JAIPUR NATIONAL UNIVERSITY

A venture of The Seedling Group of Educational Institutions

Bachelor of Computer Application (BCA)

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PROGRAM PROJECT REPORT – BCA – Distance Mode

Contents

BCA – Distance Mode

1. Program Overview

1.1 Program's Mission and Objectives

The objective is to support students aspiring for careers in the IT sector, aiming for prominent roles in technology-driven multinational corporations (MNCs) and various other entities like e-commerce firms, banks, government agencies, networking companies, stock exchanges, and more across corporate sectors.

Our goals include:

- Offering a comprehensive and interdisciplinary educational foundation.
- Fostering social investigative skills and encouraging contributions from diverse individuals and communities.
- Guiding eager learners to engage in social responsibilities within both private and public sectors.
- Supplying knowledgeable and skilled workforce adaptable to the IT and IT-enabled services (ITES) industry.
- Meeting global demands by providing adept professionals to professional, industrial, and service sectors.
- Advocating for learners to gain extensive knowledge in humanities and social sciences for enhanced employment prospects.
- Providing opportunities for higher education to working professionals.

The BCA Programme is structured with the following distinct aims:

a) Attracting young individuals to the promising and lucrative realm of computer applications.
b) Establishing a foundational undergraduate Programme that serves as a precursor for advanced studies in Computer Science/Applications.
c) Cultivating proficiency in software development, empowering BCA graduates to pursue entrepreneurship opportunities in both the Indian and global software markets.
d) Providing training and resources to students, ensuring they meet the standards demanded by various industries.

1.2 Relevance of the Program with JNU's Vision and Mission

Jaipur National University (JNU) was established in 2007. JNU provides a world-class learning experience, with a highly accomplished faculty, numerous extracurricular activities, and a wide range of academic pursuits. The university fosters holistic development of students.

JNU with its vision to transform the Education Landscape of India and contribute to the maximum to improve the GER of India has plans to launch affordable and flexible education programs. Distance programs are an excellent way to launch affordable and flexible education programs in sync with the vision and mission of the university stated below:

University Vision:

To be a leader in creating unique and exclusive learning opportunities in all disciplines of study that ultimately lead to the advancement of learning and creation of a sustainable society and environment.

University Mission:

- Provide global opportunities of learning through broad and balanced academic programmes.
- Explore and hone the potential of stakeholders, develop their human and intellectual capacities to the fullest.
- Create and maintain excellence with high standard driven activities, universal significance and acknowledgement.
- Inculcate and keep track of the current trends and finest practices in education for constant growing and evolving.
- Leverage diversity of thoughts, ideas, and perspectives to enrich the stake holders.

1.3 Nature of Prospective Target Group of Students

The curriculum of B.C.A. is designed in such a way that it helps the students to become not only more employable but also encourage them to become entrepreneurs. Primarily the target group of learners will be:

- population living in remote areas where higher education institutes are not easily accessible.
- Learners who could not get admission in the regular mode due to limited intake capacity.
- Learners who are working and who desire to pursue higher education as a means for movement up the ladder.
- Learners who are unable to pursue Higher education due to social, financial and economic compulsions as well as demographic reasons.

1.4 Appropriateness of programs to be conducted in Distance mode to acquire specific skills and competence

The Bachelor of Computer Applications (BCA) program holds significant value for students aspiring to pursue professional opportunities in diverse industries, businesses, finance, and the civil service. Additionally, employers highly regard the BCA degree for various roles where proficiency in logical and quantitative reasoning is essential, such as software development, database management, and information technology consulting.

2. Procedure for Admission and Curriculum Transaction

The academic programs catered to candidates enrolled in the Distance mode of learning are facilitated by CDOE-JNU, with the backing of various faculties within the University. Eligibility criteria, course structure, detailed curriculum, program duration, and evaluation criteria are subject to approval by the Board of Studies and Academic Council, adhering to UGC guidelines for programs falling under the purview of Distance mode for degree conferment.

Below are the details of the admission procedure, eligibility criteria, fee structure, curriculum, program delivery, information about the Learning Management System (LMS), and assessments and evaluations.

2.1Procedure for Admission

Students who are seeking admission in programs offered by CDOE-JNUneed to apply through https://online.jnujaipur.ac.in/in the courses offered.

