of two integers.

5	Write a program to demonstrate use of function overloading. (e.g., area of a circle, rectangle, and triangle).
6	Write a program to demonstrate encapsulation using of class.
7	Write a program to demonstrate the use of different types of constructors and a destructor in a class.
8	Write a program to demonstrate single inheritance.
9	Write a program to demonstrate multiple inheritance.
10	Write a program to demonstrate use of unary operator overloading.
11	Write a program to demonstrate use of binary operator overloading.
12	Write a program to demonstrate use of friend function.
13	Write a program to demonstrate use of virtual function.
14	a) Write a program to demonstrate the use of a pointer to pointer. b) Write a program to create pointers that point to objects and access their members. c) Write a program to demonstrate the use of pointers to functions.
15	Write a program to demonstrate use of Exception Handling.
16	a) Write a program to find the largest and smallest elements from an array. b) Write a program to sort an array in ascending and descending order.
17	Write a program to concatenate two strings and find the length of a string.
18	Write a program to calculate the factorial of a number using recursion
19	Write a program that demonstrates different types of polymorphism (e.g., method overriding).
20	Write a program to demonstrate use of File Handling.
21	Write a program to allocate and deallocate memory dynamically using pointers.

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓		✓	✓
End Semester Examination (60)	✓	✓	✓	✓	✓	✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor OF Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: II

BCA-MIN-123 System Analysis and Design

Course Title: System Analysis and Design

Course Code: BCA-MIN-123

Lectures: Tutorials: Practical: 2:0:0

Lecture Hours: 24 Hours

Course Type: Minor

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

The objective of the course is to provide the necessary background and experience in developing a System so that a student can enter in the professional community in the capacity of a system analyst or programmer. This course provides the student with a practical approach to systems analysis and design using a blend of traditional developments and current technologies. The student will learn how to apply established and evolving methodologies for the analysis, design, and development of an information system.

Course Objectives:

- To understand the fundamental concepts of systems, their analysis, and design.
- To apply systematic approaches to problem-solving in the context of system development.
- To equip students with the skills necessary to model, analyze, and design complex systems.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓	--	--	--	✓	--

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

CO1	Understand systems and their development through the System Development Life Cycle (SDLC).
CO2	Develop various system models, including DFDs, ERDs, and Use Case Diagrams.
CO3	Design efficient systems with robust testing and maintenance.

SN	Contents of Module	Hrs	COs
1	Unit – 1 Overview of System Analysis and Design 1.1 Introduction to Systems Concepts: Definition and characteristics of a system, Types of systems (open, closed, physical, abstract), Subsystems and system boundaries 1.2 System Development Life Cycle (SDLC): Phases of SDLC: Planning, Analysis, Design, Implementation, and Maintenance, Advantages and limitations of SDLC, Role of system analysts and stakeholders 1.3 Problem Identification and Feasibility Analysis: Identifying system requirements, Types of feasibility studies: Technical, Economic, Legal, Operational, and Schedule feasibility, Feasibility report and its components	8	CO1
2	Unit – 2 System Modelling and Design Techniques 2.1 Data Flow Diagrams (DFD): Levels of DFD: Context, Level 0, and Level 1, Symbols and rules used in DFDs, Constructing DFDs for	8	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	system analysis 2.2 Entity-Relationship Diagrams (ERD): Components of ERD: Entities, Attributes, Relationships, Cardinality and participation constraints, Normalization techniques (1NF, 2NF, 3NF) and their importance in database design 2.3 Use Case Diagrams: Actors, Use Cases, and System Boundaries, Relationships in use case diagrams: Include, Extend, Generalization, Creating use case diagrams for system scenarios		
3	Unit – 3 System Design, Implementation, and Testing 3.1 System Design Strategies: Structured vs. Object-Oriented Design, Modular Design: Coupling and Cohesion, Input/output Design: User interface design principles and guidelines 3.2 Database Design: Introduction to database design: Conceptual, Logical, and Physical design, Database normalization: Importance and application, designing relational databases and implementing schemas 3.3 System Testing and Implementation: Types of testing: Unit, Integration, System, and Acceptance testing, System implementation strategies: Direct cutover, Parallel, Phased, and Pilot implementation, Post-implementation review and maintenance	8	CO3

REFERENCE BOOKS:

1. "Systems Analysis and Design" by Kenneth E. Kendall, Julie E. Kendall
2. "Modern Systems Analysis and Design" by Jeffrey A. Hoffer, Joey F. George, and Joseph S. Valacich
3. "Systems Analysis and Design" by Alan Dennis, Barbara Haley Wixom, and Roberta M. Roth

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	1	2	-	-
CO2	2	3	2	2	3	2	1
CO3	1	2	3	3	2	3	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Utilize	Develop
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	✓
End Semester Examination (30)	✓	✓	✓	✓	✓	✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: II

BCA-OE-124-A Marketing Management

Course Title: Basics of Marketing

Course Code: BCA-OE-124-A

Lectures: Tutorials: Practical: 2:0:0

Lecture Hours: 24 Hours

Course Type: Open Elective (OE)

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

The "Fundamentals of Marketing" course provides an overview of key marketing concepts and practices. It covers the definition, nature, scope, and importance of marketing, contrasting it with selling and exploring functional areas and the marketing process. The course examines the role of a marketing manager in the modern business environment and delves into the marketing environment, including micro and macro factors, as well as segmentation, targeting, and positioning strategies. Additionally, it explores the marketing mix, focusing on product development, pricing, distribution channels, and promotional strategies.

Course Objectives:

The subject aims to provide the student with:

- To know and understand the concepts, principles, process and environment of marketing.
- To understand the need and importance of market segmentation, targeting and positioning.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	--	✓	✓	✓	--	✓	--

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

CO1	Define the fundamental concepts of marketing, including its definition, nature, scope, process and importance (Remember).
CO2	Explain the concept of the marketing environment, segmentation, targeting and positioning (Understand).
CO3	Explain the concept of the marketing mix and its components, commonly referred to as the 4Ps (Product, Price, Place, and Promotion). (Understand).

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
1	Unit 1: Introduction: 1.1 Definition, Nature, scope and importance of marketing. 1.2 Selling Vs Marketing 1.3 Functional areas of Marketing 1.4 Marketing Process 1.5 Role of a Marketing Manager in the current scenario.	8	CO1
2	Unit 2: Marketing Environment and Segmentation, Targeting and Positioning: 2.1 Concept of marketing environment and importance of marketing environmental analysis. 2.2 Micro-environment and Macro-environment 2.3 Meaning, concepts, benefits and limitations of segmentation 2.4 Bases for Segmenting Consumer Markets	8	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	2.5 Concept of Product Positioning and Differentiation		
3	Unit 3: Marketing Mix 3.1 Concept of Marketing mix. 3.2 Product – Concept, Levels of product (core benefit, basic product, expected product, augmented product and potential product), Product Life Cycle. 3.3 Price – Concept, significance, factors affecting price. 3.4 Place (Channel of distribution) – Meaning, importance, Types of distribution channels; Factors affecting choice of distribution channel. 3.5 Promotion – Nature, importance, Elements of Promotional Mix (Advertising, Publicity, Public Relations, Sales Promotion, Personal Selling and Direct Marketing).	8	CO3

REFERENCE BOOKS:

1. Marketing Management- S.A. Sherlekar, Himalaya Publishing House.
2. Principles of Marketing (A South Indian Perspective)- Philip Kotler, Gary Amrstrong, Prafulla Agnihotri, Ehsan, Pearson.
3. Marketing Management – RajanSaxena – Tata McGraw Hill.
4. Basics of Marketing Management – R.B. Rudani - S. Chand & Company Ltd.
5. Marketing Management – Ramaswamy, Namakumari 4th edition – Macmillion.
6. Principles of Marketing, R.K. Mittal, A. Sharma, V.K. Global Pub. Pvt. Ltd, New Delhi.
7. Principles of Marketing M K Nabi, K C Raut, Vrinda Publications (P) Ltd

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	1	1	1	2	1
CO2	2	2	2	1	1	2	2
CO3	2	2	3	1	1	2	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓			
End Semester Examination (30)	✓	✓	✓	✓		

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FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: II

BCA-OE-124-B Principles of Accounting-II

Course Title: Principles of Accounting-II

Course Type: Open Elective (OE)

Course Code: BCA-OE-124-B

Total Credits: 02

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

An accountant takes you through the fundamentals of accounting and explains concepts like revenue, costs, assets, liabilities and equity through a series of ground breaking business simulations. Accounting principles serve several purposes. They ensure that all publicly-traded companies are reporting their transactions and data in the same way so the information can be compared accurately between companies. Accounting equips you with knowledge and skills that are important to every organization. From traditional roles such as auditors and tax professionals, to specialized positioning in accounting, financial analysis, and consulting, an accounting degree will unlock a rewarding career path for you.

Course Objectives:

- Introduce accounting in ledger and balance sheet.
- Identify the basics of financial accounting through the accounting cycle for service and merchandise business.
- Apply the theoretical foundation of financial accounting (concepts, assumptions, and principles) and the financial statements of a profit seeking enterprise.
- Perform the different steps of the accounting cycle for service and merchandising businesses.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	--	✓	--	--	--	✓	--

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

CO1	Able to post recording from Books of original entries to Ledger. Balancing of various ledger accounts. Able to prepare Trial Balance. Understand the meaning and need of Subsidiary Books. Able to prepare and balance different types of Cash Book.		
CO2	Understand effects of Rectification of Errors. Able to detect the errors and rectify them. Meaning and need of Suspense A/c.		
CO3	Able to understand Meaning, Objective and Importance of Final Accounts. Able to Prepare Trading A/c, Profit and Loss A/c and Balance sheet with competency. Able to understand effects of adjustments.		
<i>SN</i>	<i>Contents of Module</i>	<i>Hrs.</i>	<i>COs</i>
1	Unit – I Ledger & Subsidiary Books.	10	CO1

	1.1 Meaning, Definition and Importance of Ledger. 1.2 Specimen of Ledger. 1.3 Posting of entries from Journal/Subsidiary Books to Ledger. 1.4 Balancing of Ledger Accounts. 1.5 Preparation of Trial Balance. 1.6 Introduction, Meaning and need for maintaining Subsidiary Books. 1.7 Cash Book with Cash Column 1.8 Cash Book with Cash and Bank Columns. 1.9 Simple and Analytical Petty Cash Book under Imprest System. 1.10 Purchase Book. Purchase Return Book. Sales Book. Sales Return Book 1.11 Journal Proper		
2	Unit – II Rectification of Errors. 2.1 Meaning & Effects of errors 2.2 Types of Errors 2.3 Detection & Rectification of errors 2.4 Preparation of Suspense Account	5	CO2
3	Unit – III Final Accounts of a Proprietary concern. 9.1 Meaning, Objectives and Importance of Final Accounts. 9.2 Preparation of Trading Account. 9.3 Preparation of Profit and Loss Account 9.4 Preparation of Balance Sheet 9.5 Effects of following adjustments:- Closing stock Outstanding Expenses Prepaid Expenses Depreciation on assets Bad debts and R.D.D. Discount on Debtors and Creditors Income received in advance Accrued Income Goods distributed as free sample Goods withdrawn by proprietor for Personal use. Interest on capital Interest on Drawings	9	CO3

REFERENCE BOOKS:

1. Robert N. Anthony, David F. Hawkins, Kenneth A. Merchant. Accountancy- text and cases. McGraw Hill Education (India) Private Limited, New Delhi.
2. Fundamentals of Accounting by Dr. S.N. Maheshwari, Dr.S.K. Maheshwari- Vikas Publishing House
3. (ISBN-139788180544491).
4. Financial accounting: By Jane Reimers (Pearson Education) ISBN: 9780136115274.

5. Book - Keeping and Accountancy Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune - 411 004

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	1	1	1	1	1	1
CO2	1	1	1	1	1	1	1
CO3	1	1	1	1	1	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓			✓
End Semester Examination (30)	✓	✓	✓	✓		✓

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FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: II

BCA-OE-125-A Digital Marketing-II

Course Title: Digital Marketing - II

Course Code: BCA-OE-125-A

Lectures: Tutorials: Practical: 2:0:0

Lecture Hours: 24 Hours

Course Type: MDE

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This course introduces students to the fundamentals of digital marketing. It focuses on essential concepts and strategies, including search engine optimization (SEO), social media marketing, content marketing, and email marketing, to build a strong digital presence and engage with customers effectively.

Course Objectives:

The course aims to provide a thorough understanding of digital marketing's core principles, including its various components such as SEO, social media, content marketing, and email marketing. Students will learn how to design and manage effective digital marketing campaigns, using real-world examples to apply their knowledge. The course also covers key tools and techniques, such as analytics platforms and SEO tools, to enhance digital marketing efforts. Additionally, students will develop skills to analyze campaign performance using data-driven insights, enabling them to optimize strategies for improved engagement, conversion rates, and return on investment (ROI).

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	--	✓	--	✓	--	✓	--

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

CO1	Understand the strategic role of content in digital marketing and how it influences customer engagement and brand visibility.
CO2	Understand and apply mobile marketing strategies to reach and engage mobile users effectively.
CO3	Develop proficiency in using digital marketing analytics to track and measure campaign performance.

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
1	Unit – 1 : Content Marketing and Email Marketing 1.1 The Role of Content in Digital Marketing 1.2 Types of Content (Blogs, Videos, Infographics, etc.) Content Creation Process 1.3 Content Marketing Channels SEO for Content Marketing 1.4 Repurposing and Syndicating Content 1.5 Building and Segmenting an Email List 1.6 Crafting Effective Email Campaigns Email Marketing Automation 1.7 Tools for Email Campaigns (e.g., Mailchimp, Constant Contact) 1.8 A/B Testing in Email Marketing Measuring Email Marketing Success	8	CO1

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
2	Unit 2: Mobile Marketing and E-commerce 1.1 Mobile Marketing Strategies 1.2 Mobile Advertising Formats 1.3 Mobile SEO and User Experience 1.4 Introduction to E-commerce marketing 1.5 Role of Digital Marketing in E-commerce 1.6 Conversion Rate Optimization (CRO) 1.7 E-commerce Tools and Platforms	8	CO2
3	Unit 3: Analytics, Trends, and Future of Digital Marketing 1.1 Digital Marketing Analytics 1.2 Importance of Data in Digital Marketing 1.3 Overview of Google Analytics 1.4 Tracking and Measuring Digital Campaigns 1.5 Advanced Data Analysis Techniques 1.6 Emerging Trends in Digital Marketing 1.7 Capstone Project and Presentations - Students Work in Groups to Develop a Comprehensive Digital Marketing Plan - Presentation of the Plan to the Class - Feedback and Evaluation	8	CO3

REFERENCE BOOKS:

1. Vandana, Ahuja; Digital Marketing, Oxford University Press India (November, 2015).
2. Menon, Arpita; Media Planning and Buying; McGraw Hill (1st Edition, 2010)
3. Arnold, George; Media Writer's Handbook: A Guide to Common Writing and Editing Problems; McGraw-Hill Education; (5th edition, 2008)
4. Ryan, Damian; Understanding Digital Marketing: marketing strategies for engaging the digital generation; Kogan Page (3rd Edition, 2014).

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	3	1	2	2	1
CO2	2	2	3	1	2	2	1
CO3	2	2	3	1	3	3	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Utilize	Develop
Continuous Internal Evaluation. (20)	✓	✓	✓		✓	
End Semester Examination (30)	✓	✓	✓	✓	✓	

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FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: II

BCA-OE-125-B Personal Financial Planning-II

Course Title: Personal Financial Planning-II

Course Code: BCA-OE-125-B

Lectures: Tutorials: Practical: 2:0:0

Lecture Hours: 24 Hours

Course Type: OE

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This course will help students organize their financial lives by learning and implementing selected principles of accounting, finance, and management. The course will address value and risk determination by dealing specifically with the analysis of one's financial status, goal setting and planning, and decision-making. Risk analysis, savings and investment principles, taxes, debt management, retirement, and estate considerations are areas, which guide the financial management of individuals and businesses alike.

Course Objectives:

The subject aims to provide the student with an understanding of the personal financial planning and its relevance to modern management practices. It covers introduction, investment management and risk analysis.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	--	✓	--	✓	--	✓	--

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

CO1	Understand the fundamental concepts of Personal financial planning.
CO2	Analyse and apply knowledge and theories of financial planning.
CO3	Apply skills for effective decision-making in financial planning

SN	Contents of Module	Hrs	COs
1	Unit – 1 Personal Tax Planning 1.1 Concept of Tax structure in India 1.2 Personal Tax Planning 1.3 Need for Tax Planning 1.4 Objectives and Advantages of Tax Planning 1.5 Concept of Tax Exemptions 1.6 Exemption of Allowances 1.7 Concept of Tax Deductions 1.8 Benefits and Allowances of Tax Deductions 1.9 Tax Exemptions vs Tax Deductions 2. Tax Avoidance vs Tax Evasion.	8	CO1 & CO2
2	Unit – 2 Insurance Planning 2.1 Introduction of Insurance: Types of Insurance 2.2 Concept of Life Insurance	8	CO1 & CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	2.3 Benefits and types of Life Insurance 2.4 How to claim Life insurance? 2.5 Factors affecting Life Insurance Policy. 2.6 Concept, features and benefits of Health Insurance 2.7 Best Health Insurance Plans available in India 2.8 Concept and benefits of Property Insurance 2.9 Types of Property Insurance		
3	Unit – 3 Retirement Benefits Planning 3.1 Meaning of Retirement 3.2 Saving for your retirement 3.3 Methods to save for retirement 3.4 Retirement planning goals 3.5 Process of Retirement planning 3.6 Pension Plans available in India.	8	CO1, CO2 & CO3

REFERENCE BOOKS:

1. Halan, M. *“Let's Talk Money: You've Worked Hard for It, Now Make It Work for You”* Harper Collins Publishers, New York.
2. *Indian Institute of Banking & Finance. “Introduction to Financial Planning”* Taxmann Publication, New Delhi.
3. Keown A.J. *“Personal Finance”* Pearson, New York.
4. Madura, J. *“Personal Finance”*, Pearson
5. Pandit, A. *“The Only Financial Planning Book that You Will Ever Need”* Network 18 Publications Ltd., Mumbai.
6. Sinha, M. *“Financial Planning: A Ready Reckoner”* McGraw Hill Education, New York.
7. Tripathi, V. *“Fundamentals of Investment”* Taxmann Publication, New Delhi.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	1	1	1	1	1	1
CO2	1	1	1	1	1	1	1
CO3	1	1	1	1	1	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Utilize	Develop
Continuous Internal Evaluation. (20)	✓	✓	✓	✓		
End Semester Examination (30)	✓	✓	✓	✓	✓	✓

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FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor OF Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: II

BCA-VSC-126 Web Technology-II

Course Title: Web Technology-II

Course Code: BCA-VSC-126

Lectures: Tutorials: Practical: 0:0:2

Lecture Hours: 24 Hours

Course Type: VSC

Total Credits: 2

CIE Marks: 20

ESE Marks: 30

Course Overview:

This course focuses on client-side scripting with JavaScript and front-end web development using the Bootstrap framework. The course emphasizes practical skills, enabling students to create dynamic, responsive web pages.

Course Objectives:

- **Understand and apply fundamental JavaScript concepts** to create interactive and dynamic web applications.
- **Develop server-side applications** using Node.js and Express.js to handle HTTP requests, manage data, and implement RESTful APIs.
- **Utilize Bootstrap for responsive web design** to build visually appealing and mobile-friendly websites with ease.
- **Integrate JavaScript, Node.js, Bootstrap, and Express.js** to build full-stack web applications, ensuring seamless interaction between front-end and back-end components.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓	--	✓	--	✓	--

Course Outcomes:

CO1	Develop interactive and dynamic web applications using JavaScript for front-end functionality
CO2	Create and manage server-side applications with Node.js and Express.js for robust backend solutions.
CO3	Design responsive and visually appealing web pages using Bootstrap, ensuring cross-device compatibility.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	2	3	2	2
CO2	3	2	3	3	3	2	2
CO3	3	2	3	2	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	-	✓	✓	-

End Semester Examination (30)	✓	✓	-	✓	✓	-
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Practical Assignments:

1	Basic JavaScript Program: Write a simple JavaScript program to perform arithmetic operations.
2	Control Structures: Implement a JavaScript program using if-else statements and loops
3	JavaScript Functions: Create and invoke functions that perform specific tasks.
4	Event Handling: Develop a web page where JavaScript responds to user events (e.g., button clicks).
5	Perform a practical on node js installation .
6	Set Up a Basic Node.js Server Create a basic HTTP server using Node.js that responds with "Hello, World!" to any request.
7	Create a REST API with Node.js Develop a basic REST API using Node.js that performs CR (Create, Read) operations on a simple data set.
8	Create a REST API with Node.js Develop a basic REST API using Node.js that performs UD (Update, Delete) operations on a simple data set.
9	Perform a practical on bootstrap setup
10	Bootstrap Grid Layout: Create a responsive web page layout using Bootstrap's grid system.
11	Bootstrap Components: Implement a navigation bar and modal using Bootstrap components.
12	Create a Bootstrap Form Design a form using Bootstrap's form components with input and styling.
13	Set Up a Basic Express.js Server Create a basic Express.js server that serves static files and handles basic routing.
14	Build a Simple Blog with Express.js Develop a simple blogging application using Express.js with routes for viewing, adding
15	Build a Simple Blog with Express.js Develop a simple blogging application using Express.js with routes for updating
16	Build a Simple Blog with Express.js Develop a simple blogging application using Express.js with routes for deleting posts.