2.1.1 Minimum Eligibility Criteria for Admission

The minimum eligibility criteria for admission to the Distance BCA program require candidates to 10+2 (12th Standard) from a recognized Board, in accordance with UGC norms. Additionally, candidates must have secured at least 40% marks in the qualifying examination.

Candidates must also fulfill all documentation requirements as specified on the program's website for admission purposes. Failure to submit proof of eligibility within the stipulated timeframe specified by CDOE-JNU will result in the cancellation of admission. Prospective candidates are encouraged to carefully review all instructions provided on the website before proceeding with the application process.

2.1.2 Admission Process and Instructions: Learner Communication

The admission process for the students is provided below:

Step	Process	Particulars
Step 1	**Counselling**	Prospective students will receive guidance and counseling for their chosen program from designated and authorized counselors.
Step 2	**Registration on admission portal to get access to My Account.**	To initiate the registration process, prospective students are required to complete the application form by providing all necessary details and uploading mandatory documents.
Step 3	**Details of Document upload**	Student Uploads document as follows- <u>Personal Documents</u> Passport-size Photograph Student's Signature Aadhar Card (Back & Front) <u>Academic Documents</u> *UG Student -* 10th Marksheet 12th Marksheet *PG Student -* 10th Marksheet 12th Marksheet UG Marksheet Other Certificates (detailed list of documents is provided in **Annexure II**)
Step 4	**Verification of documents by the Deputy Registrar**	The Deputy Registrar is responsible for verifying all documents uploaded by prospective students on the admission portal. Within a timeframe of 48 hours, the Deputy Registrar will review and either approve or disapprove the eligibility of the prospective student for the chosen program.
Step 5	**Undertaking**	Student will sign Undertaking after Approval in Application.
Step 6	**Payment of fees**	All eligible students, duly approved by the Deputy Registrar, will get fees payment link activated in their My Account for payment. The Fee is payable through any of the following means: (a) UPI (b) Credit/Debit Card (c) Net-banking

		Note: Cash, bank demand draft and Cheques are not accepted
Step 7	**Enrolment**	After the payment of program fee, the eligible student will get the Enrolment number and access to the LMS within 21 days.
Step 8	**Access to Learning Management System (LMS)**	

General Instructions:

1. Prior to applying for programs, all students are advised to thoroughly read and comprehend the eligibility conditions provided in the student handbook document and outlined on the university website.
2. It is the responsibility of prospective learners to ensure that their educational or qualifying degree has been issued by a recognized university or board only. For learners from Indian higher education institutions, recognition by the regulatory authority of the Government of India is necessary. To verify degrees from recognized boards of education, refer to www.cobse.org.in/. For Polytechnic Diploma, check the respective State Board of Technical Education. Verification of degrees from recognized universities can be done at www.ugc.ac.in/. Foreign prospective learners should verify their institutions at www.aiu.ac.in/.
3. Prospective learners must verify their eligibility on the date of admission and ensure that they have passed the qualifying exams before the commencement of the admission batch.

Upon enrollment, students must register with the Academic Bank of Credits (ABC), a central scheme for depositing credit formulated by the Ministry of Education, Government of India. Creation of an Academic Bank of Credits (ABC) ID is mandatory for all students. (Refer to Annexure V for details).

2.1.3 Program Fee for the Academic Session beginning July 2024

Program fees for students pursuing BCA offered by CDOE-JNU is mentioned below:

Program	Academic Total Fees (INR)	Exam Fee
BCA	**54000**	**1500 per Semester**

2.2 Curriculum Transactions

2.2.1 Program Delivery

The curriculum is delivered through Self Learning Materials (SLMs) in the form of e-Contents, supplemented by a variety of learning resources including audio-video aids via the Learning Management System (LMS). Furthermore, the program includes contact hours featuring synchronous live interactive sessions conducted through the LMS, adhering to the current UGC norms for course delivery.

2.2.2 Learning Management System to support Distance mode of Course delivery

The Learning Management System (LMS) is available on URL https://lms.jnujaipur.ac.in/is meticulously developed to offer students a truly global learning experience. With a user-friendly interface, the LMS simplifies the learning process and ensures it meets the highest global standards. Utilizing audio-visual teaching methods, self-learning materials, and evaluation patterns, the platform stands out as unique and aligns seamlessly with both industry requirements and the UGC Guidelines.

Students can engage in uninterrupted learning 24x7 via web and mobile devices, allowing them to progress at their preferred pace. The LMS boasts a simple and intuitive user interface, facilitating easy navigation through the e-learning modules. Designed in accordance with standard norms, all learning tools are easily accessible, ensuring a perfect learning experience for all users.