REFERENCE BOOKS:

1. "JavaScript: The Good Parts" by Douglas Crockford
2. "Bootstrap 5: From Zero to Hero" by Dorianer Orozco
3. "Learning Node.js Development" by Andrew Mead

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FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Applications
B.C.A. (BACHELOR OF COMPUTER APPLICATION) PROGRAMME BATCH 2024-28

SEMESTER: II

BCA- SEC-127 Operating System concepts with Linux

Course Title: Operating System concepts with Linux

Course Type: SEC

Course Code: BCA-SEC-127

Total Credits: 02

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

This course will introduce our students to recall the basic concepts of operating system and its functions. It will focus on Linux operating systems. Throughout this course, students will also learn about alternative operating systems, like Windows, Linux etc. The course will begin with basic concepts of an operating systems, its components, architecture diagram etc. Over the course of the subsequent units, we will discuss the history of Linux, features, benefits of Linux etc. with students in detail. They will also learn each of the major components of an operating system and explore basic commands of Linux. The class will conclude with a discussion of various Shell Programs and Linux programs.

Course Objectives:

The subject aims to provide the student with an understanding of operating System basic concepts and its architecture, components etc. It also covers Linux operating System, its benefits. Students also learn the Linux commands to implement shell programming applications so that they can develop their own applications in Linux.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓	--	✓	--	✓	✓

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

CO1	To recall the basic concepts of Operating System like it's definition, types etc.
CO2	To Understand Components of OS and its architecture, Process state and learn basic Linux commands.
CO3	To Apply the Linux commands to implement the Shell Programming applications.

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
1	Unit-1: Introduction 1.1 Introduction of an Operating System 1.2 Components of an OS 1.3 Types of Operating System: Batch OS, Time-Sharing OS, Distributed OS, Network OS, Real-Time OS. 1.4 Architecture of Linux system 1.5 Process and States of Process	6	CO1 CO2
2	2. Linux Operating System 2.2 Brief History of Linux 2.3 features of Linux OS 2.4 Benefits of Linux 2.5 Basic commands of Linux: pwd, cd, ls, more, less, echo, clear, kill, ps, man, cal, date, who, who am I, wc, mkdir, rmdir, rm, sort.	6	CO2 CO3

REFERENCE BOOKS:

1. Peterson Silberschats, Galvin (2005), Operating System Concepts, Addition Wesley Publication. ISBN-10:

8126554274 ISBN-13: 978-8126554270

2. Peterson, (2007), Linux: Complete Reference, 6th Edition, TMH, ISBN: 9780070222946

3. Foster Johnson Welch, Anderson,(2006),Beginning Shell Scripting, Wiley India (Wrox), ISBN:9780764597916

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	1	---	---	---	----
CO2	---	1	2	----	----
CO3	---	----	2	---	3

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Utilize	Develop
Continuous Internal Evaluation. (20)	✓	✓	✓			
End Semester Examination (30)	✓	✓	✓			

	Practical Assignments:
1	Demonstration of Linux commands with attributes: - pwd, cd, ls, more, less, echo, clear, kill, ps, man, cal, date, who, who am I, wc, mkdir, rmdir, rm, sort.
2	Write a shell script to display student information
3	Write a shell script to display addition of three number from runtime user input
4	Write a shell script to display first 20 terms of Fibonacci series.
5	Write a shell script to display current time of system and display the message according to the time.
6	Write a shell script to check the user is login or not and say hello.
7	Write a shell script to calculate factorial of a number.
8	Write a shell script to check number is divisible by 7 or not.
9	Write a shell script to check number is prime or not.
10	Write a shell script to check number is palindrome or not.
11	Write a shell script to check number is Armstrong or not.
12	Write a shell script to check number is even or odd.

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SEMESTER: II

BCA-AEC-128 Professional Communication - II

Course Title: Professional Communication - II

Course Code: BCA-AEC-128

Lectures: Tutorials: Practical: 2:0:0

Lecture Hours: 24 Hours

Course Type: AEC

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This course is designed to enhance students' proficiency in public speaking, presentation, cross-cultural communication, and business correspondence. The course covers effective negotiation, telephonic communication, and interview techniques, along with strategies for making impactful presentations. Students will also explore the dynamics of cross-cultural communication and the use of technology-enabled tools to facilitate professional interactions. Additionally, the course provides practical guidelines for writing business letters, resumes, and cover letters, ensuring that students can create professional documents that meet industry standards.

Course Objectives:

- To develop skills in public speaking and presentation, focusing on effective negotiation, telephonic communication, interviews, group discussions, and delivering impactful presentations.
- To understand and apply the principles of cross-cultural communication, leveraging technology-enabled communication tools to improve professional interactions in a globalized environment.
- To master the techniques of writing business correspondence, including crafting various types of business letters, creating professional resumes, and writing effective cover letters

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓	--	✓	--	✓	--

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

CO1	Demonstrate proficiency in public speaking and presentation, effectively conducting negotiations, participating in interviews, and contributing to group discussions.
CO2	Apply cross-cultural communication strategies and utilize technology-enabled communication tools to enhance professional interactions in diverse cultural settings.
CO3	Create well-structured business documents, including business letters, resumes, and cover letters, following industry standards and best practices.

SN	Contents of Module	Hrs	COs
1	Unit – I Public Speaking and Presentation 1.1. Effective Negotiation: Elements, Process and General Guidelines 1.2. Telephonic Conversation 1.3. Conducting & Facing Interviews 1.4. Conducting & Participating in Group Decisions 1.5. Essentials for Presentation 1.6. Making Presentations: Content and Organizing 1.7. Delivering a Presentation	12	CO1
2	Unit – II Cross-Cultural Communication and Technology-Enabled Communication	6	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	2.1 Concept of Cross-Cultural Communication 2.2 Factors affecting Cross-Cultural Communication 2.3 Strategies and Tips to improve Cross-Cultural Communication 2.4 Technology-Enabled Communication 2.5 Technology-Based Communication tools: Advantages and Disadvantages		
3	Unit – III Writing Business Correspondence and Documents 3.1 Principles of Writing Business Letters 3.2 Kinds of Business Letters 3.3 The Resume: Structure, Format 3.4 To-Do & Not-To-Do 3.5 Instructions for Effective Resume 3.6 Uncovering the Cover Letters	6	CO3

REFERENCE BOOKS:

1. Business Communication: Neha Nigam, Digital Publishing House
2. Business Communication: R. C B, Ane Books Pvt. Ltd
3. Text Book of Communication Skills: D. Amutha & S. Vithya, Manglam Publications, 2023

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	1	1	2	1	1
CO2	2	1	2	1	2	2	2
CO3	3	2	3	2	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation (20)	✓	✓	-	✓	✓	-
End Semester Examination (30)	✓	✓	-	✓	✓	-

Semester III

SEMESTER: III
BCA-DSC-231 - Data & File Structure

Course Title: Data & File Structure
Course Code: BCA-DSC-231
Lectures: Tutorials: Practical: 2:0:0
Lecture Hours: 24 Hours

Course Type: DSC
Total Credits: 02
CIE Marks: 20
ESE Marks: 30

Course Description:

This course offers a comprehensive introduction to data structures, covering both linear and non-linear structures essential for efficient data management and algorithm development. It begins with foundational concepts such as data types, abstract data types (ADTs), and algorithm design techniques. Students will explore arrays, sorting and searching methods, stacks, queues, and various types of linked lists. The course further delves into non-linear structures like trees and graphs, including traversal techniques and algorithms such as Kruskal's for minimum spanning trees. Practical applications and memory representations are emphasized to strengthen problem-solving skills.

Course Objectives:

1. To understand the concepts of data structures and algorithm design methods.
2. To implement and use of sequential data structures such as arrays, searching and sorting.
3. To understand and implement data structure like stack, queue and link list.
4. To learn non-linear data structures Tree and Graph, their algorithms and applications.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	✓

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

CO1	Demonstrate understanding of fundamental data structures and algorithm design techniques, Sorting and Searching.
CO2	Implement and apply linear data structures such as stacks, queues, and linked lists in solving computational problems.
CO3	Analyze and implement non-linear data structures like trees and graphs, along with their associated algorithms and real-world applications.

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
1	UNIT -I Introduction to Data Structure: 1.1 Data 1.2 Data Structure Concepts 1.3 Types of data structures, Data types 1.4 ADT (Abstract Data Type) 1.5 Algorithm, Algorithm Design Techniques. Array, Representations of Array in memory and Operations on array. 1.6 Sorting: Bubble Sort, Selection Sort, Insertion Sort. Merge sort. Quick sort. 1.7 Searching: Linear and Binary search.	8	CO1

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
2	UNIT –II Linear Data Structure 2.1 Stack: Introduction, Operations on stack – PUSH, POP, Traverse, Applications of Stack- Infix to Postfix, Evaluation of Postfix expression, Recursion. 2.2 Queue: Introduction, Operations on queue – Insert, Delete, Traverse, Types of Queues - Circular Queue, Priority Queue and DeQueue. 2.3 Linked List: Introduction, Dynamic representation, Types – Singly, doubly, singly circular, doubly circular.	8	CO2
3	UNIT –III Non-Linear Data Structure 3.1 Tree: Concept, Tree Data Structure, Tree Terminology, Binary Tree – Representation in memory. Types of tree: Full, Complete. Traversal: Non-Recursive - Inorder, Preorder, Postorder, 3.2 Graph: Concept, Graph Terminologies, Representation in memory: Adjacency List, Adjacency Matrix, Path Matrix, Weighted Matrix. Spanning Tree, Minimum Spanning Tree Problem-Kruskal's Algorithm.	8	CO3

REFERENCE BOOKS:

1. Horowitz, Sahni, Mehta, (2008), Fundamentals of Data Structures in C++, 2nd Edition, Universities Press, , ISBN 10: 8173716064 ISBN 13: 9788173716065
2. Schaum's Outline of Data Structures with C++ ISBN-10: 0071353453
3. Data Structure: Balucha ISBN: 978-93-833-0383-0 4

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	1	1	2	2	2
CO2	3	3	1	1	3	2	2
CO3	3	3	1	2	3	3	3

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓		
End Semester Examination (30)	✓	✓	✓	✓		

SEMESTER: III
BCA-DSC-232 – Lab on Data & File Structures

Course Title: Lab on Data & File Structure
Course Code: BCA-DSC-232
Lectures: Tutorials: Practical: 0:0:2
Lecture Hours: 24 Hours

Course Type: DSC
Total Credits: 02
CIE Marks: 20
ESE Marks: 30

Course Description:

This course offers a comprehensive introduction to data structures, covering both linear and non-linear structures essential for efficient data management and algorithm development. It begins with foundational concepts such as data types, abstract data types (ADTs), and algorithm design techniques. Students will explore arrays, sorting and searching methods, stacks, queues, and various types of linked lists. The course further delves into non-linear structures like trees and graphs, including traversal techniques and algorithms for minimum spanning trees. Practical applications and memory representations are emphasized to strengthen problem-solving skills.

Course Objectives:

1. To understand the concepts of data structures and algorithm design methods.
2. To implement and use of sequential data structures such as arrays, searching and sorting.
3. To understand and implement data structure like stack, queue and link list.
4. To learn non-linear data structures Tree and Graph, their algorithms and applications.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	✓

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

CO1	Demonstrate understanding of fundamental data structures and algorithm design techniques, Sorting and Searching.
CO2	Implement and apply linear data structures such as stacks, queues, and linked lists in solving computational problems.
CO3	Analyze and implement non-linear data structures like trees and graphs, along with their associated algorithms and real-world applications.

Practical Assignments:

1	Implementation of Array operations Insertion, Deletion and Display.
2	Implementation of Stack using array .
3	Implementation of infix to postfix using stack .
4	Implementation of Queue using array.
5	Implementation of Linear Link List.
6	Implementation of Linear Search.
7	Implementation of Binary Search.

8	Implementation of Bubble sort.
9	Implementation of Selection sort.
10	Implementation of Insertion sort.
11	Implementation of Quick sort.
12	Implementation of Merge sort.
13	Implementation of Binary Search Tree.
14	Implementation of In-order, Pre-order and Post-order Traversals.
15	Implement the program for graph representation in memory.

REFERENCE BOOKS:

4. Horowitz, Sahni, Mehta, (2008), Fundamentals of Data Structures in C++, 2nd Edition, Universities Press, , ISBN 10: 8173716064 ISBN 13: 9788173716065
5. Schaum's Outline of Data Structures with C++ ISBN-10: 0071353453
6. Data Structure: Balucha ISBN: 978-93-833-0383-0 4

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓		✓
End Semester Examination (30)	✓	✓	✓	✓		✓

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SEMESTER: III

BCA-DSC-233 Mathematical Foundation - I

Course Title: Mathematical Foundation - I

Course Code: BCA DSC-233

Lectures: Tutorials: Practical: 4:0:0

Lecture Hours: 48 Hours

Course Type: SYBCA

Total Credits: 04

CIE Marks: 40

ESE Marks: 60

Course Description:

This course focuses on Mathematics oriented toward Computer Science. Students will learn to analyse problems and solve them using concepts of mathematics. The course consists of fundamental concepts of Mathematics like Logic, Sets, Matrix, Functions, Relations.

Course Objectives:

1. Understand the concepts of mathematical logic to solve problems
2. Understand sets; apply operations on sets and algebraic structures.
3. Apply the mathematical concepts such as relations and functions.
4. Analyze the matrix and determinants.
5. To understand and represent data graphically.

Teaching/ Evaluation Pedagogy:

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	

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

CO1	Understand mathematical logic to solve problems.
CO2	Apply operations on sets and algebraic structures.
CO3	Apply the mathematical concepts such as relations and functions.
CO4	Analyze the matrix and determinants.
CO5	Apply the concepts graph theory.

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
1	UNIT-I Mathematical logic 1.1 Meaning of Statement 1.2 Primitive and Compound Statements 1.3 Truth Values of a Statement 1.4 Logical Operations 1.5 Truth Tables & Construction of Truth Tables 1.6 Equivalence of Logical Statements 1.7 Tautology and Contradiction	8	CO1
2	UNIT-II Sets 2.1 Meaning of a Set 2.2 Methods of Describing a Set -Tabular Form, Set Builder Form 2.3 Types of a Set: Finite Set, Infinite Set, Empty Set, Subset, 2.4 Universal Set, Equal Sets, Overlapping Sets, Disjoint Sets, Complementary Set. Operations on Sets: Union of Sets,	8	CO2

SN	Contents of Module	Hrs	COs
	Intersection of Sets, Difference of Sets, Cartesian Product of two Sets 2.5 Venn Diagrams		
3	UNIT - III Relation and Function 3.1 Relations: and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Congruence Relation. 3.2 Function: Meaning of a Function, Methods of Describing a Function, Meaning of Domain, Codomain, Image, and Range of a Function. 3.3 Types Of a Function: One-One Function, One Two Functions, Many-One Function, Constant Function, Identity Function, Polynomial Function, Linear Function, Rational Function, Exponential Function, Logarithmic Function, Explicit And Implicit Functions, Even Function, Odd Function, Composite Function	8	CO3
4	UNIT –IV Matrices 4.1 Meaning and Order of Matrix 4.2 Types of Matrix 4.3 Equality of Matrices, 4.4 Multiplication of Matrix by A Scalar. 4.5 Addition of Matrices 4.6 Subtraction of Matrices 4.7 Multiplication of Matrices	8	CO4
5	UNIT -V Determinants 5.1 Algebra of Matrices. 5.2 Evaluation of Second and Third Order Determinants 5.3 Minor, Cofactor of an Element Adjoint of Matrix, 5.4 Meaning of Inverse of a Matrix, 5.5 Matrix Inversion by Adjoint Method.	8	CO5
6	UNIT-VI Graph Theory 6.1 Introduction of a Graph 6.2 Foundational Concepts: Vertices and Edges, Graph Types, Paths, Cycles, Walks and Trees 6.3 Shortest Path Algorithms 6.4 General Rules for Graphical Representation of Data 6.5 Principles of Graphical Representation 6.6 Applications	8	CO5

REFERENCE BOOKS:

1. Sancheti&Kapoor, Business Mathematics, Sultan Chand & Co. New Delhi.
2. Anand Sharma, Business Mathematics & Analytics Himalaya Publishing
3. Dr.Ramnath Dixit and Dr.Jinendra Jain Business Mathematics Himalaya Publishing
4. G. S. S. BhishmaRao, Mathematical Foundation of Computer Science, Scitech publication, India Pvt. LTD. Edition 2nd ISBN 0 – 07 – Y85493 –9
5. Tremblay, Discrete Mathematics, TATA Mcgraw Hill ISBN 13:9780074631133

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
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CO1	3	3	2	2	1	1	2
CO2	3	3	2	2	2	1	1
CO3	3	3	2	1	2	1	2
CO4	3	2	3	3	3	1	2
CO5	3	3	3	2	3	2	2

Assessment Pattern:

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓	✓	✓	-
End Semester Examination (60)	✓	✓	✓	✓	✓	-

SEMESTER: III

BCA-MIN-234 Management Information System - I

Course Title: Management Information System - I
 Course Code: BCA-MIN-234
 Lectures: Tutorials: Practical: 4:0:0
 Lecture Hours: 48 Hours

Course Type: Minor
 Total Credits: 04
 CIE Marks: 40
 ESE Marks: 60

Course Description:

This course introduces the fundamentals of Management Information Systems (MIS), focusing on their role in business operations, decision-making, and the use of IT in functional areas and e-business.

Course Objectives:

1. To enable students to apply MIS concepts in solving real-world business problems.
2. To familiarize students with key components and technologies used in MIS environments.
3. To develop skills in managing data resources and using database structures effectively.
4. To understand how IT helps build competitive, agile, and customer-focused enterprises.
5. To analyze emerging trends in MIS including e-business, virtualization, and knowledge systems.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	✓

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

CO1	Describe the basic concepts of MIS and its significance in business organizations.
CO2	Explain the structure and components of information systems and their classifications.
CO3	To understand the structure and role of MIS in Finance and Human Resource functions.
CO4	To explore how MIS supports operational and strategic goals within the functional areas of production and marketing.
CO5	To explore how businesses use technology to become virtual and share knowledge.
CO6	To analyze the principles of system analysis, design, and implementation within MIS frameworks.

SN	Contents of Module	Hrs	COs
1	UNIT -I Introduction to MIS 1.1 Data vs. Information, Information System Concept 1.2 Definition and Purpose of MIS 1.3 Role of MIS in Business Organizations 1.4 Types of Information System 1.5 Managerial Challenges of Information Technology	8	CO1
2	UNIT –II Components and Types of MIS 2.1 What is System? Types of Systems: Open, Closed	8	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	2.2 Feedback and Control 2.3 Components of Information Systems 2.4 Information System Resources a. People Resources b. Hardware Resources c. Software Resources d. Data Resources e. Network Resources 2.5 TPS, DSS, EIS,KMS		
3	UNIT –III MIS in Functional Areas-I 3.1 MIS in Finance a. Introduction b. Features c. Functions d. Model of Financial Information System e. Subsystems of Financial IS f. Input and Output of Financial IS 3.2 MIS in Human Resources a. Introduction - o Information Flow in HRM - o Functions of HRM - o Files of HRM - o Subsystems of HRM	8	CO3
4	UNIT –IV MIS in Functional Areas-II 4.1 MIS in Production a. Introduction b. Task c. Sources d. Types e. Responsibilities f. Benefits 4.2 MIS in Marketing - o Introduction - o Model of Marketing System - o Different Parts - o Input and Output of MKIS	8	CO4

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	○ Sources of MKIS ○ Benefits of MKIS		
5	UNIT-V Competing with Information Technology 5.1 The Role of Information Technology in MIS 5.2 Becoming an Agile Company 5.3 Creating a Virtual Company a. Virtual Company Strategies 5.4 Building a Knowledge Creating Company	8	CO5
5	UNIT – VI System Analysis and Design 6.1 Concept of System 6.2 Types of Systems – Open, Closed, Deterministic, Probabilistic, etc. 6.3 Relevance of choice of System in MIS 6.4 Integration of Organization Systems and Information Systems 6.5 System Analysis, Design and Implementation	8	CO6

REFERENCE BOOKS:

1. O'Brien, James A., "Management Information System", Tata McGraw Hill, 2003 ISBN 81-203-1282-1
2. Javadekar, W. S. "Management Information System", Tata Mac Graw Hill Publication, 2003. ISBN 0-07-282256-2
3. Basandra, Suresh K., "Management Information System", Wheeler Publishing, New Delhi, 1999.
4. Arora, Ashok & Bhatia, Akshaya, "Management Information System", Excel Books, New Delhi, 2001 ISBN: 978-81-7446-781-2

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	2	2	2	2	2
CO2	3	3	3	3	3	3	3
CO3	2	2	2	2	2	2	2
CO4	1	1	1	1	1	1	1
CO5	2	2	2	2	2	2	2
CO6	2	2	2	2	2	2	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation.	✓	✓	-	✓	-	-

(40)						
End Semester Examination (60)	✓	✓	-	✓	-	-

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SEMESTER: III

BCA-OE-235-A Entrepreneurship Development

Course Title: Entrepreneurship Development

Course Type: OE

Course Code: BCA-OE-235-A

Total Credits: 02

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description: Entrepreneurship plays an influential role in the economic growth and development of the country. As the world economy is changing so is the dynamism of the business world. The aim of this course is to in still and kindle the spirit of Entrepreneurship amongst students. The idea of this course is to create “job providers rather than job seekers”. By the end of the course, students will have gained insights into both the challenges and opportunities of entrepreneurship, preparing them to pursue entrepreneurial ventures or contribute effectively to entrepreneurial environments.

Course Objectives:

1. **To understand** the fundamental concepts, evolution, and roles of entrepreneurs in business and society.
2. **To analyze** the significance, challenges, and contributions of women entrepreneurs in the economic landscape.
3. **To explore** the psychological and motivational factors that drive entrepreneurial behavior.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	

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

CO1	Understand the concept, evolution, characteristics, and types of entrepreneurs and differentiate them from managers.
CO2	Evaluate the role, growth, and problems faced by women entrepreneurs in India and globally.
CO3	Apply motivation theories and factors to understand entrepreneurial drive and behavior.

SN	Contents of Module	Hrs	COs
1	UNIT -I Introduction to Entrepreneur 1.1 Evolution of the concept of Entrepreneur 1.2 Meaning and Characteristics of an Entrepreneur 1.3 Distinction between an Entrepreneur and a Manager 1.4 Functions and Types of Entrepreneur	8	CO1
2	UNIT –II Women Entrepreneurship 2.1 Concept of Women Entrepreneurship 2.2 Functions of Women Entrepreneurship 2.3 Growth of Women Entrepreneurship 2.4 Problem of Women Entrepreneurship	8	CO2
3	UNIT –III Small Business 3.1 Concept; Definition, Role of Small Business in the Modern	8	CO3

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	Indian Economy 3.2 Steps for starting a small industry, 3.3 Registration as SSI, advantages and problems of SSIs 3.4 Govt. Policies for SSI		

REFERENCE BOOKS:

1. Entrepreneurial Development– Dr. S. S. Khanka, S. Chand and Company Ltd.
2. Entrepreneurial Development and Project Development-Text and Cases – Neeta Baporikar- Himalaya Publishing House
3. Entrepreneurial Development- S. L. Gupta and Arun Mittal- International Book House Pvt. Ltd.
4. Entrepreneurial Development – Dr. C. B. Gupta, Dr. N. P. Srinivasan – Sultans Chand and Sons
5. Dynamics of Entrepreneurial Development and Management- Vasant Desai- Himalaya Publishing House

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	1	1	1	2	2	2
CO2	1	1	1	1	3	1	1
CO3	1	1	1	1	3	2	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyse	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓		✓		
End Semester Examination (60)	✓	✓		✓		

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SEMESTER: III

BCA- OE-235-B Ecommerce & M-Commerce

Course Title: Ecommerce & M-Commerce

Course Type: OE

Course Code: BCA-OE-235-B

Total Credits: 02

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

An Ecommerce & M-Commerce course aims to equip students with the knowledge and skills to manage and succeed in online businesses, particularly those focused on mobile commerce. The course covers various aspects of e-commerce, including business models, website design, digital marketing, logistics, and legal and security aspects. M-commerce, a subset of e-commerce, focuses on transactions conducted through mobile devices, such as smartphones and tablets.

Course Objectives:

The objectives of the course are to introduce the concept of electronic commerce, and to understand how electronic commerce is affecting business enterprises, governments, consumers and people in general. In addition, this skill enhancement paper will provide elementary knowledge to students to acquaint with the art and skill of developing websites using relevant software tools.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	

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

CO1	Students will be able to Define and explain e-commerce and m-commerce concepts. As well as difference between various business models. And impact of mobile devices on commerce.
CO2	Students will be able to Understand how technology supports online and mobile commerce. And Explain payment systems and security in digital commerce. With Comparison mobile app and web-based solutions.
CO3	Students will be able to Understand concepts to real-world digital commerce platforms. As well as ethical and legal frameworks. Analyse current and future trends in E-commerce.

SN	Contents of Module	Hrs	COs
1	UNIT -I Introduction to E-Commerce and M-Commerce 1.1 Definition and Features of E-Commerce & M-Commerce 1.2 E-Business vs E-Commerce 1.3 Evolution and History of E-Commerce 1.4 Business Models (B2B, B2C, C2C, C2B, G2C) 1.5 Benefits and Limitations 1.6 M-Commerce Overview: Growth and Importance 1.7 Key Differences Between E-Commerce and M-Commerce	8	CO1

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
2	UNIT –II Technologies and Infrastructure 2.1 Internet and Web Technologies (HTML, HTTP, HTTPS) 2.2 E-Commerce Website Design and Development 2.3 Hosting, Domains, and Web Servers 2.4 Payment Gateways and Online Payment Systems 2.5 Mobile Devices and Wireless Technologies (GPRS, 4G, 5G, NFC, QR codes) 2.6 Security and Encryption (SSL, Digital Certificates, Firewalls) 2.7 Mobile Apps vs Mobile Web	8	CO2
3	UNIT –III Applications, Strategies, and Trends 3.1 E-Commerce in Retail, Education, Banking, and Services 3.2 M-Commerce Applications (Mobile Banking, Mobile Wallets, Location-Based Services) 3.3 E-Marketing and Mobile Marketing (SEO, SEM, SMS, Social Media) 3.4 Legal, Ethical, and Regulatory Issues 3.5 E-Commerce and M-Commerce Trends: AI, Big Data, IoT 3.6 Case Studies (e.g., Amazon, Flipkart, Paytm, Google Pay, a. Alibaba)	8	CO3

REFERENCE BOOKS:

- *E-Commerce 2023: Business, Technology, and Society* by Kenneth C. Laudon & Carol Guercio Traver
- *Mobile Commerce: Technology, Theory and Applications* by Brian Mennecke & Troy Strader
- *Introduction to E-Commerce* by Amir Manzoor
- *M-Commerce: Global Experiences and Perspectives* by Nansi Shi.
- Kenneth C. Laudon, *E-Commerce: Business, Technology, Society*, 4th Edition, Pearson.
- S. J. Joseph, *E-Commerce: An Indian perspective*, PHI.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	2	1	2	1	1
CO2	3	1	3	2	3	1	1
CO3	2	1	2	1	2	2	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓	✓	✓	
End Semester Examination	✓	✓	✓	✓	✓	✓

(60)						
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SEMESTER: III

BCA-VSC-236 Lab on Web Technology-III

Course Title: Lab on Web Technology-III

Course Type: VSC

Course Code: BCA-VSC-236

Total Credits: 02

Lectures: Tutorials: Practical: 0:0:2

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description: This course introduces students to React.js, a powerful and widely-used JavaScript library for building dynamic, component-based user interfaces. The course covers the fundamentals of React including JSX, components, props, state, hooks, event handling, and routing, as well as integration with APIs and basic deployment techniques.

Course Objectives:

- To **introduce the fundamentals of React.js** and enable students to build component-driven, dynamic single-page applications (SPAs).
- To develop skills for state management, event handling, routing, and building reusable UI components in React.
- To enable students to create and manage **RESTful APIs** using **Node.js** and **Express.js**, and to connect these APIs to **MongoDB** using **Mongoose**.
- To implement **CRUD operations** and perform full-stack data flow from the React frontend to the MongoDB backend via API endpoints.
-

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

CO1	Understand the fundamentals of React.js for building dynamic and component-based front-end web applications.
CO2	Develop and manage stateful and reusable components using React features such as props, state, hooks, and routing.
CO3	Design and build RESTful APIs using Node.js and Express, integrating MongoDB as a backend database via the Mongoose library.

<i>SN</i>	<i>Contents of Module</i>
1	Setting Up React Environment and Creating a Basic React Application .(Install Node.js, NPM, Create React App)
2	JSX and Component Creation Using Props.
3	State Management in React Using use State: Building a Counter App
4	Event Handling in React: Managing Button Clicks and Input Changes
5	Rendering Dynamic Lists in React Using Array Mapping and Key Props
6	Building Controlled Forms in React: Managing State and Implementing Basic Validation

<i>SN</i>	<i>Contents of Module</i>
7	Styling React Components: Implementing CSS Modules and Inline Styles
8	Conditional styling in React using both CSS Modules and inline styles . (Toggle Button with Conditional Styling).
9	Developing a Personal Portfolio Website with React and Bootstrap
10	Setting Up a Node.js and Express.js Development Environment: A Practical Guide
11	Implementing Basic Routing in Express.js: Creating Multiple GET Endpoints"
12	Building a RESTful API with Express.js: A Hands-On Guide to HTTP Methods on (Customer details).
13	Building RESTful APIs: Managing JSON POST Requests in Express.js (Employee Post Method).
14	Implementing CRUD Operations (Students)Using RESTful API and HTTP Methods.
15	Setting up Mongo DB Environment: Teachers API with MongoDB by using MongoDB Compass.
16	Mini Project on Inventory Management System.

REFERENCE BOOKS:

1. "Full Stack Development with MongoDB" by Shama Naz.
2. "REACTJS DEVELOPMENT" by Sandeep Bisht.
3. "Full-Stack React, Type Script, and Node" by David Choi.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	1	3	-	-
CO2	3	2	3	1	3	-	-
CO3	3	2	2	3	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyse	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	-	✓	✓	-
End Semester Examination (60)	✓	✓	-	✓	✓	-

SEMESTER: III

BCA-AEC-237 Personality Development-I

Course Title: Personality Development-I
 Course Code: BCA-AEC-237
 Lectures: Tutorials: Practical: 2:0:0
 Lecture Hours: 24 Hours

Course Type: AEC
 Total Credits: 02
 CIE Marks: 20
 ESE Marks: 30

Course Description:

This course enhances personal and professional development through self-awareness, personality assessment, and goal setting. It covers key concepts like self-monitoring, perception, attitude, and assertiveness. Students will also learn interpersonal skills, conflict resolution, and professional etiquette to thrive in academic and workplace environments.

Course Objectives:

- To develop self-awareness and confidence in students.
- To improve communication skills, focusing on both verbal and non-verbal communication.
- To introduce essential interpersonal skills and professional etiquette required in personal and academic settings.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	✓

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

CO1	Assess personality traits, identify strengths and weaknesses, and set personal and professional goals with time management strategies.
CO2	Demonstrate effective communication skills including body language, active listening, and professional writing.
CO3	Apply interpersonal skills to manage relationships, resolve conflicts, and exhibit professional etiquette.

SN	Contents of Module	Hrs	COs
1	Unit 1: Personality 1.1 Definition – Determinants – Personality Traits –Theories of Personality – Importance of Personality Development 1.2 Self-Awareness: Identifying personal strengths, weaknesses, values, and personality traits. 1.3 SWOT – Meaning – Importance- Application – Components. 1.4 Personality Types: Introduction to basic personality types (e.g., Myers-Briggs Type Indicator, Big Five). 1.5 Goal Setting: SMART goals (Specific, Measurable, Achievable, Relevant, Time-bound). a. How to create short-term and long-term academic and career goals.	8	CO1

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	1.6 Time Management Basics: Introduction to techniques like the Eisenhower Matrix.		
2	Unit 2: Self-Monitoring 2.1 Meaning – High self – monitor versus low self-monitor – Advantages and Disadvantages self-monitor 2.2 PERCEPTION- Definition- Factor influencing perception- Perception process –Errors in perception – Avoiding perceptual errors. 2.3 ATTITUDE – Meaning- Formation of attitude – Types of attitude - Measurement of Attitudes – Barriers to attitude change – Methods to attitude change. 2.4 ASSERTIVENESS - Meaning – Assertiveness in Communication – Assertiveness Techniques – Benefits of being Assertive – Improving Assertiveness	8	CO2
3	UNIT 3: Interpersonal Skills and Professional Etiquette 3.1 Building Positive Relationships: How to build and maintain professional relationships with peers and faculty. 3.2 Conflict Resolution: Basic conflict management strategies in personal and academic settings. 3.3 Professional Etiquette: Importance of dressing appropriately, communication etiquette, and email/telephone manners. 3.4 Teamwork: The importance of collaboration and working efficiently with others in group settings.	8	CO3

REFERENCE BOOKS:

1. Dr.S. Narayana Rajan, Dr. B. Rajasekaran, G. Venkadasalapathi, V. Vijuresh Nayaham and Herald M.Dhas, Personality Development, Publication Division, Manonmaniam Sundaranar University, Tirunelveli
2. Stephan P.Robbins, Organisational Behaviour, Tenth Edition, Prentice Hall of India Private Limited, New Delhi,2008

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	1	1	1	2	1	1
CO2	1	2	2	1	3	1	1
CO3	1	1	2	1	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyse	Evaluate	Create
Continuous Internal Evaluation.	✓	✓	✓	✓	✓	✓

(20)						
End Semester Examination (30)	✓	✓	✓	✓	✓	✓

SEMESTER: III
BCA-FP-238 Field Project

Course Title: Field Project
Course Code: BCA-VSC-236
Lectures: Tutorials: Practical: 0:0:2
Lecture Hours: 24 Hours

Course Type: FP
Total Credits: 02
CIE Marks: 20
ESE Marks: 30

Course Description:

To enable students to gain practical exposure by assessing and analysing real-time IT projects implemented in the industry or public domain. This project aims to enhance students' research, analytical, and presentation skills through field-based investigation and reporting.

Course Objectives:

1. To enable students to assess real-time IT systems and understand their design, implementation, and user impact.
2. To develop students' ability to conduct field-based research using primary data collection and analytical tools.
3. To encourage innovation and problem-solving through observation and evaluation of existing IT infrastructure.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

CO1	Students will be able to critically analyze and assess existing IT systems in real-world settings.
CO2	Students will gain hands-on experience in collecting, analyzing, and interpreting primary data using different tools.
CO3	Students will enhance their report writing, presentation, and communication skills through structured documentation and viva voce.

Contents of Module

Field Work Participation:

- Each student must undergo fieldwork during the 3rd semester.
- It may be carried out individually or in a group of two students.

Project Theme:

- The project must be based on the assessment of an IT project already implemented in real time.
- It must be research-oriented, innovative, and problem-solving.
- The topic must be finalized in consultation with an internal faculty guide.

Suggested Project Areas:

- Field work must focus on live and functional IT systems, such as (For example):
- E-Commerce Websites (e.g., Amazon, Flipkart)
- E-Governance Platforms (e.g., Aadhaar, Passport Seva)
- University/College IT Services (e.g., student portals, exam systems)
- Government Digital Portals (e.g., UMANG, Digilocker)

<i>Contents of Module</i>
• E-Banking Systems (e.g., online banking apps, ATM software) • Railway Reservation Systems (e.g., IRCTC) • Bus Ticketing Systems (e.g., RedBus) • Online Travel Booking Platforms (e.g., MakeMyTrip)
Data Collection & Analysis: • The project must be based on primary data collected directly from users/stakeholders. • A minimum sample size of 100 respondents is mandatory. ◦ Written in formal academic language ◦ Include all sections such as Introduction, Objectives, Methodology, Data Analysis, Findings, and Conclusion ◦ Certified by the internal guide • Use of tools such as Advanced Excel or SPSS is encouraged for data analysis.
Report Submission: • A detailed typed report must be prepared, certified by the guide, and submitted in two copies to the Head/Principal of the Institute.
Presentation & Viva Voce: • At the end of the semester, a Viva Voce will be conducted. • Each student must prepare and present a PowerPoint presentation summarizing their fieldwork. ◦ Project title and objective ◦ Brief on data collection and methodology ◦ Key findings and analysis ◦ Conclusion and recommendations • Viva duration will be a minimum of 15 minutes per student.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	1	2	3	3	2
CO2	2	1	1	2	2	3	3
CO3	1	1	2	1	2	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	-	✓	✓	-
End Semester Examination (60)	✓	✓	-	✓	✓	-

Semester IV

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SEMESTER: IV

BCA-DSC-241 Database Management System

Course Title: Database Management System

Course Type: DSC

Course Code: BCA-DSC-241

Total Credits: 02

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

The "Database Management System (DBMS)" course introduces students to the core concepts of database systems. Topics include DBMS architecture, data models, ER modelling, normalization, SQL, and transaction management. Students will learn to design and query relational databases using SQL and understand key principles like data integrity and ACID properties. The course emphasizes practical skills through hands-on exercises, preparing students for advanced database applications and real-world data handling.

Course Objectives:

- To provide a strong foundation in database concepts, architecture, and design using ER modeling and normalization techniques.
- To develop practical skills in SQL and relational algebra for effective data manipulation, querying, and transaction management.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	✓

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

CO1	Understand DBMS architecture, users, and ACID properties of transactions.
CO2	Design ER models and normalize relational schemas up to 4NF.
CO3	Write SQL queries and apply relational algebra for data manipulation and control.

SN	Contents of Module	Marks	Hrs	COs
1	UNIT -I INTRODUCTION 1.1 Database system application and purpose, Characteristics of DBMS. 1.2 Database Users, 1-tier, 2-tier and 3-tier architecture of DBMS along with its advantages. 1.3 Levels of Database Architecture' 1.4 Data Models, Transaction and states of transactions. 1.5 Desirable properties (ACID properties) of Transactions. 1.6 Data-schemas and instances, Data Independence, Role and responsibilities of DBA.	08	06	CO1
2	UNIT –II DATABASE DESIGN AND E-R MODEL 2.1 Overviews of Database Design 2.2 ER Modeling concepts, ER Diagrams. 2.3 Reduction to Relational Schemas, Extended ER Features.	10	08	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Marks</i>	<i>Hrs</i>	<i>COs</i>
	2.4 Alternative notations for Modeling. 2.5 Cardinality constraints. 2.6 Atomic Domains and 1NF, Decomposition using Functional Dependencies (BCNF, 3NF and 4NF)			
3	UNIT –III RELATIONAL DATABASES 3.1 Structure of Relational Databases 3.2 Database Schemas, Keys, Schema diagrams, SQL data types and Schemas. 3.4 Relational Query Languages, Relational Operation. 3.5 Overview of SQL- Basic Structure of SQL Queries- DDL,DML, DCL, TCL, DQL. 3.6 Basic Operations- Set Operations, Null Values 3.7 Aggregate Functions, and Nested Sub queries, 3.8 Modification of Databases. Join Expressions, Views, Transactions, Integrity Constraints, Authorization. 3.9 Functions and Procedures. The relational Algebra fundamental and extended Operations. 3.10 AWS Types of Databases - Amazon DynamoDB, Amazon Aurora, Amazon Relational Database Service (RDS), Amazon Time stream, Amazon Neptune, Amazon Quantum Ledger Database (QLDB), Amazon RDS on VMware	12	10	CO3

REFERENCE BOOKS:

1. Michael Kifer, Arthur Bernstein, P.M, Lewis and P.K. Panigrahi (2011), “Database Systems: An Application Oriented Approach”, Second Edition, Pearson Education, 2011, ISBN: 9788131703748.
2. Fundamentals of Database Systems, Mark L Gillenson, 2nd Edition, John Wiley & Sons, 2011
3. Silberschatz, H.F.Korth, and S.Sudarshan (2011), “Database System Concepts”, TMH Publications, Sixth Edition, 2011, ISBN: 978-007-132522-6.
4. Ramez Elmasri, Shamkant B. Navathe (2011), “Fundamentals of Database Systems” Seventh Edition, Pearson Education, 2011, ISBN: 978-0-13-397077-7.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	3	2	1	1
CO2	3	1	2	3	2	1	1
CO3	3	2	2	3	3	1	1

Assessment Pattern

Bloom’s Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓			✓

End Semester Examination (60)	✓	✓	✓	✓		✓
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SEMESTER: IV

BCA-DSC-242 Lab on Database Management System

Course Title: Lab on Database Management System
 Course Code: BCA-DSC-242
 Practical: 02:0:0
 Lecture Hours: 24 Hours

Course Type: DSC
 Total Credits: 02
 CIE Marks: 20
 ESE Marks: 30

Course Description:

The objective of this lab course is to understand the practical applicability of database management system concepts. Working on existing database systems, designing of database, creating relational database, analysis of table design.