2.2.3 Course Design

The curriculum is designed by a committee comprising experts from the parent department of the University and Industry experts, keeping in view the needs of the diverse groups of learners.

2.2.4 Academic Calendar for Academic Session beginning July 2024

Sr. No.	**Event**	**Session**	**Month (Tentative)**
1.	Commencement of semester	January	January
		July	July
2.	Enrol learner to Learning Management system	January	Within 21 working days from fee deposit and Eligibility confirmation
		July	
3.	Interactive Live Lectures for query	January	February to May

	resolution	July	August to November
4.	Assignment Submission	January	By April
		July	By October
5	Project Report Submission (Wherever applicable during Final semester)	January	Last week of April
		July	Last week of November
6	Term End Examination	January	May onwards
		July	December onwards
7	Result Declaration of End Term Examination	January	By June
		July	By January

3. Instructional Design

3.1 Curriculum Design

The curriculum is meticulously designed by experts in the field of Computer Science, incorporating contemporary topics and fostering environmental awareness. It has received approval from the Board of Studies, the Centre for Internal Quality Assurance (CIQA), and the University Academic Council.

3.2 Program Structure and detailed Syllabus

3.2.1 Program Structure

SEMESTER-I										
Theory					**Contact Per week**			**Evaluation**		
Semester	**Course Code**	**Course Category/(Core/ Elective)**	**Paper Title**	**Credits**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**
I	DBCACO101T24	CORE	'C' Programming Fundamentals	3	3	0	0	30	70	100
	DBCACO102T24	CORE	Fundamentals of Computers and PC Tools	3	3	0	0	30	70	100
	DBCACO103T24	CORE	Elementary Mathematics	3	3	0	0	30 30	70 70	100

	DBCASE104T24	SEC	Digital Electronics	3	3	0	0	30 30	70 70	100
	DBCAAE105T24	AEC	English-I	3	3	0	0	30 30	70 70	100
	*OE/GE	OE/GE	OE/GE	2	2	0	0	30	70	100
Practical										
I	DBCACO106P24	CORE	C Programming Lab	2	0	0	4	30	70	100
	DBCACO107P24	CORE	Office Automation Tool Lab	2	0	0	4	30	70	100
	DBCASE108P24	SEC	Digital Electronics Lab	2	0	0	4	30	70	100
TOTAL				**23**	**17**	**0**	**12**			**900**
	*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 1.									

Sr. NO.	Subject Code	Name of Subject
1	DBCAGE101T24	Understanding Prescription, Doses and doses forms
2	DBCAGE102T24	Dining etiquettes
3	DBCAGE103T24	Basics of Photography
4	DBCAGE104T24	Crime and society
5	DBCAGE105T24	Industrial Mathematics

SEMESTER-II										
Theory					**Contact Per week**			**Evaluation**		
Sem.	**Course Code**	**Course Category/(Core/ Elective)**	**Paper Title**	**Credits**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**
II	DBCACO201T24	CORE	Database Management System	3	3	0	0	30	70	100
	DBCACO202T24	CORE	Discrete Mathematics	3	3	0	0	30	70	100
	DBCACO203T24	CORE	Analysis of Algorithms and Data Structures	3	3	0	0	30	70	100

	DBCAVA204T24	VAC	Environment Science	2	2	0	0	30	70	100
	DBCASE205T24	SEC	HTML Programming	3	3	0	0	30	70	100
	*OE/GE	OE/GE	OE/GE	2	2	0	0	30	70	100
Practical										
II	DBCACO206P24	CORE	Database Management System Lab	2	0		0	4	30	70	100
	DBCACO207P24	CORE	Data Structures Using 'C' Lab	2	0		0	4	30	70	100
	DBCASE208P24	SEC	HTML Programming Lab with projects	2	0		0	4	30	70	100
TOTAL				**22**	**16**		**2**	**12**			**900**

*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 2.