Course Objectives:

- Understand and Apply SQL DDL, DML and data integrity constraints.
- Use SQL Clauses, Aggregate functions, string and date time functions.
- Perform set based operations, joins and create procedure.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

CO1	Execute DDL,DML commands and implement integrity constraints.
CO2	Apply SQL clauses, Aggregate functions, string and date time functions.
CO3	Create Procedure, apply joins and perform set based operations

<i>SN</i>	<i>Practical List</i>
1	Implement DDL Statement. • Create table , Modify table, Drop table
2	Implement DML Statement. • Adding/Modify/Delete data using Insert/ Update/ Delete.
3	Implement following Constraints. • NULL and NOT NULL, Primary Key Constraint, Foreign Key Constraint • Unique Constraint, Check Constraint, Default Constraint.
4	Implement following clauses. • Simple select clause • Accessing specific data with Where Clause • Ordered By/ Distinct/Group By Clause.
5	Implement Aggregate Functions. • AVG, COUNT, MAX, MIN, SUM, CUBE.
6	Implement all String functions.
7	Implement Date and Time Functions.
8	Implement use of UNION, INTERSECTION, SET DIFFERENCE.
9	Implement Nested Queries & all types of JOIN operation.
10	Implement practical performing different operations on a view.
11	Implement use of Procedure.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	--	--	--	2	--

CO2	--	3	3	--	3	--	--
CO3	--	--	3	--	3	--	--

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓	✓	✓	✓
End Semester Examination (60)	✓	✓	✓	✓	✓	✓

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SEMESTER: IV

BCA-DSC-243 Mathematical Foundation - II

Course Title: Mathematical Foundation - II

Course Code: BCA DSC-243

Lectures: Tutorials: Practical: 4:0:0

Lecture Hours: 48 Hours

Course Type: SYBCA

Total Credits: 04

CIE Marks: 40

ESE Marks: 60

Course Description:

This course provides a comprehensive introduction to the mathematical and statistical principles that underpin computer science. It is designed to equip students with the necessary tools to understand, analyses computational methods.

Course Objectives:

1. To build the foundation of computer algorithms using mathematical base.
2. To apply statistical measures on the data and represent it graphically.
3. To relate practical examples to the probability theory.
4. To build the foundation for machine learning by probability theory.
5. Understand the concepts of Measures of Central Tendency and Measures of Dispersion.

Teaching/ Evaluation Pedagogy:

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	

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

CO1	Solve applications involving permutations and combinations.
CO2	Apply problem-solving techniques needed to accurately calculate probabilities.
CO3	Develop problem-solving techniques needed to accurately calculate probabilities.
CO4	Analyze statistical data using measures of central tendency, dispersion and location.
CO5	Understand the various measures of dispersion to analyzed the spread of data.

SN	Contents of Module	Hrs	COs
1	UNIT- I Statistics 1.1 Meaning of Statistics 1.2 Importance and Limitations of statistics 1.3 Meaning of data, Raw data, Primary data, Secondary data 1.4 Variable and attribute, Types of variable: - districts and continuous 1.5 Meaning of Population and sample 1.6 Introduction to methods of sampling: - simple random sampling, stratified random sampling and systematic random sampling.	8	CO1
2	UNIT –II Permutation and Combination 2.1 Meaning of permutation and combination 2.2 Statement of fundamental 2.3 Principle of counting	8	CO2

SN	Contents of Module	Hrs	COs
	2.4 Determination of number of permutations (all N Objects are different) 2.5 Determination of Number of Combination (all N objects are different).		
3	UNIT –III Probability 3.1 Making decisions under uncertainty 3.2 Classical definition of Probability 3.3 Sample Space and Events 3.4 Types of Events and their Outcomes 3.5 Rules of Probability 3.6 Probability axioms	8	CO3
4	UNIT –IV Conditional Probability and Independence 4.1 Introduction of Conditional probability 4.2 Probability independence 4.3 Baye's theorem Proof 4.4 Applications of Baye's theorem	8	CO4
5	UNIT-V Measures of central tendency 5.1 Meaning and central tendency 5.2 Statement of measures of central tendency 5.3 Computation of these measures of central tendency for given data : - arithmetic mean, geometric mean, harmonic mean, median and mode 5.4 Partition values: - quartiles, deciles and percentiles	8	CO5
6	UNIT– VI Measures of Dispersion 6.1 Range, Interquartile Range and Coefficient of Range 6.2 Variance 6.3 Standard Deviation (SD) and Coefficient of Variation (CV) 6.4 Mean Absolute Deviation (MAD) and Coefficient of Mean Deviation 6.5 Median Absolute Deviation (also MAD) 6.6 Quartile Deviation (Semi-Interquartile Range) and Quartile Coefficient of Dispersion	8	CO5

REFERENCE BOOKS:

1. Michael Baron (2014) Probability and Statistics for Computer Scientists Second Edition, CRC press. ISBN: 978-1-4822-1410-9
2. Goon A.M., Gupta M.K., Dasgupta. B. (2001), Fundamentals of Statistics, Volume I and II, World Press, Calcutta.
3. Ross, S. (2005). Introduction to Probability Models, (6th Ed. Academic Press). ISBN 978 25 0-12375686-2
4. Anand Sharma, (2008), Business Mathematics & Analytics, Himalaya Publishing house, ISBN NO.:1234029928

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	2	1	1	1
CO2	3	3	2	3	2	1	2
CO3	3	3	3	3	2	1	2

CO4	3	2	3	3	3	2	2
CO5	3	2	2	3	2	2	2

Assessment Pattern:

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓	✓	✓	-
End Semester Examination (60)	✓	✓	✓	✓	✓	-

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SEMESTER: IV

BCA-MIN-244 Management Information System - II

Course Title: Management Information System-II

Course Type: Minor

Course Code: BCA-MIN-244

Total Credits: 04

Lectures: Tutorials: Practical: 4:0:0

CIE Marks: 40

Lecture Hours: 48 Hours

ESE Marks: 60

Course Description:

This course covers the integration of CRM, ERP, decision support systems, and AI technologies in business. It also focuses on developing business strategies and managing IT security.

Course Objectives:

1. To explore the applications of CRM in improving customer relationships and understanding CRM trends and challenges.
2. To learn how ERP systems integrate business functions and manage enterprise-wide resources effectively.
3. To apply decision-making tools like what-if analysis, sensitivity analysis, and optimization for improved business decision-making.
4. To evaluate AI-based systems like expert systems and intelligent agents, and their use in business problem-solving.
5. To identify and apply IT security measures such as biometric security, firewalls, and fault-tolerant systems in an organization.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	

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

CO1	Describe the concept, phases, and strategic role of Customer Relationship Management in business.
CO2	Explain ERP implementation strategies and analyze the causes of ERP successes and failures.
CO3	Apply decision support technologies to solve business problems and improve strategic outcomes.
CO4	Explore the role of AI in business through expert systems, neural networks, fuzzy logic, and genetic algorithms.
CO5	Understand business/IT architecture planning and strategic alignment for competitive advantage.
CO6	Evaluate methods for protecting information systems from internal and external security threats.

SN	Contents of Module	Hrs	COs
1	UNIT -I Enterprise Business Systems 1.1 What is CRM? 1.2 The Three Phase of CRM 1.3 Benefits and Challenges of CRM,	8	CO1

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	1.4 CRM Failures 1.5 Trends in CRM		
2	UNIT –II Enterprise Resource Planning 2.1 Introduction 2.2 What is ERP? 2.3 Benefits and Challenges of ERP a. The Costs of ERP b. Causes of ERP Failures 2.4 Trends in ERP	8	CO2
3	UNIT –III Supporting Decision Making 3.1 Introduction a. Information, Decision, and Management b. Information Quality 3.2 Decision Support Trends 3.3 Decision Support System a. Example b. DSS Components 3.4 Online Analytical Processing 3.5 Using Decision Support Systems o What – If Analysis o Sensitivity Analysis o Optimization Analysis o Data Mining for Decision Support	8	CO3
4	UNIT-IV Artificial Intelligence Technologies in Business 4.1 Business and AI 4.2 The Domains of AI 4.3 Expert Systems a. Components of an Expert System b. Expert System Applications c. Benefits of Expert Systems d. Limitations of Expert Systems 4.4 Developing Expert Systems	8	CO4

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	4.5 Neural Networks 4.6 Fuzzy Logic in Business 4.7 Genetic Algorithms 4.8 Virtual Reality Application 4.9 Intelligent Agents		
5	UNIT-V Developing Business/ IT Strategies 5.1 Introduction, Organizational Planning 5.2 Planning for Competitive Advantage a. SWOT Analysis 5.3 Business Models and Planning 5.4 Business/IT Architecture Planning a. Information Technology Architecture b. Balanced Scorecard 5.5 Identifying Business/IT Strategies 5.6 Business Application Planning	8	CO5
6	UNIT - VI Security Management of Information Technology 6.1 Introduction 6.2 Tools of Security Management 6.3 Inter-Networked Security Defenses a. Encryption b. Firewalls c. Denial of Service Attacks d. E-mail Monitoring e. Virus Defenses 6.4 Other Security Measures a. Security Codes b. Backup Files c. Security Monitors d. Biometric Security e. Computer Failure Controls f. Fault-Tolerant Systems g. Disaster Recovery	8	CO6

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	6.5 System Control and Audits ○ Information System Controls ○ Auditing IT Security		

REFERENCE BOOKS:

1. O'Brien, James A., "Management Information System", Tata McGraw Hill, 2003 ISBN 81-203-1282-1
2. Javadekar, W.S. "Management Information System", Tata Mac Graw Hill Publication, 2003. ISBN 0-07-282256-2
3. Basandra, Suresh K., "Management Information System", Wheeler Publishing, New Delhi, 999.
4. Arora, Ashok & Bhatia, Akshaya, "Management Information System", Excel Books, New Delhi, 2001 ISBN: 978-81-7446-781-2

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	2	1	2	1	1
CO2	2	1	1	2	3	2	1
CO3	2	1	2	3	3	3	2
CO4	1	2	1	1	2	2	3
CO5	2	1	2	2	3	2	2
CO6	2	1	1	2	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓		✓		
End Semester Examination (60)	✓	✓		✓		

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SEMESTER: IV
BCA-OE-245-A-Basics of Tally

Course Title: Basics of Tally
 Course Code: BCA-OE-245 (A)
 Lectures: Tutorials: Practical: 2:0:0
 Lecture Hours: 24 Hours

Course Type: OE
 Total Credits: 02
 CIE Marks: 20
 ESE Marks: 30

Course Description:

Tally Prime is the latest updated version of the Tally accounting software. It is the successor of Tally ERP 9 and comes with many new features; it promotes business growth and makes everyday business simple. It helps you manage accounting, banking, taxation, inventory and payroll in a much easier way

Course Objectives:

1. To provide a practical foundation in accounting and financial management
2. To use software effectively for transaction recording, and generate financial reports.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	--	--	-	--		

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

CO1	Memorize key Tally Prime Concepts.
CO2	Create Ledger & Compile Stock in Tally Prime Software.
CO3	Pass Voucher Entries in Tally Prime Software.

SN	Contents of Module	Hrs	CO's
1	1. Maintaining Charts in Tally Prime 1.1 Introduction to Tally Prime. 1.2 What is Accounting. 1.3 Golden rules of Accounting. 1.4 Accounting Masters 1.5 Inventory Masters	6	CO1
2	Assignment 2. Create BCA Ltd company with following details 2.1 Enter the hypothetical details e.g. Address, State, PAN No. etc. 2.2 Select Accounts with Inventory option, Use 1-4-20XX (Current Financial Year) as the date of Commencement of business. 2.3 Alter company Details. 2.4 Delete Company. Assignment 3. Create the following Ledger accounts, place under appropriate group (Create new groups whenever necessary) (a) Wages paid to factory workers (b) Wages paid to temporary workers (c) Salary paid to H.O. employees (d) Salary paid to Branch employees (e) Share Capital (Rs. 5,00,000 Cr.) (f) Telephone Charges	8	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>CO's</i>
3	Assignment 4. Create Ledger & Groups Ledger Name Under Opening Balance Capital A/c Capital Account 5,00,000 Building A/c Fixed Assets 25,000 Mr. Rajesh A/c Sundry Debtors 15,000 Mr. Swapnil A/c Sundry Creditors 10,000 Sales A/c Sales 5,000 SBI Loan A/c Loans & Advances 50,000 Purchase A/c Purchase 10,000 Assignment 5; Pass Journal Entries: 1. On July 1st 2024 Ramu started business with a capital of Rs. 75,000. 2. Purchased Furniture from Manu for Rs. 25,000. 3. Sold goods to Tanu for cash Rs.16, 000. 4. Bought furniture for Rs.15, 000. 5. Cash Paid to Manu Rs. 10,000. 6. Sold Furniture to Prakash for Rs. 40,000.	10	CO3

REFERENCE BOOKS:

ReferenceBooks:

1. Master Tally Prime A Complete Guide, Ravi Thelgu, Vedanta Soft Solutions.
2. Mastering Tally Prime: Training, Certification & Job, Ashok K. Nadhani, BPB Solutions.
3. Official Guide to Financial Accounting Using Tally Prime, Tally Education Private Limited.

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation (40)	✓	✓	✓	✓		✓
End Semester Examination (60)	✓	✓	✓	✓		✓

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SEMESTER: IV

BCA-OE-245-B Advanced Excel

Course Title: Advanced Excel
Course Code: BCA-OE-245-B
Lectures: Tutorials: Practical: 2:0:0
Lecture Hours: 24 Hours

Course Type: OE
Total Credits: 02
CIE Marks: 20
ESE Marks: 30

Course Description:

This course is designed to enhance your Excel skills by equipping you with powerful tools and techniques for data management, analysis, and automation. You will learn how to use smart formulas, advanced lookup functions, and text manipulation tools to streamline your workflow and reduce errors. The course covers essential data analysis techniques, such as PivotTables, charts, and What-If analysis, enabling you to summarize and visualize large datasets effectively. Additionally, you will gain expertise in automating tasks using Macros, securing your work with password protection, and cleaning and combining data from multiple sources using Power Query. Whether you're managing simple spreadsheets or complex data models, this course will empower you to work faster, make informed decisions, and safeguard your Excel files with confidence.

Course Objectives:

1. **Master Advanced Excel Functions:**

Learn to apply smart formulas such as IF, AND, OR, VLOOKUP, HLOOKUP, INDEX + MATCH, and text functions (LEFT, RIGHT, MID, CONCAT) to automate decision-making, clean data, and enhance workflow efficiency.

2. **Analyze and Visualize Data Effectively:**

Develop the ability to summarize large datasets using PivotTables, create dynamic reports with Pivot Charts, and present insights visually using a variety of charts and graphs, including Bar, Line, and Waterfall charts.

3. **Automate Tasks and Ensure Data Security:**

Gain proficiency in automating repetitive tasks using Macros, managing data with Excel Tables, and securing your workbooks with password protection, permissions, and auditing tools to maintain data integrity and confidentiality.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	

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

CO1	Apply advanced Excel functions (e.g., IF, VLOOKUP, TEXT functions) to manipulate data, automate calculations, and streamline decision-making processes.
CO2	Utilize PivotTables, charts, and What-If tools to analyze large datasets, create dynamic reports, and visualize data effectively for decision support.
CO3	Automate repetitive tasks with Macros, secure Excel files with password protection, and clean/combine data using Power Query to improve workflow efficiency and data integrity.

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
1	UNIT -I Smart Formulas and Data Tools 1.1 An Overview of the Screen, Navigation and Basic Spreadsheet 1.2 Concept 1.3 Lookup Functions, Logical If Functions 1.4 Text Function, Statistical Function, Math; Trig Functions 1.5 Date; Time and Logical Functions, Financial Functions 1.6 Data Validation 1.7 Sorting, Filtering, and Removing Duplicates 1.8 Conditional Formatting	10	CO1
2	UNIT –II Analysing Data and Making Reports 2.1 PivotTables 2.2 Pivot Charts 2.3 Slicers and Timelines 2.4 What-If tools: Goal Seek, Scenario Manager 2.5 Charts: Bar, Line, Pie, Waterfall, Sparkline's 2.6 Grouping data and creating Subtotals 2.7 Making simple Dashboards	8	CO2
3	UNIT –III Automating and Securing Your Work 3.1 Recording Macros 3.2 Excel Tables 3.3 Power Query 3.4 Power Pivot 3.5 Locking and Protecting Worksheets	6	CO3

REFERENCE BOOKS:

- Excel 2021 Bible by Michael Alexander and Dick Kusleika
- Learn MS Excel in One Day by Krishna Rungta
- Excel Made Easy by Diane Griffiths

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	2	3	2	1
CO2	2	1	1	2	2	3	2
CO3	3	1	1	2	3	3	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓	✓	✓	

End Semester Examination (60)	✓	✓	✓	✓	✓	✓
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SEMESTER: IV

BCA-SEC- 246 Networking concepts

Course Title: Networking concepts
 Course Code: BCA-SEC- 246
 Lectures: Tutorials: Practical: 2:0:0
 Lecture Hours: 24 Hours

Course Type: BCA-SEC- 246
 Total Credits: 02
 CIE Marks: 20
 ESE Marks: 30

Course Description:

This course introduces the fundamentals of computer networks, including network types, devices, topologies, and transmission methods. It covers data communication techniques, transmission media, error detection/correction, and multiplexing. Students will also learn about network layer functions, IP addressing (IPv4/IPv6), routing, and protocols like ARP and NAT.

Course Objectives:

- To introduce the fundamental concepts of computer networking.
- To understand the architecture and protocols of networking systems.
- To develop practical skills in configuring and managing networks.
- To address security concerns in network design and implementation

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	

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

CO1	Understand the structure and types of computer networks, network devices, communication modes, and transmission media.
CO2	Apply data communication principles including OSI and TCP/IP models, framing, multiplexing, and error detection and correction techniques.
CO3	Analyze the functionality of the network layer, including IP addressing (IPv4 & IPv6), routing, ARP, NAT, and basic network security concepts such as cryptography and firewalls.

SN	Contents of Module	Hrs	COs
1	UNIT -I Overview of computer networks. 1.1 What is Network? Classification Of Network: LAN, WAN, MAN and Wireless Networks. 1.2 Transmitter, Receiver, Medium, Message, Protocol 1.3 Analog Signal and Digital Signal, 1.4 Functions of hubs, switches, bridges, routers, and gateways. 1.5 Star, Ring, Bus, Mesh, and Tree. 1.6 Simplex, Half-Duplex, and Full-Duplex.	8	CO1
2	UNIT –II: Data Communication and Transmission 2.1 Reference Models: OSI Reference Model, TCP/IP Reference Models	8	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	2.2 Communication Media: Guided Transmission Media Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable 2.3 Framing: Fixed Sized and Variable Sized Framing 2.4 Multiplexing: Frequency-Division Multiplexing, Time - Division Multiplexing 2.5 Error Detection and Correction: Parity bits, Checksum, Hamming codes, and Cyclic Redundancy Check (CRC).		
3	UNIT –III: : Network Layer and Routing 3.1 Network Layer Functions: Logical addressing, routing, and packet forwarding. 3.2 Network Computing Model: Peer to Peer, Client Server Process-to-Process Delivery, Cryptography, Firewalls 3.3 IP Addressing: IPv4 and IPv6 addressing, subnetting. 3.4 Address Resolution Protocols: ARP. 3.5 Network Address Translation (NAT): Purpose and implementation.	8	CO3

REFERENCE BOOKS:

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	-	-
CO2	3	3	2	2	2	-	-
CO3	3	2	2	2	2	-	-

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyse	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓	✓		
End Semester Examination (30)	✓	✓	✓			

SEMESTER: IV

BCA-AEC-247 Personality Development-II

Course Title: Personality Development-II

Course Type: AEC

Course Code: BCA-AEC-247

Total Credits: 02

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

This course equips students with advanced communication and public speaking skills, emphasizing clarity, persuasion, and cross-cultural awareness. It fosters leadership and team management abilities through exploration of leadership styles, teamwork strategies, and conflict resolution. Students also gain workplace readiness through professional etiquette, time management, interview preparation, and networking skills.

Course Objectives:

- To refine communication skills for professional and social settings.
- To develop leadership qualities and teamwork strategies.
- To impart practical knowledge of handling professional situations, including interviews, public speaking, and workplace ethics.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	✓

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

CO1	Enhance their verbal communication, deliver engaging public speeches, and understand cultural differences in communication.
CO2	Develop leadership skills, learn to work effectively in teams, and understand key strategies for conflict management and decision-making.
CO3	Acquire essential workplace skills, including professional etiquette, time management, interview preparation, and networking strategies.

SN	Contents of Module	Hrs	COs
1	Unit 1: Advanced Communication and Public Speaking 1.1 Communication: Introduction, types and merits of communication. 1.2 Advanced Verbal Communication: Using persuasive language, clarity in complex discussions, and engaging storytelling. 1.3 Public Speaking Skills: Techniques for effective presentations, overcoming stage fright, and managing audience interaction. a. Structuring a speech (introduction, body, conclusion). b. Managing body language and voice modulation during presentations.	8	CO1

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	1.4 Cross-Cultural Communication: Understanding communication nuances in global or diverse environments.		
2	Unit 2: Leadership and Team Management 2.1 Leadership Styles: Exploring different leadership styles (e.g., transformational, transactional, servant leadership) and identifying personal leadership traits. 2.2 Effective Teamwork: Strategies for building and leading teams, delegation of tasks, and motivating team members. 2.3 Problem-Solving and Decision-Making: Applying logical approaches to solve group challenges and make effective decisions in teams. 2.4 Conflict Management: Techniques for resolving conflicts within teams and maintaining team harmony.	8	CO2
3	Unit 3: Professional Etiquette and Workplace Readiness 3.1 Workplace Etiquette: Professional behaviour in meetings, emails, and phone calls. Understanding corporate culture and organizational behaviour. 3.2 Time Management for Professionals: Tools and techniques for prioritizing tasks and meeting deadlines (e.g., the Pomodoro technique, task prioritization matrix). 3.3 Mock Interviews and Career Preparation: Preparing for interviews (both technical and HR rounds), understanding commonly asked questions, and handling pressure. 3.4 Networking Skills: Building professional connections and maintaining them through social media platforms (e.g., LinkedIn).	8	CO3

REFERENCE BOOKS:

1. Jit S. Chandan, Organizational Behavior, Third Edition, Vikas Publishing House Private Limited, 2008
2. Dr. K. K. Ramachandran and Dr. K. K. Karthick, From Campus to Corporate, Macmillan Publishers India Limited, New Delhi, 2010.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	1	2	1	3	1	1
CO2	1	1	1	1	3	1	1
CO3	1	1	2	1	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	✓
End Semester Examination (30)	✓	✓	✓	✓	✓	✓

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SEMESTER: IV

BCA-CEP-401 Community Engagement and Service

Course Title: Community Engagement and Service

Course Type: CEP

Course Code: BCA-CEP-401

Total Credits: 02

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

This course enables students to understand the importance of community service and encourages them to participate actively in social engagement. It helps foster a sense of responsibility, empathy, and social awareness among students by introducing them to real-life challenges in communities and motivating them to contribute to sustainable development.

Course Objectives:

1. To develop awareness about the importance of community involvement.
2. To instill empathy, responsibility, and civic sense among students.
3. To encourage participation in community development and service learning activities.
4. To relate academic learning to real-life social challenges.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓	✓	✓	✓	✓	-

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

CO1	Understand the foundational concepts and importance of community engagement.
CO2	Analyse and identify prevalent social issues through real-life case examples.
CO3	Plan and execute community service initiatives with collaborative effort and appropriate engagement methods.
CO4	Critically reflect on service experiences through documentation, assess impact.

SN	Contents of Module	Hrs	COs
1	Unit I: Introduction to Community Engagement: 1.1 Concept and Scope of Community Engagement. 1.2 Importance of Social Responsibility. 1.3 1.3 Role of Youth in Nation Building	6	CO1
2	Unit II: Understanding the Community: 2.1 Types of Communities. 2.2 Social Structure. 2.3 Identification of Local Issues and Stakeholders. 2.4 Case Examples	6	CO2

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
3	Unit III: Participating in Community Service: 3.1 Cleanliness drive 3.2 Tree Plantation 3.3 Donation to Needy 3.4 Awareness Campaigns, etc. 3.5 Journaling of activities	12	CO3

REFERENCE BOOKS:

1. Handbook on Community Engagement – Dr. P.N. Raju (Allied Publishers)
2. Social Work and Community Development – Surendra Singh (IGNOU Publications)
3. Community Organization and Development – Prof. M.S. Gore (Himalaya Publishing)
4. Youth and Social Change – Yogendra Singh (Rawat Publications)

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	1	1	1	2	1	1
CO2	1	1	1	1	2	1	1
CO3	2	1	2	1	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation (20)	✓	✓	✓	✓		
End Semester Examination (30)	✓	✓	✓	✓		

Semester V

KCES's Institute of Management and Research (Autonomous), Jalgaon

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SEMESTER: V

BCA-DSC-351 Java Programming

Course Title: Java Programming

Course Type: DSC

Course Code: BCA-DSC-351

Total Credits: 02

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

This course presents a detailed overview of Java programming, introducing essential topics such as data types, control statements, arrays, and string manipulation. It focuses on core Object-Oriented Programming (OOP) concepts, including classes, objects, inheritance, polymorphism, and interfaces. The course further examines exception handling and wrapper classes to build reliable and optimized Java applications. Through practical exercises, students will acquire the knowledge and skills required to design, develop, and troubleshoot Java programs efficiently.

Course Objectives:

1. Remember & Apply Java syntax, data types, operators, and control structures to develop basic applications.
2. Implement operations on arrays and string manipulations to solve structured problems.
3. Develop Java programs using classes, objects, inheritance, polymorphism, interfaces, and abstraction.
4. Use exception handling techniques to build error-resilient applications.
5. Implement wrapper classes, type conversions, and auto boxing/unboxing to manipulate primitive data types as objects.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	✓

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

CO1	Understand and explain the fundamentals of Java programming including Java environment, syntax, data types, arrays, control statements, and string handling.
CO2	Apply object-oriented programming concepts such as classes, objects, inheritance, polymorphism, constructors, and method overloading/overriding to develop Java programs.
CO3	Implement abstraction concepts using abstract classes, interfaces, static members, and access modifiers in Java applications.
CO4	Develop robust Java programs using exception handling mechanisms, custom exceptions, and wrapper classes.

SN	Contents of Module	Hrs	COs
1	UNIT -I Introduction to Java 1. 1 History and Features of Java 1. 2 Java Environment (JDK, JRE, JVM) 1. 3 Structure of Java Program 1. 4 Data Types, Variables, Operators 1. 5 Arrays (One-Dimensional Arrays, Multi-Dimensional Arrays) 1. 6 Input and Output in Java 1. 7 Conditional Statements (if, if-else, nested if, switch)	6	CO1

<i>SN</i>	<i>Contents of Module</i>	<i>Hrs</i>	<i>COs</i>
	1. 8 Looping Statements (for loop, while loop, do-while loop) 1. 9 String class 1. 10 StringBuffer class 1. 11 StringBuilder class		
2	UNIT –II Object-Oriented Programming 2. 1 Classes and Objects 2. 2 Introduction to Constructor 2. 3 Types of Constructors a. Default Constructor b. Parameterized Constructor c. Copy Constructor 2. 4 Constructor Overloading 2. 5 Methods 2. 6 Method Overloading 2. 7 Introduction to Inheritance 2. 8 Types of Inheritance a. Single Inheritance b. Multilevel Inheritance c. Hierarchical Inheritance d. Hybrid Inheritance (through Interfaces) e. Multiple Inheritance using Interfaces 2. 9 Method Overriding 2. 10 this and super keywords	6	CO2
3	UNIT –III Abstract Class & Interfaces 3. 1 Static Members, Access Modifiers 3. 2 Abstract Methods, Abstract classes 3. 3 Introduction to final Keyword 3. 4 Final methods, final fields and final class 3. 5 Interfaces 3. 6 Implementation of Interfaces 3. 7 Multiple Inheritance using Interface 3. 8 Difference between Abstract Class and Interface	8	CO3
4	UNIT- IV Exception Handling 4. 1 Types of Exceptions 4. 2 try, catch, finally keywords 4. 3 throw and throws keywords 4. 4 Multiple Catch Blocks 4. 5 Custom Exceptions 4. 6 Wrapper Classes	4	CO4

REFERENCE BOOKS:

1. Horstmann, Cay S. Core Java: Fundamentals, Volume I. 13th ed., Pearson, ISBN 9780135328378.
2. Schildt, H. (2022). Java: The Complete Reference (12th ed.). McGraw-Hill Education. ISBN9781260463552
3. J. Bloch, Effective Java, 3rd ed. Addison-Wesley, 2018, ISBN: 9780134685991.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	1	-	-

CO2	3	3	1	1	2	-	-
CO3	2	3	1	1	2	1	1
CO4	2	2	1	2	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	-
End Semester Examination (30)	✓	✓	✓	✓	✓	-

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SEMESTER: V

BCA-DSC-352 Lab on Java Programming

Course Title: Lab on Java Programming

Course Code: BCA-DSC-352

Lectures: Tutorials: Practical: 0:0:2

Lecture Hours: 24 Hours

Course Type: DSC

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This practical course provides hands-on experience in Java programming, focusing on core concepts such as data types, control structures, arrays, strings, object-oriented programming, exception handling, and wrapper classes. Through real-time problem solving and application development, students will strengthen their ability to write robust, maintainable Java programs.

Course Objectives:

1. Remember & Apply Java syntax, data types, operators, and control structures to develop basic applications.
2. Implement operations on arrays and string manipulations to solve structured problems.
3. Develop Java programs using classes, objects, inheritance, polymorphism, interfaces, and abstraction.
4. Use exception handling techniques to build error-resilient applications.
5. Implement wrapper classes, type conversions, and auto boxing/unboxing to manipulate primitive data types as objects.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	✓

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

CO1	Understand and explain the fundamentals of Java programming including Java environment, syntax, data types, arrays, control statements, and string handling.
CO2	Apply object-oriented programming concepts such as classes, objects, inheritance, polymorphism, constructors, and method overloading/overriding to develop Java programs.
CO3	Implement abstraction concepts using abstract classes, interfaces, static members, and access modifiers in Java applications.
CO4	Develop robust Java programs using exception handling mechanisms, custom exceptions, and wrapper classes.

Practical Assignments:

1.	Write a Java program to compare three numbers and display the largest number using nested if-else.
2.	Write and execute Java Program to find factorial of a given number.
3.	Write a Java program to store 10 integer numbers in a single-dimensional array, then: • display all elements • calculate the sum of all elements • compute the average of the elements • display the final result
4.	Write a Java program to demonstrate 5 different string operations. • length ()

	• toUpperCase() • toLowerCase() • equals() • equalsIgnoreCase()
5.	Write a Java Program that create a class Student with data members and methods to display student details using objects.
6.	Write a Java program to demonstrate constructor overloading by creating multiple constructors in a class Rectangle: • no-argument constructor • constructor with one parameter (square case) • constructor with two parameters (rectangle case)
7.	Write a Java program to demonstrate method overloading by defining multiple add() methods for: • two integers • three integers • two double values
8.	Write a Java Program that Create a base class Person and derived class Student to demonstrate inheritance and display details.
9.	Write a Java program to implement method overriding using: • a superclass Bank with method getInterestRate() • subclasses SBI and HDFC overriding the method with different interest rates
10.	Write a Java program to demonstrate abstraction by creating an abstract class Shape with an abstract method area(), and implement it in subclasses: • Circle (calculate area using radius) • Rectangle (calculate area using length and breadth)
11.	Write a Java program to create an interface Calculator containing methods for: • addition of two integers • multiplication of two integers and implement it in a class MyCalculator.
12.	Write a Java program to demonstrate exception handling where: • user enters numerator and denominator • program performs division • catches divide-by-zero exception and displays a meaningful message

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	1	-	-
CO2	3	3	1	1	2	-	-
CO3	2	3	1	1	2	1	1
CO4	2	2	1	2	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	-

End Semester Examination (30)	✓	✓	✓	✓	✓	-
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KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: V

BCA-DSC-353 - Python Programming

Course Title: Python programming

Course Code: BCA-DSC-353

Lectures: Tutorials: Practical: 4:0:0

Lecture Hours: 48 Hours

Course Type: DSC

Total Credits: 04

CIE Marks: 40

ESE Marks: 60

Course Description:

This course introduces the fundamentals of Python programming language and its applications. Students will learn Python syntax, control structures, functions, modules, data structures, object oriented programming concepts, file handling, exception handling, database connectivity and modern Python applications used in software industries.

Course Objectives:

1. To understand the fundamentals of Python programming language.
2. To develop problem solving skills using Python.
3. To learn functions, modules and object oriented programming concepts.
4. To understand file handling and exception handling mechanisms.
5. To learn database connectivity and GUI programming using Python.
6. To develop practical applications using modern Python libraries and tools.

Teaching / Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

CO1	Understand Python syntax, operators and control structures.
CO2	Apply functions, modules and Python data structures for problem solving.
CO3	Develop applications using object oriented programming concepts in Python.
CO4	Implement file handling, exception handling and database operations using Python.
CO5	Apply Python libraries for data analysis and visualization.
CO6	Develop Practical Python applications using modern tools and libraries.

SN	Contents of Module	Hrs	COs
1.	UNIT I: Introduction to Python Programming 1.1 Introduction to Python: Features of Python, Installing Python, Python IDE. 1.2 Basics of Python Programming: Variables, Data Types, Operators, Input and Output Statements. 1.3 Flow Control Statements: Conditional Statements and Looping Statements.	8	CO1
2.	UNIT-II Functions in Python 4. 1 Functions: Function Definition, Calling, Parameters and Return 4. 2 Statement 4. 3 Advantages of Functions and Types 4. 4 Types of Arguments and Scope of Variables	8	CO2

	Recursive Functions, Lambda Functions		
3.	UNIT III: Data Structures Modules & Packages 2. 1 Modules and Packages: Creating and Using Modules and Packages. 2. 2 Data Structures in Python: Strings, Lists, Tuples, Sets and Dictionaries. 2. 3 Operations on Data Structures.	8	CO2
4.	UNIT IV: Object Oriented Programming in Python 3. 1 Overview of OOP Concepts: Classes and Objects, Constructors. 3. 2 Concepts of OOP: Inheritance, Polymorphism , Encapsulation. 3. 3 Advanced OOP Features: Method Overriding, Operator Overloading. 3. 4 Applications of Object Oriented Programming in Python.	8	CO3
5	UNIT V: File Handling and Data Analysis 5. 1 Introduction to File Handling: File Operations, Reading and Writing Files, File Modes 5. 2 Exception Handling Concepts: try, except and finally blocks 5. 3 User Defined Exceptions and Handling Runtime Errors 5. 4 Data Analysis using NumPy: Arrays, Array Creation, Indexing and Basic Operations 5. 5 Introduction to Pandas: Series and DataFrame 5. 6 Data Loading, Filtering, Selection and Basic Data Analysis using Pandas 5. 7 Data Visualization using Matplotlib: Data Visualization, Plotting Line Charts, Bar Charts and Pie Charts 5. 8 Introduction to Scikit-learn: Overview of Machine Learning, Datasets, Model Training and Prediction using Simple Examples	8	CO4, CO5
6	UNIT VI: Database Connectivity and GUI Programming 6. 1 Database Connectivity: Using SQLite/MySQL. 6. 2 Executing SQL Queries using Python. 6. 3 GUI Programming using Tkinter 6. 4 Event Handling and GUI Applications.	8	CO6

REFERENCE BOOKS:

- 1 Lutz, Mark. Learning Python (6th Edition). Reilly Media, 2025. ISBN: 978-1098171308.
- 2 Chun, Wesley J. Core Python Applications Programming (3rd Edition). Pearson Education, 2012. ISBN:978-0132678209.
- 3 Downey, Allen B. Think Python: How to Think Like a Computer Scientist (3rd Edition).; Reilly Media, 2024. ISBN: 978-1098155438.
- 4 Barry, Paul. Head First Python (3rd Edition). O; Reilly Media, 2023. ISBN: 978-1492051299.
- 5 Matthes, Eric. Python Crash Course (3rd Edition). No Starch Press, 2023. ISBN: 978-1718502703.
- 6 Goodrich, Michael T., Tamassia, Roberto, and Goldwasser, Michael H. Data Structures and Algorithms in Python. Wiley. ISBN: 978-1118290279.
- 7 Lambert, Kenneth A. Fundamentals of Python: First Programs (3rd Edition). Cengage Learning, 2023. ISBN: 978-0357881019.
- 8 WEB RESOURCES:
 - a. Python Official Documentation – <https://docs.python.org/3/>
 - b. W3Schools Python Tutorial – <https://www.w3schools.com/python/>
 - c. NumPy Documentation – <https://numpy.org/doc/stable/>
 - d. Pandas Documentation – <https://pandas.pydata.org/docs/>

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	1	1	2	-	-
CO2	3	3	2	1	3	-	-
CO3	2	3	2	2	3	-	-

CO4	2	2	1	3	3	-	-
CO5	2	2	2	2	3	-	-
CO6	2	2	3	2	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓	✓	✓	-
End Semester Examination (60)	✓	✓	✓	✓	✓	-

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: V

BCA-DSC-354 Lab on Python Programming

Course Title: Lab on Python Programming

Course Code: BCA-DSC-354

Lectures: Tutorials: Practical: 0:0:2

Lecture Hours: 24 Hours

Course Type: DSC

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This course introduces the fundamentals of Python programming, including basic syntax, control statements, functions, data structures, object-oriented programming, exception handling, and advanced Python applications. It enables students to develop problem-solving skills and build Python-based applications using modern programming concepts and tools.

Course Objectives:

1. To understand the fundamentals of Python programming and problem-solving techniques.
2. To develop programs using functions, modules, and Python data structures.
3. To apply object-oriented programming concepts in Python applications.
4. To implement advanced Python features for real-world applications.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	✓

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

CO1	Understand basic programming concepts to develop Python programs.
CO2	Apply functions and Python data structures to solve problems.
CO3	Implement object-oriented programming concepts in Python applications.
CO4	Develop Python applications using advanced programming concepts and tools.

SN	Practical Assignments
1.	Develop a program for installation of Python and configuration of the working environment. Develop simple Python statements for displaying text ("Hello World"), numeric values, and performing arithmetic operations.
2.	Develop a Python program to identify and display all prime numbers within a specified range.
3.	Develop a program to generate and display the first n terms of the Fibonacci sequence using an iterative approach.
4.	Develop a Python program illustrating string slicing operations.
5.	Develop a Python application showcasing the usage of the following along with their built-in functions: • List • Dictionaries • Tuples
6.	Develop a Python program to perform file handling operations (create, write, read, and append data to a text file).
7.	Develop a Python program to accept student details and calculate total marks, percentage, and grade using functions.
8.	Develop a Python program to perform searching and sorting operations (Linear Search and Bubble Sort) on a list of numbers.

9.	Develop a program using lambda function and Implement Custom Modules in Python.
10.	Develop a Python program to explain the concept of Classes and Objects.
11	Develop a program illustrating the implementation of Inheritance in Python.
12	Develop a Python application to demonstrate Method Overloading concepts.
13	Develop a Python application to demonstrate Method Overriding concepts.
14	Develop a program to illustrate the Exception Handling mechanism in Python.

REFERENCE BOOKS:

1. John V Guttag (2013), Introduction to Computation and Programming Using Python, Prentice Hall of India, 2013, ISBN: 9780262525008
2. Peter C. Norton, Alex Samuel and others, —Beginning Python, Wrox Publication, 2005 ISBN 10:0764596543 ISBN 13: 9780764596544
3. R. Nageswara Rao (2016), Core Python Programming, Dreamtech Press, 2016, ISBN-13:9789351199427

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	-	-
CO2	3	2	1	1	2	1	-
CO3	2	3	1	-	2	-	-
CO4	2	2	1	2	3	2	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓		✓
End Semester Examination (30)	✓	✓	✓	✓		✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: V

BCA-DSE-355(A) Artificial Intelligence

Course Title: Artificial Intelligence

Course Code: BCA-DSE-355(A)

Lectures: Tutorials: Practical: 2:0:0

Lecture Hours: 24 Hours

Course Type: DSE

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This course introduces the fundamentals of Artificial Intelligence, including problem-solving, search techniques, and knowledge representation. It covers classical AI problems, search algorithms, and rule-based reasoning to develop intelligent problem-solving skills.

Course Objectives:

1. Understand the foundational history, goals, types, and core techniques of Artificial Intelligence.
2. Formulate real-world problems into state-spaces and solve them using basic un-informed search methods.
3. Apply advanced heuristic search algorithms to solve and optimize complex computational problems.
4. Understand knowledge representation techniques and rule-based reasoning for intelligent systems.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

CO1	Explain the fundamental types, branches, and core goals of Artificial Intelligence.
CO2	Formulate state-space search models and apply basic search methods to solve standard puzzles.
CO3	Implement and evaluate advanced heuristic search algorithms to solve complex optimization problems.
CO4	Apply knowledge representation and rule-based reasoning techniques to solve AI problems.