Sr. NO.	Subject Code	Name of Subject
1	DBCAGE201T24	Introduction to Epidemiology
2	DBCAGE202T24	Basics of Baking
3	DBCAGE203T24	Videography
4	DBCAGE204T24	Sociology of Health
5	DBCAGE205T24	Nanotechnology

Semester	Course Code	Course Category	Paper Title	Credits	Contact Per week			Evaluation		
					L	T	P	Int.	Ext.	Total
Theory										
III	DBCACO301T24	CORE	Operating System	3	3	0	0	30	70	100
	DBCACO302T24	CORE	OOPS Using C++	3	3	0	0	30	70	100
	DBCACO303T24	CORE	Software Engineering	3	3	0	0	30	70	100
	DBCACO304T24	CORE	Computer Networks	3	3	0	0	30	70	100

	DBCASE305T24	SEC	MySQL (SQL/PL-SQL)	3	3	0	0	30	70	100
	GE3*	GE3	GE3*	2	2	0	0	30	70	100
Practical										
III	DBCACO306P24	CORE	Operating Systems Lab	2	0	0	4	30	70	100
	DBCACO307P24	CORE	OOPs Using C++ Lab	2	0	0	4	30	70	100
	DBCACO308P24	CORE	Software Engineering Lab	1	0	0	2	30	70	100
	DBCASE309P24	SEC	MySQL (SQL/PL-SQL) Lab with Projects	1	0	0	2	30	70	100
TOTAL				**23**	**17**	**0**	**12**			**1000**

*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 3.

S. No.	Subject Code	Name of Subject
1	DBCAGE301T24	Public Health Pharmacy
2	DBCAGE302T24	Rajasthan and Punjabi cuisine
3	DBCAGE303T24	Script writing for film
4	DBCAGE304T24	Sociology of Media
5	DBCAGE305T24	Research Methodology

Semester	Course Code	Course Category	Paper Title	Credits	Contact Per week			Evaluation		
					L	T	P	Int.	Ext.	Total
Theory										
IV	DBCACO401T24	CORE	Computer Architecture	3	3	0	0	30	70	100
	DBCACO402T24	CORE	Programming in Java	3	3	0	0	30	70	100
	DBCACO403T24	CORE	Internet and Web Design	3	3	0	0	30	70	100

	DBCACO405T24	CORE	Shell Programming and System Administration	3	3	0	0	30	70	100
	DBCASE404T24	SEC	E-Commerce Technologies	3	3	0	0	30	70	100
	GE4*	GE4	GE4*	2	2	0	0	30	70	100
Practical										
IV	DBCACO407P24	CORE	Java Programming Lab	2	0	0	4	30	70	100
	DBCACO408P24	CORE	Internet and Web Design	1	0	0	2	30	70	100
	DBCACO409P24	CORE	Shell Programming and System Administration	1	0	0	2	30	70	100
Total				21	19	0	8			900
	DBCAAE406T24	AEC	English-II	0	2	0	0	30	70	100

*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 4.

S. No.	Subject Code	Name of Subject
1	DBCAGE401T24	Social Pharmacy
2	DBCAGE402T24	Reception management
3	DBCAGE403T24	Radio Jockey
4	DBCAGE404T24	Corporate Social Responsibility And Social Entrepreneurship
5	DBCAGE405T24	Industrial Safety & Hazard Management.

Sem.	Course Code	Course Category	Paper Title	Credits	Contact Per week			Evaluation		Total
					L	T	P	Int.	Ext.	
Theory										

V	DBCACO501T24	CORE	Computer Graphics and Multimedia	3	3	0	0	30	70	100
	DBCACO502T24	CORE	Programming in .NET	3	3	0	0	30	70	100
	DBCACO503T24	CORE	Data Warehousing and Data Mining	3	3	0	0	30	70	100
	DBCACO505T24	CORE	Android Programming	3	3	0	0	30	70	100
	DBCAVA506T24	VAC	Management Process & Organization Behaviour	2	2	0	0	30	70	100
	DBCASE504T24	SEC	Management Information System	3	3	0	0	30	70	100
	GE5*	GE5	GE5*	2	2	0	0	30	70	100
Practical										
V	DBCACO507P24	CORE	Computer Graphics and Multimedia Lab	2	0	0	4	30	70	100
	DBCACO508P24	CORE	.NET Programming Lab	2	0	0	4	30	70	100
	DBCACO509P24	CORE	Android Programming Lab & Minor Project	1	0	0	2	30	70	100
TOTAL				24	19	0	10			1000

*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 5.