SN	Contents of Module	Hrs	COs
1.	UNIT –I Introduction to AI 1. 1 History of AI. 1. 2 What is Artificial Intelligence? 1. 3 Need of AI 1. 4 Goal of AI 1. 5 Advantages and Disadvantages of AI. 1. 6 Types of AI 1. 7 The AI Problems. 1. 8 What is an AI Technique? 1. 9 Branches of Artificial Intelligence. 1. 10 Applications of Artificial Intelligence.	06	CO1
2.	UNIT –II Problem, Problem Spaces and Search 2. 1 Defining the Problem as a State Space Search 2. 2 8 Puzzle Problem 2. 3 N-Queen Problem. 2. 4 Monkey Banana Problem. 2. 5 Tower of Hanoi.	06	CO2

	2. 6 Production systems. 2. 7 Problem Characteristics. 2. 8 Production System Characteristics. 2. 9 Uninformed Search techniques - DFS and BFS. 2. 10 Issues in the Design of Search Programs.		
3.	UNIT –III Advanced Search Strategies: 3. 1 Generate-and- Test, Traveling Sales Man Problem 3. 2 Hill Climbing Search 3. 3 Best-First Search: OR Graph, A* Algorithm, Agenda-Driven Search. 3. 4 Problem Reduction: AND-OR Graphs, AO* Algorithm	06	CO3
4.	UNIT-IV Knowledge Representation and Rule-Based Reasoning 4. 1 Introduction to Knowledge Representation 4. 2 Fundamental Issues in Knowledge Representation 4. 3 Knowledge Representation Techniques 4. 4 First-Order Predicate Logic 4. 5 Instance and ISA Relationships 4. 6 Procedural vs. Declarative Knowledge 4. 7 Principles of Logic Programming 4. 8 Forward and Backward Chaining Reasoning	06	CO4

REFERENCE BOOKS:

1. "Artificial Intelligence" by Elaine Rich, Kevin Knight, and Shivashankar B. Nair, 3rd Edition, ISBN-13: 978-0070087705, McGraw Hill Education
2. "Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig, 4th Edition, ISBN-13: 978-0134610993 (US Edition) / 978-1292401133 (Global Edition), Pearson
3. "A First Course in Artificial Intelligence" by Deepak Khemani, 1st Edition, ISBN-13: 978-1259029981, McGraw Hill Education

WebLinks:

4. GeeksforGeeks, Artificial Intelligence Tutorial: Core Concepts, Search Algorithms, and Applications. Available online: <https://www.geeksforgeeks.org/artificial-intelligence/>
5. Prof. Deepak Khemani (IIT Madras), Artificial Intelligence: Search Methods for Problem Solving, National Programme on Technology Enhanced Learning (NPTEL) Course Archive. Available online: <https://nptel.ac.in/courses/106106126>

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	-	-	1	1	3
CO2	2	3	-	-	2	2	3
CO3	3	3	-	-	2	3	3
CO4	2	2	-	1	2	2	3

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	

End Semester Examination (30)	✓	✓	✓	✓	✓	
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KCES's Institute of Management and Research (Autonomous), Jalgaon
FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application
B.C.A. PROGRAMME BATCH 2024-27

SEMESTER: V
BCA-DSE-355(B) Data Analytics-I

Course Title: Data Analytics-I
Course Code: BCA-DSE-355(B)
Lectures: Tutorials: Practical: 2:0:0
Lecture Hours: 24 Hours

Course Type: DSE
Total Credits: 02
CIE Marks: 20
ESE Marks: 30

Course Description:

This course introduces the fundamental concepts of data analytics and the use of R programming for data analysis. Students will learn the basic techniques of data collection, data preparation, descriptive statistical analysis, and data visualization. The course also provides an overview of machine learning concepts and the use of Microsoft Excel for data cleaning and analysis. Emphasis is placed on developing analytical thinking and practical skills required to analyze and interpret data for informed decision-making.

Course Objectives:

- 1 To understand the basic concepts, applications, and tools of data analytics and data science.
- 2 To learn the fundamentals of R programming, including data types, operators, control structures, and basic data manipulation.
- 3 To apply basic statistical methods and visualization techniques to analyze and present data effectively using R.
- 4 To gain an introductory understanding of machine learning concepts and utilize Excel for data preparation, cleaning, and basic analytical tasks.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

CO1	Understand the fundamentals of data analytics and use basic R programming constructs.
CO2	Collect , clean, and prepare datasets using R for analysis.
CO3	Perform basic statistical analysis and create charts for data visualization using R.
CO4	Describe the fundamentals of machine learning and use Excel tools for basic data analysis.

SN	Contents of Module	Hrs	COs
1.	UNIT I: Introduction to Data Analytics and R Programming 1.1 Introduction to Data Analytics and Data Science 1.2 Types of Data Analytics 1.3 Applications of Data Analytics 1.4 Overview of Data Analytics Tools (R, Python, SQL, Excel) 1.5 Introduction to R 1.6 R Environment and Packages 1.7 Basic Syntax 1.8 Variables and Data Types 1.9 Operators 1.10 Input/Output Functions 1.11 Decision Making Statements (if, if-else) 1.12 Loops (for, while)	6	CO1
2.	UNIT II: Data Collection and Data Preparation	6	CO2

	2.1 Data Collection and Sources of Data 2.2 Data Quality 2.3 Handling Missing Data 2.4 Data Cleaning 2.5 Data Science Project Life Cycle 2.6 Introduction to Data Mining 2.7 Data Import and Export in R 2.8 Basic Data Manipulation in R		
3.	UNIT III: Descriptive Statistics and Data Visualization 3.1 Mean, Median, Mode 3.2 Measures of Dispersion 3.3 Summary Statistics in R 3.4 Correlation 3.5 Data Visualization ○ Bar Chart ○ Pie Chart ○ Histogram ○ Box Plot ○ Line Chart ○ Scatter Plot	6	CO3
4.	UNIT IV: Introduction to Machine Learning and Excel for Analytics 4.1 Introduction to Artificial Intelligence 4.2 Introduction to Machine Learning 4.3 Types of Machine Learning 4.4 Decision Trees (Basic Concept) 4.5 Excel for Data Analytics ○ Sorting and Filtering ○ Conditional Formatting ○ IF Function ○ Data Validation ○ Working with CSV Files ○ Data Cleaning	6	CO4

REFERENCE BOOKS:

1. R Programming for Data Science – Roger D. Peng.
2. An Introduction to Statistical Learning – Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani.
3. Microsoft Excel Data Analysis and Business Modeling – Wayne L. Winston.
4. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach, and Vipin Kumar.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	-	-	1	2	1
CO2	2	2	-	1	2	3	2
CO3	2	1	-	-	2	3	2
CO4	1	1	-	-	2	2	3

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)		✓	✓	✓	✓	✓
End Semester Examination (30)		✓	✓	✓	✓	✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. PROGRAMME BATCH 2024-27

SEMESTER: V

BCA-DSE-356(A) Lab on Artificial Intelligence

Course Title: Lab on Artificial Intelligence

Course Type: DSE

Course Code: BCA-DSE-356(A)

Total Credits: 02

Lectures: Tutorials: Practical: 0:0:2

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

This practical course introduces students to Python programming and fundamental Artificial Intelligence techniques. It covers problem-solving using Python, object-oriented programming, search algorithms, knowledge representation, logical reasoning, and basic intelligent systems development through hands-on laboratory exercises.

Course Objectives:

1. Understand the implementation of fundamental AI search algorithms for problem-solving.
2. Develop solutions for classical AI problems using state-space search techniques.
3. Apply knowledge representation and rule-based reasoning techniques to build simple intelligent systems.
4. Gain practical experience in implementing AI algorithms using Python.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

CO1: Implement uninformed and informed search algorithms to solve AI problems.

CO2: Develop solutions for classical AI problems using state-space search techniques.

CO3: Apply heuristic search algorithms to find optimal or near-optimal solutions.

CO4: Implement simple knowledge-based systems using facts, rules, and inference techniques such as forward and backward chaining.

SN	Practical Assignments
1	Write a program to implement Breadth-First Search (BFS) for graph traversal.
2	Write a program to implement Depth-First Search (DFS) for graph traversal.
3	Write a program to solve the 8-Puzzle Problem using a state-space search approach.
4	Write a program to solve the Monkey and Banana Problem using a sequence of actions.
5	Write a program to implement the Hill Climbing Algorithm.
6	Write a program to implement the Best-First Search Algorithm.
7	Write a program to solve a problem using the A* Algorithm.
8	Write a program to solve a problem using the AO* Algorithm.
9	Write a program to Implement a simple knowledge base using facts and rules.

10	Write a program to Implement Forward Chaining for rule-based inference.
11	Write a program to Implement Backward Chaining for goal-based reasoning.

Mapping of Course Outcomes to Program Outcomes:

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	–	–	2	–	3
CO2	3	2	–	–	2	–	3
CO3	3	2	–	–	2	2	3
CO4	2	2	–	–	2	2	3

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	
End Semester Examination (30)	✓	✓	✓	✓	✓	

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. PROGRAMME BATCH 2024-27

SEMESTER: V

BCA-DSE-356(B) Lab on Data Analytics-I

Course Title: Lab on Data Analytics-I

Course Code: BCA-DSE-356(B)

Lectures: Tutorials: Practical: 0:0:2

Lecture Hours: 24 Hours

Course Type: DSE

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This practical course provides hands-on training in R programming and Excel for Data Analytics. It covers R programming fundamentals, data import and export, data cleaning, handling missing values, descriptive statistics, correlation analysis, and data visualization using various charts. The course also introduces essential Excel tools for data organization, cleaning, and analysis, enabling students to perform basic data analytics tasks effectively.

Course Objectives:

- 1 Understand and apply the fundamentals of R programming, including variables, data types, operators, decision-making, and looping constructs.
- 2 Import, clean, manipulate, and preprocess datasets from CSV and Excel files using R and Excel.
- 3 Perform statistical analysis by computing descriptive statistics, handling missing values, assessing data quality, and conducting correlation analysis.
- 4 Create meaningful data visualizations and use Excel analytical features to effectively analyze and present data for informed decision-making.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	-	-	✓	-	-	✓

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

CO1	Demonstrate proficiency in the R programming environment by implementing basic programming concepts, including variables, data types, operators, decision-making, and looping constructs.
CO2	Import, export, clean, and manipulate datasets, handle missing values, and assess data quality using R and Excel.
CO3	Apply descriptive statistical techniques and correlation analysis to summarize and interpret data effectively.
CO4	Create and interpret basic and advanced data visualizations in R and utilize Excel tools to communicate data-driven insights effectively.

SN	PRACTICAL ASSIGNMENTS
	- Study of R Environment and Installation of R & RStudio - Familiarization with R environment, packages, and basic syntax. - Implementation of Variables, Data Types, Operators, and Input/Output Functions in R - Working with variables, data types, arithmetic, relational, logical operators, and I/O functions. - Implementation of Decision Making and Looping Statements in R - Programs using if, if-else, for, and while loops. - Data Import and Export in R - Importing and exporting data using CSV and Excel files. - Basic Data Manipulation in R - Selecting, filtering, sorting, updating, and summarizing datasets. - Data Collection, Data Quality Assessment, and Data Cleaning - Identifying data quality issues, removing duplicates, handling inconsistent data, and cleaning datasets. - Handling Missing Values in R - Detecting, removing, and replacing missing values using appropriate techniques. - Computation of Descriptive Statistics - Calculation of mean, median, mode, range, variance, standard deviation - Correlation Analysis in R - Finding and interpreting correlation between two or more variables. - Data Visualization Using R – Basic Charts - Creating Bar Charts, Pie Charts, and Histograms. - Data Visualization Using R – Advanced Charts - Creating Box Plots, Line Charts, and Scatter Plots. - Excel for Data Analytics - Sorting and Filtering, Conditional Formatting, IF Function, Data Validation, Working with CSV files, and Data Cleaning.

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	✓
End Semester Examination (30)			✓	✓	✓	✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. PROGRAMME BATCH 2024-28

SEMESTER: V

BCA-MIN-357 Software Engineering

Course Title: Software Engineering

Course Code: BCA-MIN-356

Lectures: Tutorials: Practical: 4:0:0

Lecture Hours: 48 Hours

Course Type: MINOR

Total Credits: 04

CIE Marks: 40

ESE Marks: 60

Course Description:

This course introduces the fundamental concepts of Software Engineering and systematic approaches used in software development. It covers Software Development Life Cycle (SDLC) models, requirement analysis, software design, testing, quality assurance, and project management techniques. The course also includes modern software development practices such as Agile methodology, DevOps, Git, CI/CD, and emerging trends in Software Engineering. Students will gain knowledge of software development processes, documentation, testing methods, and teamwork practices required for building reliable and quality software systems.

Course Objectives:

1. To understand Software Engineering principles and SDLC models.
2. To study requirement analysis and software design techniques.
3. To learn software testing and quality assurance methods.
4. To understand software project management and modern development practices.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	

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

CO1	Explain Software Engineering concepts and SDLC models.
CO2	Analyse software requirements and prepare UML models and SRS documents.
CO3	Apply software design principles and architectural concepts.
CO4	Perform software testing and quality assurance activities.
CO5	Understand software project management and maintenance processes.
CO6	Explain modern practices like Agile, DevOps, Git, and CI/CD.

SN	Contents of Module	Hrs	COs
1.	Unit I – Introduction to Software Engineering 1. 1 Software Characteristics 1. 2 Software Crisis 1. 3 SDLC Models: a. Waterfall Model b. Spiral Model c. Prototype Model d. Agile Model 1. 4 Introduction to DevOps and CI/CD	8	CO1
2.	Unit II – Requirement Engineering and UML 2. 1 Requirement Engineering Process	8	CO2

	2. 2 Functional and Non-Functional Requirements 2. 3 Feasibility Study 2. 4 Software Requirement Specification (SRS) 2. 5 UML Basics 2. 6 Use Case Diagram 2. 7 Class Diagram 2. 8 Activity Diagram 2. 9 User Stories		
3.	Unit III – Software Design and Architecture 3. 1 Software Design Concepts 3. 2 Coupling and Cohesion 3. 3 Function-Oriented Design 3. 4 Object-Oriented Design 3. 5 DFD and ER Diagram 3. 6 Interface Design 3. 7 Introduction to Micro services and APIs	8	CO3
4.	Unit IV – Software Testing and Quality Assurance 4. 1 Software Testing Concepts 4. 2 Verification and Validation 4. 3 Unit Testing 4. 4 Integration Testing 4. 5 System Testing 4. 6 Black Box and White Box Testing 4. 7 Debugging 4. 8 Automated Testing Basics	8	CO4
5.	Unit V – Software Project Management 5. 1 Project Planning and Scheduling 5. 2 Cost Estimation 5. 3 Risk Management 5. 4 Software Maintenance 5. 5 CASE Tools 5. 6 Configuration Management 5. 7 Git and GitHub Basics	8	CO5
6.	Unit VI – Emerging Trends in Software Engineering 6. 1 Agile Methodology 6. 2 Scrum Basics 6. 3 DevOps Lifecycle 6. 4 Secure Coding Practices 6. 5 AI in Software Engineering: ChatGPT, GitHub Copilot, Gemini - Benefits, Challenges, and Ethical Considerations 6. 6 Low Code / No Code Platforms 6. 7 Ethics in Software Development	8	CO6

REFERENCE BOOKS:

1. Software Engineering: A Practitioner's Approach: Roger S. Pressman & Bruce Maxim 978-1259872976
2. Software Engineering (10th Edition): Ian Sommerville 978-0133943030
3. Fundamentals of Software Engineering (5th Edition): Rajib Mall 978-9388028028
4. Software Engineering: With Open Source and GenAI (2nd Edition): Pankaj Jalote 978-9363869189
5. Software Engineering: K. K. Aggarwal & Yogesh Singh 978-8120329867

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	1	1	2	-	-
CO2	3	3	2	1	2	-	-
CO3	3	3	2	1	3	-	-
CO4	2	2	1	2	3	-	-
CO5	2	2	1	2	3	-	-
CO6	3	2	2	1	3	1	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓	✓	✓	
End Semester Examination (60)	✓	✓	✓	✓	✓	

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FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. PROGRAMME BATCH 2024-28

SEMESTER: V

BCA-FP-358 Lab on Web Technology-IV

Course Title: Lab on Web Technology-IV

Course Type: VSC

Course Code: BCA-VSC-358

Total Credits: 02

Lectures: Tutorials: Practical: 0:0:2

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

This course provides a practical introduction of Microservices Architecture, Docker, and Kubernetes through hands-on practice. This course covers containerization, Docker image creation, networking, Docker Compose, microservices communication, and Kubernetes deployment. By the end of the course, participants will be able to build, deploy, and manage containerized microservices applications using Docker and Kubernetes.

Course Objectives:

The objective of this course is to help learners understand Microservices, Docker, and Kubernetes. Participants will learn how to create, containerize, deploy, and manage applications using Docker and Kubernetes. They will also learn how different microservices communicate with each other and gain practical experience through hands-on projects and real-world examples.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓	--	✓	--	✓	✓

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

CO1	Explain the fundamentals of Microservices Architecture and containerization.
CO2	Create, build, and manage Docker images, containers, networks, and volumes.
CO3	Develop and deploy containerized applications using Docker and Docker Compose.
CO4	Implement an end-to-end microservices application deployment using Docker and Kubernetes.

SN	Practical Assignments:
1	Study of Microservices Architecture and Its Components.
2	Installation and Configuration of Docker Desktop on Windows.
3	Exploring Basic Docker Commands and Container Management.
4	Creating Custom Docker Images Using Dockerfile.
5	Dockerizing a Simple Node.js Web Application.
6	Working with Docker Volumes and Docker Networking.
7	Deploying Multi-Container Applications Using Docker Compose.
8	Designing and Implementing a Simple Microservices Application.

9	Implementing Communication Between Microservices Using REST APIs.
10	Installation and Setup of Kubernetes (kubectl and Minikube) and Managing Pods.
11	Deploying and Exposing Applications Using Kubernetes Deployments and Services.
12	Deploying Dockerized Microservices on Kubernetes Using Minikube (Mini Project).

REFERENCE BOOKS:

1. Newman, S. (2021). Building Microservices: Designing Fine-Grained Systems (2nd ed.). O'Reilly Media. ISBN: 9781492034025.
2. Poulton, N. (2023). Docker Deep Dive (Latest ed.). Independently Published. ISBN: 9781916585256.
3. Burns, B., Beda, J., & Hightower, K. (2022). Kubernetes: Up and Running (3rd ed.). O'Reilly Media. ISBN: 9781098110208.
4. Richardson, C. (2018). Microservices Patterns: With Examples in Java. Manning Publications. ISBN: 9781617294549.
5. Turnbull, J. (2024). The Docker Book: Containerization is the New Virtualization (Latest ed.). ISBN: 9780988820289.
6. Lukša, M. (2025). Kubernetes in Action (2nd ed.). Manning Publications. ISBN: 9781633437166.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	3	2	2	3	2	2
CO2	1	2	3	1	2	2	3
CO3	2	3	1	1	2	2	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	✓
End Semester Examination (30)	✓	✓	✓	✓	✓	✓

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FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. PROGRAMME BATCH 2024-28

SEMESTER: V

BCA-FP-359 Field Project

Course Title: Field Project

Course Code: BCA-FP-359

Practical: 24 Hours

Course Type: FP

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This course focuses on the analysis, design, development, and implementation of real-world IT solutions based on the field study conducted in BCA-FP-238. Students gain practical exposure to software development, system analysis, testing, and documentation through hands-on project work.

Course Objectives:

1. To analyze existing IT systems and identify real-world problems.
2. To design and develop software-based solutions using suitable technologies.
3. To apply system design, database, and programming concepts in project implementation.
4. To develop practical skills in testing, documentation and presentation.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓	✓	✓	✓	✓	✓

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

CO1	Analyze real-world IT problems and gather system requirements effectively.
CO2	Design system models, databases, and user interfaces for software applications.
CO3	Develop and implement functional IT solutions using appropriate tools and technologies.
CO4	Perform testing, prepare project documentation, and present the implemented system professionally.

Contents of Module

Project Work

- Can be done individually or in a group of two students.
- Students must study and analyze the existing system and develop their own proposed system.

System Development

Students should perform:

- Requirement Analysis
- System Design (DFD, ERD, Database Design)
- Coding and Implementation
- Testing and Validation

Technologies

Projects may be developed using: (Not limited)

- Python, Java, .NET, ANDROID
- HTML, CSS, JavaScript

MySQL or other databases
Documentation The report should include: - Introduction - Objectives - Proposed System - Methodology - Implementation (Code) - Testing and Results - Conclusion and Future Scope
Presentation & Viva - Live demonstration of the system/application is required. - Viva Voce will be conducted at the end of the semester.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	2	2	1	1
CO2	3	2	3	3	2	1	1
CO3	3	3	3	2	3	2	2
CO4	2	1	1	2	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	✓
End Semester Examination (30)	✓	✓	✓	✓	✓	✓

Semester VI

SEMESTER: VI

BCA-DSC-361 Mobile Application development

Course Title: Mobile Application development

Course Type: DSC

Course Code: BCA-DSC-361

Total Credits: 2

Lectures: Tutorials: Practical: 2:0:0

CIE Marks: 20

Lecture Hours:24

ESE Marks: 30

Course Description:

This course introduces students to the fundamentals of Mobile Application Development with a focus on Android platform development. The course covers mobile computing concepts, Android architecture, Android Studio environment, and application lifecycle management. Students will learn to design interactive user interfaces using layouts, activities, intents, fragments, and event handling techniques. The course also emphasizes practical implementation of advanced mobile application features such as RecyclerView, multimedia handling, notifications, shared preferences, API integration, and basic security concepts. Additionally, students will develop database-driven mobile applications using SQLite and Firebase for local and cloud-based data management. Through hands-on laboratory work and mini-projects, students will gain practical skills required for designing, developing, testing, and deploying modern Android applications.

Course Objectives:

1. To understand the fundamentals of mobile application development and Android architecture.
2. To design and develop Android applications using activities, layouts, intents, and UI components.
3. To implement advanced features such as multimedia, notifications, shared preferences, and API integration in mobile applications.
4. To develop and manage database-driven Android applications using SQLite and Firebase.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

CO1	Understand the fundamentals of mobile computing, mobile operating systems, Android architecture, and the Android application development environment.
CO2	Design and develop Android user interfaces using layouts, UI components, activities, intents, fragments, and event handling techniques.
CO3	Implement advanced mobile application features such as RecyclerView, multimedia handling, notifications, shared preferences, API integration, and application security basics.
CO4	Develop database-driven mobile applications using SQLite and Firebase by performing CRUD operations, managing data storage, and connecting mobile apps with databases.

SN	Contents of Module	Hrs	COs
1.	Unit I: Introduction to Mobile Application Development 1.1 Introduction to Mobile Computing 1.2 Mobile Operating Systems: Android and iOS Overview 1.3 Architecture of Android Operating System 1.4 Android Studio IDE and SDK Setup 1.5 Android Application Structure 1.6 Activities and Activity Lifecycle 1.7 Introduction to Emulator and Physical Device Deployment	6	CO1
2.	UNIT –II User Interface Design and App Components 2.1 XML Layouts and UI Components	6	CO2

	2.2 Views and ViewGroups 2.3 TextView, EditText, Button, and ImageView 2.4 Intents and Intent Filters 2.5 Menus and Toast Messages 2.6 Event Handling in Android 2.7 Fragments and Navigation Basics		
3.	Unit III: Advanced Features in Mobile Applications 3.1 RecyclerView and ListView 3.2 Dialog Boxes and Notifications 3.3 Multimedia in Android 3.4 Shared Preferences 3.5 Permissions and Security Basics 3.6 Introduction to APIs and JSON Parsing 3.7 Publishing Basics of Mobile Applications	6	CO3
4.	Unit IV: Database Handling in Mobile Applications 4.1 Introduction to Mobile Databases - Need of databases in mobile applications - Types of mobile databases - Advantages of local data storage 4.2 SQLite Database Fundamentals - Introduction to SQLite - Creating Database and Tables - Data Types in SQLite - SQL Commands Basics 4.3 CRUD Operations in SQLite - Insert Records - Read/View Records - Update Records - Delete Records 4.4 Data Storage Techniques - Shared Preferences - File Storage Basics - Internal and External Storage	6	CO4

REFERENCE BOOKS:

1. Phillips, B., Stewart, C., & Marsicano, K. (2024). Android Programming: The Big Nerd Ranch Guide (5th ed.). Big Nerd Ranch. ISBN: 9780137645541.
2. Griffiths, D., & Griffiths, D. (2021). Head First Android Development (3rd ed.). O'Reilly Media. ISBN: 9781492076520.
3. Meier, R., & Lake, I. (2018). Professional Android (5th ed.). Wrox Press. ISBN: 9781118949528.
4. Felker, D. (2015). Android Application Development for Dummies (3rd ed.). Wiley. ISBN: 9781119000693.
5. Lee, W.-M. (2018). Beginning Android Application Development (5th ed.). Wiley India/Wrox. ISBN: 9781119403678.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	-	2	1	2
CO2	3	3	2	1	3	1	2
CO3	3	3	3	2	3	2	2
CO4	3	3	3	2	3	1	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	
End Semester Examination (30)	✓	✓	✓	✓	✓	

SEMESTER: VI

BCA-DSC-362 Lab on Mobile Application development

Course Title: Lab on Mobile Application development
Course Code: BCA-DSC-362
Lectures: Tutorials: Practical: 0:0:2
Lecture Hours: 24 Hrs

Course Type: DSC
Total Credits: 02
CIE Marks: 20
ESE Marks: 30

Course Description:

This laboratory course provides practical exposure to Android mobile application development using Android Studio. Students will design and develop mobile applications using UI components, activities, intents, databases, Firebase, multimedia, and API integration techniques through hands-on experiments and mini-projects.

Course Objectives:

1. To introduce students to Android mobile application development concepts and tools.
2. To develop skills for designing interactive and user-friendly mobile application interfaces.
3. To provide practical knowledge of implementing advanced mobile application features and APIs.
4. To enable students to develop database-driven mobile applications using SQLite and Firebase.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

- CO1 Develop basic Android applications using Android Studio and UI components.
- CO2 Design interactive mobile application user interfaces using layouts, activities, intents, and event handling.
- CO3 Implement advanced mobile application features such as RecyclerView, multimedia, notifications, and API integration.
- CO4 Develop database-driven mobile applications using SQLite and Firebase for data storage and management.

SN	Practical List
1.	Create a simple Android application to display "Hello World" using a Toast Message.
2.	Design a user interface using TextView, EditText, Button, and ImageView controls.
3.	Implement event handling for Button controls and display messages using Toast.
4.	Implement event handling for Radio Buttons and Check Boxes to capture user selections.
5	Create a simple calculator application to perform basic arithmetic operations (Addition, Subtraction, Multiplication, and Division).
6	Develop an application to demonstrate the Activity Lifecycle methods and display lifecycle state changes using Toast messages.
7	Create an application using Explicit Intent to navigate between two activities.
8	Develop an application using Explicit Intent to pass and display data between activities.
9	Create an application using Implicit Intent to open a website in a web browser based on the URL entered in an EditText control.
10	Design an application using Menus, Alert Dialogs, and Shared Preferences to store and retrieve simple user information.
11	Create a list-based application using ListView or RecyclerView

12	Develop an application demonstrating Fragments and basic navigation
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Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	-	2	-	1
CO2	2	2	3	1	3	-	1
CO3	2	3	2	2	3	-	1
CO4	3	3	3	2	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	✓
End Semester Examination (30)	✓	✓	✓	✓	✓	✓

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FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: VI

BCA-DSC-363 Cloud Computing

Course Title: Cloud Computing

Course Code: BCA-DSC-363

Lectures: Tutorials: Practical: 4:0:0

Lecture Hours: 48 Hours

Course Type: DSC

Total Credits: 04

CIE Marks: 40

ESE Marks: 60

Course Description:

This course introduces the concepts, architecture, technologies, services and applications of cloud computing. Students will learn virtualization, cloud deployment models, cloud storage, cloud security, cloud platforms and modern cloud technologies used in industrial and enterprise environments. The course also focuses on practical cloud based applications and emerging trends in cloud computing.

Course Objectives:

1. To understand the fundamentals of cloud computing and virtualization.
2. To study cloud service models and deployment models.
3. To learn cloud storage and resource management concepts.
4. To understand cloud security and privacy mechanisms.
5. To explore cloud platforms and industrial cloud applications.
6. To study emerging trends and technologies in cloud computing.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓			✓		✓	✓

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

CO1	Understand cloud computing concepts, architecture and virtualization techniques.
CO2	Explain cloud service models, deployment models and cloud platforms.
CO3	Apply cloud storage and resource management techniques
CO4	Analyse cloud security, privacy and reliability issues.
CO5	Use cloud technologies and cloud platforms for industrial applications.
CO6	Develop and manage cloud based applications using modern cloud tools.

SN	Contents of Module	Hrs	COs
1	UNIT I: Introduction to Cloud Computing 1. 1 Basics of Cloud Computing 1. 2 Characteristics of Cloud Computing 1. 3 Advantages and Challenges 1. 4 Evolution of Cloud Computing 1. 5 Cloud Architecture	8	CO1
2	UNIT II: Cloud Service Models and Deployment Models 2. 1 Infrastructure as a Service (IaaS) 2. 2 Platform as a Service (PaaS) 2. 3 Software as a Service (SaaS) 2. 4 Public Cloud, Private Cloud 2. 5 Hybrid Cloud, Community Cloud 2. 6 Applications of Cloud Computing.	8	CO2

SN	Contents of Module	Hrs	COs
3	UNIT III: Virtualization 3.1 Introduction to Virtualization 3.2 History of Virtualization 3.3 Types of Virtual Machines 3.4 Advantages of Virtualization 3.5 Types of Virtualization 3.6 Introduction to Hypervisors	8	CO3
4	UNIT IV: Cloud Security and Privacy 4.1 Basic Security Problems in Cloud Computing 4.2 User Login and Access Control 4.3 Data Protection and Encryption 4.4 User Identity Management 4.5 Secure Cloud System Design 4.6 Rules, Policies, and Risk Management	8	CO4
5	UNIT V: Cloud Platforms and Industrial Applications 5.1 Introduction to AWS 5.2 Introduction to Microsoft Azure and Google Cloud 5.3 Basics of Cloud APIs 5.4 Cloud Migration Techniques 5.5 Cloud Monitoring Tools 5.6 Applications of Cloud in Industries 5.7 Cloud Based Web Applications and Online Services.	8	CO5
6	UNIT VI: Emerging Trends in Cloud Computing 6.1 Introduction to Edge Computing 6.2 Internet of Things (IoT) and Cloud Computing 6.3 Basics of Serverless Computing 6.4 Basics of Docker and Kubernetes Basics 6.5 Artificial Intelligence in Cloud Computing 6.6 Future Trends in Cloud Computing	8	CO6

REFERENCE BOOKS:

1. Rajkumar Buyya, James Broberg, Andrzej Goscinski, Cloud Computing: Principles and Paradigms, Wiley, ISBN: 978-0470887998.
2. Thomas Erl, Eric Barcelo Monroy, Cloud Computing: Concepts, Technology, Security, and Architecture, 2nd Edition, Pearson, 2023, ISBN: 978-0138057855.
3. Kai Hwang, Jack Dongarra, Geoffrey Fox, Distributed and Cloud Computing: From Parallel Processing to the Internet of Things, Morgan Kaufmann, ISBN: 978-0123858801.
4. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, Mastering Cloud Computing, McGraw-Hill, ISBN: 978-1259029950.
5. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, Cloud Computing: A Practical Approach, McGraw-Hill, ISBN: 978-0071626941.
6. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Pearson, ISBN: 978-0789738035.

Web Resources

1. <https://docs.cloud.google.com/>— Google Cloud platform documentation and learning resources.
2. <https://kubernetes.io/>— Kubernetes concepts, deployment, and orchestration.
3. <https://www.cncf.io/>— Cloud-native technologies and ecosystem resources.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	-	-	1	-	-
CO2	2	2	1	-	2	-	-
CO3	2	1	-	2	2	1	-

CO4	1	1	-	2	2	1	1
CO5	2	1	2	1	3	1	1
CO6	2	2	2	1	3	1	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation.(40)	✓	✓	✓	✓	✓	-
End Semester Examination(60)	✓	✓	✓	✓	✓	-

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B.C.A. PROGRAMME BATCH 2024-28

SEMESTER: VI

BCA-DSC-364 Lab on Cloud Computing

Course Title: Lab on Cloud Computing

Course Code: BCA-DSC-364

Lectures: Tutorials: Practical: 0:0:2

Lecture Hours: 24 Hrs

Course Type: DSC

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This course introduces the fundamental concepts of Cloud Computing, including cloud architecture, service models, deployment models, and virtualization. It covers cloud security, storage, migration, and leading cloud platforms such as AWS, Microsoft Azure, and Google Cloud. The course also explores emerging technologies like Docker, Kubernetes, Serverless Computing, IoT, and Edge Computing. Through theoretical concepts and practical exercises, students will develop the knowledge and skills required to understand and implement cloud-based solutions.

Course Objectives:

1. To introduce the fundamental concepts, characteristics, architecture, and evolution of Cloud Computing.
2. To develop an understanding of cloud service models, deployment models, and virtualization technologies.
3. To familiarize students with cloud security, data management, cloud storage, and migration techniques.
4. To provide practical knowledge of leading cloud platforms such as AWS, Microsoft Azure, and Google Cloud Platform (GCP).

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
	✓			✓		✓	✓

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

CO1	Understand the fundamental concepts, architecture, and service models of Cloud Computing.
CO2	Apply cloud deployment models, virtualization, and cloud platforms to organizational needs.
CO3	Implement cloud services and virtualization tools for real-world applications.
CO4	Analyze cloud security, data protection, and migration strategies.

SN	Practical Assignments
1.	Study the basics of Cloud Computing, Cloud Architecture, and Service Models (IaaS, PaaS, SaaS) using real-life cloud applications.
2.	Create and manage files using Google Drive, Google Docs, Google Sheets, and Google Forms.
3.	Install Oracle VirtualBox and create a Virtual Machine.
4.	Install Ubuntu Linux on VirtualBox and perform basic file management, user management, and software installation.
5.	Create a GitHub account and host a simple static website using GitHub Pages.

6.	Install Docker Desktop and run basic Docker containers using simple Docker commands.
7.	Perform cloud security tasks using Google Account Security, including Password Management, Two-Step Verification, and Security Check-up.
8.	Compare Google Drive, Microsoft OneDrive, and Dropbox based on storage, file sharing, and collaboration features.
9.	Study Edge Computing, IoT, Serverless Computing, and Kubernetes through online demonstrations and educational videos.
10.	Study industrial applications of Cloud Computing through case studies of Google, Amazon, Netflix, Microsoft Azure, and other cloud-based services.

REFERENCE BOOKS:

1. Thomas Erl, Ricardo Puttini, and Zaigham Mahmood, Cloud Computing: Concepts, Technology & Architecture, Pearson Education, 1st Edition, 2013. ISBN: 978-0133387520.
2. Rajkumar Buyya, James Broberg, and Andrzej Goscinski, Cloud Computing: Principles and Paradigms, Wiley, 1st Edition, 2011. ISBN: 978-0470887998.
3. Anthony T. Velte, Toby J. Velte, and Robert Elsenpeter, Cloud Computing: A Practical Approach, McGraw-Hill Education, 1st Edition, 2010. ISBN: 978-0071626941.
4. Rajkumar Buyya, Christian Vecchiola, and S. Thamarai Selvi, Mastering Cloud Computing: Foundations and Applications Programming, McGraw-Hill Education, 1st Edition, 2013. ISBN: 978-1259029950.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	-	-
CO2	3	3	2	2	3	-	-
CO3	3	3	2	2	3	1	1
CO4	2	3	1	3	3	2	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓		✓
End Semester Examination (30)	✓	✓	✓	✓		✓

SEMESTER: VI
BCA-DSE-365(A) Machine Learning

Course Title: Machine Learning
Course Code: BCA-DSE-365(A)
Lectures: Tutorials: Practical: 2:0:0
Lecture Hours: 24 Hours

Course Type: DSE
Total Credits: 02
CIE Marks: 20
ESE Marks: 30

Course Description:

This course covers the core concepts, workflows, and algorithms of Machine Learning from data collection to deployment. Students will master the ML lifecycle, focusing on data pre-processing, regression models, key clustering techniques, and core classifiers like KNN, SVM, and Naïve Bayes. By introducing neural network basics and real-world case studies, the course prepares students to frame and solve complex, data-driven engineering problems.

Course Objectives:

1. Understand the fundamental concepts, history, types, and real-world applications of Machine Learning.
2. Learn dataset structures, data pre-processing methods, and the stages of the Machine Learning lifecycle.
3. Master the theoretical principles and practical implementation of Simple and Multiple Linear Regression models.
4. Explore and analyze algorithm classification, clustering taxonomies, and the fundamentals of Logistic Regression, KNN, SVM, and Naïve Bayes.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

CO1	Explain the foundational concepts, historical evolution, core types, and industrial applications of Machine Learning.
CO2	Apply data pre-processing methods and manage dataset structures within the stages of the Machine Learning lifecycle.
CO3	Implement and evaluate Simple and Multiple Linear Regression models to analyze numerical trends and dependencies.
CO4	Categorize machine learning algorithms and differentiate between core clustering techniques, study of Logistic Regression, KNN, SVM, and Naïve Bayes classifiers.

SN	Contents of Module	Hrs	COs
1.	UNIT –I Introduction to Machine Learning 1. 1 What is Machine Learning? 1. 2 History of Machine Learning 1. 3 Need of Machine Learning 1. 4 Features of Machine learning 1. 5 Applications of Machine learning 1. 6 Types of Machine Learning 1. 7 Real-World Examples of Machine Learning	06	CO1
2.	UNIT –II Datasets and the Machine Learning Lifecycle 2. 1 Definition and Structure of a Dataset 2. 2 Classification of Data Types within Datasets 2. 3 The Importance and Utility of Quality Data 2. 4 Steps of the Machine Learning Lifecycle 2. 5 Practical Data Pre-processing Methods	06	CO2

	2. 6 Artificial Intelligence vs. Machine Learning 2. 7 Introduction to the Fundamentals of Neural Networks		
3.	UNIT –III Learning with Regression 3. 1 Foundations of Regression Analysis 3. 2 Purpose and Core Objectives of Regression 3. 3 Classification and Types of Regression Techniques 3. 4 Principles of Linear Regression in Machine Learning 3. 5 Concepts and Implementation of Multiple Linear Regression 3. 6 Theoretical Introduction to Logistic Regression in Machine Learning	06	CO3
4.	UNIT-IV Core Machine Learning Algorithms 4. 1 Categorization and Classification of Machine Learning Algorithms 4. 2 Core Concepts and Foundations of Clustering Analysis 4. 3 Primary Taxonomy and Types of Clustering Methods 4. 4 Foundations and Application of the K-Nearest Neighbor (KNN) Algorithm 4. 5 Principles and Architecture of Support Vector Machines (SVM) 4. 6 Theoretical Framework and Implementation of the Naïve Bayes Classifier	06	CO4

REFERENCE BOOKS:

1. Giuseppe Bonaccorso, Machine Learning Algorithms, 2nd Edition, Packt Publishing, ISBN-13: 978-1789347999.
2. Andreas C. Müller and Sarah Guido, Introduction to Machine Learning with Python: A Guide for Data Scientists, 1st Edition, O'Reilly Media, ISBN-13: 978-1449369415.
3. Peter Flach, Machine Learning: The Art and Science of Algorithms that Make Sense of Data, 2012 Edition, Cambridge University Press, ISBN-13: 978-1107422223.
4. Tom Mitchell, Machine Learning, 1st Edition, McGraw Hill, ISBN-13: 978-0070428072.
5. Nithin Buduma, Nikhil Buduma, and Joe Papa, Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms, 2nd Edition, O'Reilly Media, ISBN-13: 978-1492082187 (Indian Edition ISBN-13: 978-9355420121).

Digital / Web References

1. Prof. Balaraman Ravindran (IIT Madras), Introduction to Machine Learning, National Programme on Technology Enhanced Learning (NPTEL) Course Repository. Available online: <https://www.nptel.ac.in/courses/106106139>
2. GeeksforGeeks, Machine Learning Tutorial: Lifecycle, Core Algorithms, and Implementations. Available online: <https://www.geeksforgeeks.org/machine-learning/>
3. Tutorialspoint, Machine Learning Complete Text Tutorial: Concepts, Lifecycle, and Algorithmic Frameworks. Available online: https://www.tutorialspoint.com/machine_learning/index.htm

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	-	-	2	2	3
CO2	2	1	-	2	2	3	3
CO3	3	2	-	1	2	3	3
CO4	2	1	-	-	2	3	3

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓	✓	✓	
End Semester Examination (60)	✓	✓	✓	✓	✓	

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. PROGRAMME BATCH 2024-28

SEMESTER: VI

BCA-DSE-365(B) Data Analytics-II

Course Title: Data Analytics-II

Course Code: BCA-DSE-365(B)

Lectures: Tutorials: Practical: 2:0:0

Lecture Hours: 24 Hours

Course Type: DSE

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This course introduces students to the fundamentals of Exploratory Data Analysis (EDA) and Business Intelligence (BI) using industry-standard tools and techniques. Students learn how to collect, inspect, clean, transform, and visualize data to extract meaningful insights for decision-making. The course covers the use of Python (NumPy, Pandas, and Matplotlib) for basic data analysis, Power BI for interactive reporting and dashboard development, and Tableau for effective data visualization and storytelling. Through hands-on practical exercises and real-world datasets, students develop the skills required to analyze data, create interactive dashboards, and communicate analytical findings effectively. The course provides a strong foundation for further studies in data analytics, business intelligence, and data science.

Course Objectives:

1. Understand the fundamentals of Exploratory Data Analysis (EDA) and the role of data visualization in decision-making.
2. Apply Python libraries such as NumPy and Pandas to perform basic data analysis and data preprocessing.
3. Develop interactive reports and dashboards using Power BI and Tableau for effective data visualization.
4. Analyze datasets and communicate business insights through visualizations and dashboards to support informed decision-making.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓	✓	✓	✓	✓	✓

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

CO1	Understand the fundamentals of Exploratory Data Analysis (EDA) and perform basic data analysis using Python libraries such as NumPy and Pandas
CO2	Clean, transform, and visualize data using Power BI to create basic interactive reports and dashboards.
CO3	Create charts, dashboards, and simple data stories using Tableau for effective data visualization.
CO4	Analyze datasets, interpret business insights, and develop interactive dashboards using Python, Power BI, or Tableau to support decision-making.

SN	Contents of Module	Hrs	COs
1.	UNIT – I: Fundamentals of EDA Using Python 1.1 Introduction to Data Analytics and Exploratory Data Analysis (EDA) 1.2 Importance and Applications of EDA 1.3 Types of EDA: Univariate and Bivariate Analysis 1.4 Introduction to Python for Data Analytics 1.5 Python Libraries: NumPy, Pandas, and Matplotlib 1.6 Working with Data Frames 1.7 Data Inspection using head(), tail(), info(), describe(), isna(), and drop_duplicates()	6	CO1

	1.8 Basic Data Visualization: Bar Chart, Line Chart, Pie Chart, Histogram, and Scatter Plot		
2.	UNIT – II: Power BI for Data Analysis 2.1 Introduction to Power BI 2.2 Power BI Desktop Interface 2.3 Importing Data from Excel and CSV Files 2.4 Data Cleaning using Power Query Editor 2.5 Handling Missing Values and Duplicate Records 2.6 Data Transformation (Filtering, Sorting, Splitting Columns) 2.7 Creating Visualizations: Bar Chart ,Pie Chart ,Line Chart 2.8 Using Filters and Slicers 2.9 Introduction to Dashboards	6	CO2
3.	UNIT – III: Tableau Fundamentals 3.1 Introduction to Tableau 3.2 Tableau Interface and Workspace 3.3 Connecting Tableau to Excel and CSV Data Sources 3.4 Data Sorting and Filtering 3.5 Creating Visualizations: Bar Chart ,Line Chart ,Pie Chart ,Scatter Plot, Tree Map 3.6 Creating Dashboards 3.7 Basic Data Storytelling	6	CO3
4.	UNIT – IV: Dashboard Design and Business Analytics 4.1 Principles of Effective Dashboard Design 4.2 Interactive Dashboards in Power BI and Tableau 4.3 Publishing and Sharing Dashboards 4.4 Business Intelligence Concepts 4.5 Data Interpretation and Decision Making	6	CO4

REFERENCE BOOKS:

1. **Wes McKinney**, *Python for Data Analysis*, 3rd Edition, O'Reilly Media, 2022
2. **Cole Nussbaumer Knafl**, *Storytelling with Data: A Data Visualization Guide for business Professionals*, Wiley, 2015.
3. **Joshua N. Milligan**, *Learning Tableau 2022*, 5th Edition, Packt Publishing, 2022.
4. **Foster Provost and Tom Fawcett**, *Data Science for Business*, 2nd Edition, O'Reilly Media, 2023.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	-	-	2	3	2
CO2	2	-	-	-	3	3	1
CO3	2	-	-	-	3	3	1
CO4	3	1	-	-	3	3	2

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)		✓	✓	✓	✓	✓

End Semester Examination (30)		✓	✓	✓	✓	✓
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KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: VI

BCA-DSE-366(A) Lab on Machine Learning

Course Title: Lab on Machine Learning

Course Type: DSC

Course Code: BCA-DSC-366(A)

Total Credits: 02

Lectures: Tutorials: Practical: 0:0:2

CIE Marks: 20

Lecture Hours: 24 Hours

ESE Marks: 30

Course Description:

This practical course introduces students to the fundamentals of Machine Learning using Python. Students will perform data pre-processing, visualization, regression analysis, clustering, and classification using algorithms such as KNN, Naïve Bayes, and SVM, enabling them to solve basic real-world data-driven problems.

Course Objectives:

1. Understand the fundamental concepts, history, types, and real-world applications of Machine Learning.
2. Learn dataset structures, data pre-processing methods, and the stages of the Machine Learning lifecycle.
3. Master the theoretical principles and practical implementation of Simple and Multiple Linear Regression models.
4. Explore algorithm classification, clustering taxonomies, and the fundamentals of Logistic Regression, KNN, SVM, and Naïve Bayes.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

CO1	Explain the foundational concepts, historical evolution, core types, and industrial applications of Machine Learning.
CO2	Apply data pre-processing methods and manage dataset structures within the stages of the Machine Learning lifecycle.
CO3	Implement and evaluate Simple and Multiple Linear Regression models to analyze numerical trends and dependencies.
CO4	Categorize machine learning algorithms and differentiate between core clustering techniques and Logistic Regression. Analyze the underlying operational mechanics and architectural principles of KNN, SVM, and Naïve Bayes classifiers.

SN	Practical Assignments
1.	Write a Python program to calculate Mean, Median, and Mode of a given dataset.
2.	Write a Python program to generate and visualize a Normal Distribution using Matplotlib.
3.	Write a Python program to load a CSV file into a Pandas DataFrame and display dataset information
4.	Write a Python program to perform data preprocessing by handling missing values.
5.	Write a Python program to apply One-Hot Encoding on categorical data.
6.	Write a Python program to create Line, Bar, Histogram, and Scatter Plots using Matplotlib.
7.	Write a Python program to implement Simple Linear Regression and plot the regression line.

8.	Write a Python program to implement Multiple Linear Regression and make predictions.
9.	Write a Python program to generate and visualize clusters using make_blobs().
10.	Write a Python program to implement the K-Nearest Neighbours (KNN) Algorithm for classification.
11.	Write a Python program to implement the Naïve Bayes Algorithm for classification.
12.	Write a Python program to implement the Support Vector Machine (SVM) Algorithm for classification.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	-	-
CO2	3	2	1	1	2	1	-
CO3	2	3	1	-	2	-	-
CO4	2	2	1	2	3	2	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	✓
End Semester Examination (30)	✓	✓	✓	✓	✓	✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. (Bachelor of Computer Application) PROGRAMME BATCH 2024-28

SEMESTER: VI

BCA-DSE-366(B) Lab on Data Analytics-II

Course Title: Lab on Data Analytics-II

Course Code: BCA-DSC-366(B)

Lectures: Tutorials: Practical: 0:0:2

Lecture Hours: 24 Hours

Course Type: DSC

Total Credits: 02

CIE Marks: 20

ESE Marks: 30

Course Description:

This practical course introduces students to **Python for data analytics**, **Power BI**, and **Tableau**. It covers data analysis using NumPy and Pandas, data cleaning and preprocessing, data visualization with Python, and the development of interactive reports and dashboards using Power BI and Tableau for effective data analysis and storytelling.

Course Objectives:

- Understand and apply Python programming libraries such as NumPy and Pandas for data analysis and preprocessing.
- Perform data cleaning, exploratory data analysis, and create visualizations using Python.
- Develop interactive reports and dashboards using Power BI by importing, transforming, and visualizing data.
- Design effective visualizations and dashboards in Tableau to communicate insights through data storytelling.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	✓

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

CO1	Apply Python libraries such as NumPy and Pandas to perform data analysis, manipulation, and preprocessing.
CO2	Conduct exploratory data analysis, clean datasets, and create meaningful visualizations using Python.
CO3	Develop interactive reports and dashboards in Power BI by importing, transforming, and visualizing data.
CO4	Design effective visualizations and dashboards in Tableau and communicate data-driven insights using storytelling techniques.

SN	Practical Assignments
1.	Introduction to Python Environment and NumPy Installation of Python, introduction to data analytics libraries, and basic array operations and statistical calculations using NumPy.
2.	Data Analysis using Pandas DataFrames Creating, accessing, and manipulating DataFrames using Pandas.
3.	Exploratory Data Analysis using Pandas Performing data inspection using head(), tail(), info(), describe(), isna(), and drop_duplicates() functions.
4.	Data Cleaning and Preprocessing using Python Handling missing values, duplicate records, and preparing datasets for analysis.

5.	Data Visualization using Python Creating Bar Chart, Line Chart, Pie Chart, Histogram, and Scatter Plot using Matplotlib.
6.	Introduction to Power BI and Data Import Exploring Power BI Desktop interface and importing data from Excel and CSV files.
7.	Data Cleaning and Transformation using Power Query Removing duplicates, handling missing values, filtering, sorting, and splitting columns.
8.	Creating Visualizations and Reports in Power BI Developing Bar Charts, Pie Charts, and Line Charts using Power BI.
9.	Creating Interactive Dashboards in Power BI Applying filters and slicers to build interactive dashboards.
10.	Introduction to Tableau and Data Connection Exploring Tableau interface and connecting Tableau with Excel and CSV datasets.
11.	Data Visualization using Tableau Creating Bar Charts, Line Charts, Pie Charts, Scatter Plots, and Tree Maps.
12.	Dashboard Creation and Data Storytelling using Tableau Designing dashboards and presenting insights using Tableau storytelling techniques.

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	-	-
CO2	3	2	1	1	2	1	-
CO3	2	3	1	-	2	-	-
CO4	2	2	1	2	3	2	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (20)	✓	✓	✓	✓	✓	✓
End Semester Examination (30)	✓	✓	✓	✓	✓	✓

KCES's Institute of Management and Research (Autonomous), Jalgaon

FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application

B.C.A. PROGRAMME BATCH 2024-27

SEMESTER: VI

BCA-MIN-367 - Enterprise Resource Planning

Course Title: Enterprise Resource Planning

Course Code: BCA-MIN-366

Lectures: Tutorials: Practical: 4:0:0

Lecture Hours: 48 Hours

Course Type: Minor

Total Credits: 4

CIE Marks: 40

ESE Marks: 60

Course Description:

This course provides a comprehensive understanding of Enterprise Resource Planning (ERP) systems, their evolution, implementation, and integration with modern business processes. It covers ERP modules, related technologies like SCM, MIS, DSS, and emerging trends, helping students understand how organizations use ERP to improve efficiency and decision-making.

Course Objectives:

1. Understand the concept, evolution, and importance of ERP systems.
2. Learn about ERP modules and their applications in business.
3. Analyze ERP-related technologies such as MIS, DSS, SCM, and data warehousing.
4. Understand ERP implementation lifecycle and methodologies.
5. Explore ERP market trends and future directions.
6. Gain knowledge of SCM-related technologies and e-business integration.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓		✓		✓	

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

After completing the course, students will be able to:

CO1	Explain the basic concepts, evolution, and need for ERP systems.
CO2	Identify and describe various ERP modules and their business applications.
CO3	Analyze ERP-related technologies such as BPR, MIS, DSS, SCM, and OLAP.
CO4	Understand ERP implementation lifecycle, including planning, testing, and deployment.
CO5	Evaluate different ERP packages and market trends.
CO6	Apply knowledge of SCM technologies and e-commerce integration in business scenarios.

SN	Contents of Module	Hrs	COs
1.	UNIT –I Introduction to ERP 1.1 Evolution of ERP 1.2 What is ERP? 1.3 Reasons for the Growth of ERP 1.4 Scenario and Justification of ERP in India 1.5 Evaluation of ERP 1.6 Various Modules of ERP 1.7 Advantages of ERP 1.8 Applications of ERP	6	CO1

	1.9 Integrated Data Model & Management Information 1.10 Business Modeling		
2.	UNIT –II ERP and Related Technologies 2.1 ERP and Related Technologies 2.2 Business Process Reengineering (BPR) 2.3 Management Information System (MIS) 2.4 Executive Information System (EIS) 2.5 Decision Support System (DSS) 2.6 Supply Chain Management (SCM) 2.7 Data Warehousing, Data Mining, and On-Line Analytical Processing (OLAP)	8	CO2
3.	UNIT –III Overview of Enterprise & ERP Functional Modules 3.1 An Overview of Enterprise 3.2 Integrated Management Information 3.3 Business Modeling 3.4 ERP for Small Business 3.5 ERP for Make to Order Companies 3.6 Business Process Mapping for ERP Module Design 3.7 Hardware Environment and its Selection for ERP Implementation 3.8 Materials Management 3.9 Human Resources (HRM) 3.10 Quality Management	10	CO3
4.	UNIT –IV ERP Market & Future Directions in ERP 4.1. Introduction, SAP AG, Baan Company, Oracle Corporation, People Soft, JD Edwards World Solutions Co, System Software Associates, Inc. (SSA) 4.2.QAD 4.3. A Comparative Assessment and Selection of ERP Packages and Modules. 4.4. New Markets 4.5. New Channels 4.6. Faster Implementation Methodologies	10	CO4
5.	UNIT –V ERP Implementation Lifecycle 5.1 Issues in Implementing ERP Packages 5.2 Pre-evaluation Screening 5.3 Package Evaluation 5.4 Project Planning Phase: Gap Analysis, Reengineering ,Configuration, Implementation, Team Training, Testing, Going Live, End-User Training, Post Implementation (Maintenance Mode).	8	CO5
6.	UNIT –VI Other Related Technologies of SCM 6.1 E-Procurement 6.2 E-Logistics 6.3 Internet Auctions 6.4 E-markets 6.5 Electronic Business Process Optimization 6.6 Business Objects in SCM 6.7 E-Commerce	6	CO6

REFERENCE BOOKS:

1. Enterprise Resource Planning: A Managerial Perspective — Veena Bansal, Pearson India, 1st Edition, 2024, ISBN: 9781306254311.
2. Compendium on Enterprise Resource Planning: Market, Functional and Conceptual View based on SAP S/4 HANA — Siar Sarferaz, Springer Nature, 1st Edition, 2022, ISBN: 9783030938550.
3. Enterprise Resource Planning — Norbert Gronau, De Gruyter Oldenbourg, 4th Edition, 2021, ISBN: 9783110663396.
4. Concepts in Enterprise Resource Planning — Bret Wagner & Ellen Monk, Cengage Learning, 4th Edition, Current Release, ISBN: 9788131525920.

Mapping of Course Outcomes to Program Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	–	1	2	–	–
CO2	2	1	1	2	3	–	–
CO3	2	1	1	2	3	2	2
CO4	2	1	1	1	3	–	–
CO5	1	–	–	1	3	1	1
CO6	2	1	2	1	3	2	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓	✓	✓	
End Semester Examination (60)	✓	✓	✓	✓	✓	

KCES's Institute of Management and Research (Autonomous), Jalgaon
FACULTY OF SCIENCE AND TECHNOLOGY, School of Computer Application
B.C.A. PROGRAMME BATCH 2024-28

SEMESTER: VI

BCA-OJT-368 Industrial Training

Course Title: Industrial Training

Course Code: BCA-OJT-367

Practical: 120 Hours

Course Type: OJT

Total Credits: 04

CIE Marks: 40

ESE Marks: 60

Course Description:

On-the-Job Training (OJT) provides practical exposure to professional IT environments. It helps students develop technical skills in programming, web technologies, databases, and networking along with communication, teamwork, problem-solving, and adaptability skills. Through real-world experience, students understand workplace culture, professional responsibilities, and emerging technologies in the IT industry. OJT enhances confidence, employability, and career readiness by allowing students to apply theoretical knowledge in actual job conditions. The OJT conducted in collaboration with industry should be of 120 hours.

Course Objectives:

1. To provide practical exposure in software development, web technologies, databases, and networking through OJT.
2. To develop communication, teamwork, problem-solving, and professional skills in IT environments.
3. To familiarize students with workplace culture, organizational structure, and professional ethics in the IT industry.
4. To enhance confidence, creativity, and decision-making through hands-on learning experiences.
5. To introduce students to various career opportunities and emerging trends in computer applications.
6. To apply theoretical knowledge of computer applications in real-world professional settings.

Teaching/ Evaluation Pedagogy

Chalk & Talk	ICT Tools	Group Discussion	Case Study	Guest Session	Survey	Assignment	Lab
✓	✓	✓	✓	✓	✓	✓	✓

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

CO1	Apply programming, database, and computer application concepts to real-world IT tasks and projects.
CO2	Understand workplace culture, professional ethics, and responsibilities in IT and software industries.
CO3	Use modern software tools, technologies, and emerging IT applications effectively.
CO4	Develop problem-solving and analytical skills for handling practical computing challenges.
CO5	Work effectively in teams to design, develop, and complete collaborative IT projects.
CO6	Improve technical, communication, and professional skills for higher studies and career opportunities in computer applications.

<i>Contents of Module</i>	
Process of Implementation • Appointment of OJT Internal guides from faculty members. • Students are required to complete the OJT on a full-time basis during the vacation period after the Semester 5 examinations. • The OJT must be completed within 25 days, with a minimum of 6 working hours per day.	
Suggested Areas for OJT Note: The list is suggestive in nature and may include other relevant areas related to Computer Applications and IT industries. • Information Technology (IT), IT Enabled Services and Electronics • Agricultural Fields • Digitization and Emerging Technologies (AI, ML, IoT, AR/VR, Deep Learning) • Banking, Financial Services and Insurance • Commerce and Small-Scale Industries • Retail and Consumer Goods • Logistics, Automotive and Capital Goods • Healthcare and Life Science • Education • Communication and Media • Tourism and Hospitality • Sports, Wellness and Physical Education • Trade and Agriculture • Handcraft, Art, Design and Music • Sustainable Development • Humanitarian, Public Policy and Legal Services	
OJT Required Documents 1. Submit Joining Letter 2. Resume 3. Maintain Daily Attendance Sheet 4. Obtain OJT Evaluation Report 5. Collect OJT Completion Certificate 6. Prepare and Submit OJT Report 7. Submit OJT Feedback Form	
Project Report Format <u>Cover Page Contents</u> • Title of the Report: <i>On-the-Job Training Report</i> • Name of the Student • Program and Semester • Name of the Organization/Company • Department/Division of Training • Duration of Training (Start Date to End Date) • Date of Submission • Name of Institute	
<u>Detailed Documentation Format</u> 1. Certificate 2. Declaration by Student 3. Introduction 4. Company/Organization Overview 5. Objectives of OJT Training 6. Work Performed During Training 7. Software Tools and Technologies Used	

8. Skills Developed
9. Projects/Tasks Completed (screen shots)
10. Challenges Faced
11. Solutions/Results
12. Conclusion
13. Future Scope
14. Appendices
 - Appendix I – OJT Undertaking
 - Appendix II – Resume
 - Appendix III – Joining/Confirmation Letter
 - Appendix IV – Daily Work Log/Attendance
 - Appendix V – OJT Completion Certificate
14. References

Mode of Evaluation

The evaluation of OJT will be based on practical performance, technical skills, project work, and professional conduct. The assessment will be conducted in the ratio of 60:40 for External and Internal Evaluation. Students will complete OJT under the guidance of an industry supervisor and faculty guide.

Evaluation Components**External Evaluation (60%)**

Maintain Daily Attendance Sheet: 10 M

Obtain OJT Evaluation Report: 10 M

Collect OJT Completion Certificate: 10 M

Students must submit the OJT report and appear for Viva-Voce/Presentation: 30 M

Internal Evaluation (40%)

Evaluation by the faculty guide based on:

- Quality of OJT report: 20 M
- Presentation and Viva-Voce: 20 M

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	3	2	1	1
CO2	1	1	1	1	3	1	1
CO3	3	2	3	2	3	2	2
CO4	3	3	2	2	2	2	2
CO5	2	1	2	1	3	1	1
CO6	2	1	1	1	3	1	1

Assessment Pattern

Bloom's Category	Remember	Understand	Apply	Analyze	Evaluate	Create
Continuous Internal Evaluation. (40)	✓	✓	✓	✓	✓	✓
End Semester Examination (60)	✓	✓	✓	✓	✓	✓

Seat No.							Security Code	
Subject Code Subject Name								
Total Pages: 00 Time: 2 Hours							Max. Marks: 60	
Instructions to Candidates: 1. Do not write anything on question paper except seat number. 2. Answer sheet should be written with BLUE/BLACK ink only. 3. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil. 4. Student should note, no supplement will be provided. 5. Figures to the right indicate full marks. 6. Attempt any five questions from following.								
		SECTION I					Marks	CO
Que.1	A						6	
	B						6	
Que.2	A						6	
	B						6	
Que.3	A						6	
	B						6	
Que.4	A						6	
	B						6	
Que.5	A						6	
	B						6	
Que.6	A						6	
	B						6	
Que.7	A						6	

	B		6	
Que.8	A		6	
	B		6	

Seat No.							Security Code	
Subject Code Subject Name								
Total Pages: Time: One and Half Hours							Max. Marks: 30	
Instructions to Candidates: 1. Do not write anything on question paper except seat number. 2. Answer sheet should be written with BLUE/BLACK ink only. 3. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil. 4. Student should note, no supplement will be provided. 5. Figures to the right indicate full marks. 6. Attempt any three questions from following.								
		SECTION I					Marks	CO
Que.1	A						5	
	B						5	
Que.2	A						5	
	B						5	
Que.3	A						5	
	B						5	
Que.4	A						5	
	B						5	
Que.5	A						5	
	B						5	
Que.6	A						5	
	B						5	