S. No.	Subject Code	Name of Subject
1	DBCAGE501T24	Ayurvedic and Traditional Medicine
2	DBCAGE502T24	Basics of Hospitality and Tourism Marketing
3	DBCAGE503T24	Basics of TV Production
4	DBCAGE504T24	Sociology of Tribal Societies
5	DBCAGE505T24	Digital Marketing

Sem.	Course Code	Course Category	Paper Title	Credits	Contact Per week			Evaluation		
					L	T	P	Int.	Ext.	Total
Theory										
VI	DBCACO601T24	CORE	PHP Programming	3	3	0	0	30	70	100
	DBCACO602T24	CORE	Cloud Computing	3	3	0	0	30	70	100
	DBCACO604T24	CORE	'R' Programming and Python Programming	3	3	0	0	30	70	100
	DBCASE603T24	SEC	Software Testing Concepts	3	3	0	0	30	70	100
	GE6*	GE6	GE6*	2	2	0	0	30	70	100
Practical										
VI	DBCACO605P24	CORE	PHP Lab	2	0	0	4	30	70	100
	DBCACO606P24	CORE	Cloud Computing Lab	2	0	0	4	30	70	100
	DBCACO607P24	CORE	'R' Programming and Python Programming Lab	2	0	0	4	30	70	100
	DBCAPS608P24	CORE	Project	4	0	0	8	30	70	100
TOTAL				24	14	0	20			900

*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 6.

S. No.	Subject Code	Name of Subject
1	DBCAGE601T24	Pharmaco-economics
2	DBCAGE602T24	Interior Decoration
3	DBCAGE603T24	Global Media Scenario
4	DBCAGE604T24	Contemporary Social Issues
5	DBCAGE605T24	Industrial IOT and Automation

3.2.2 Detailed Syllabus of BCA

Detailed syllabus of BCA is attached in Annexure-I.

3.3 Duration of the Program

Program	Level	Duration	Maximum duration for completion	Credits
BCA	Bachelor's Degree	3 years (6 Semesters)	6 Years	137

3.4 Faculty and Support staff requirements (Refer Regulation Document for all Staff Details)

Academic Staff	Number available to meet the norms
Program Coordinator	1 Member
Course Coordinator	36
Course Mentor	1 Member per batch of 250 students

3.5 Instructional delivery mechanisms

JNU boasts a fully dedicated team of faculty members and staff proficient in delivering lectures through CDOE – JNU. At the commencement of each session, students will receive the academic calendar via the Learning Management System (LMS). The distribution of self-learning material, audio, and video content to students will be facilitated through the LMS via the following delivery channels:

- Self-Learning Material (Hard Copy will be provided to student)
- EBooks
- Study Guide
- Question Bank in Learning Management system - For Practice Test through LMS
- Audio / Video Component in Learning Management System
- Assignments (Submitted through Assignment Response Sheet)
- Personal Contact Program would be conducted at University Campus.

3.6 Identification of media-print, audio, or video, online, computer aided

The Learning Management System (LMS) serves as a comprehensive digital platform, offering a multitude of features including recorded faculty video lectures,live sessions, e-content comprising study material, open source materials, and graded assessments.

For each module within a course, there will be one live session conducted by the respective faculty member, focusing on a specific topic. CDOE-JNU has curated study material that is clear and easily comprehensible, complete with concise summaries, self-assessment questions, and case studies.

Access to these course materials is facilitated through:

- Login credentials provided in the welcome email sent by the university
- Students can also log on the University website at https://lms.jnujaipur.ac.in/ .

Courseware

Through the Learning Management System (LMS), students will have access to a comprehensive array of course materials mentioned above.

The Dashboard feature of the LMS serves to track and monitor students' learning progress. It includes functionalities such as:

- Monitoring progress in learning
- Comparing progress with peers
- Receiving regular notifications about upcoming Live Sessions, assignments, and examinations

3.7 Student Support Services

Students will have access to support services provided by CDOE-JNU through the Student Relationship Management (SRM) system for queries related to administration and general technical issues. A ticketing system integrated into the LMS will enable learners to connect with the CDOE-JNU technical team for support services, with resolutions handled by the appropriate authority. Notifications will also be sent to the Deputy Registrar to ensure queries are addressed within 24 hours or sooner.

For academic course-related queries, students can raise queries directly with the Course Coordinator, Program Coordinator, and Deputy Director. Queries should be resolved within 48 hours of being raised, with the Program Coordinator responsible for managing and resolving any unresolved matters. The Deputy Director will ensure the timely resolution of academic queries.

In addition to academic excellence, CDOE-JNU prioritizes the holistic development of its students. The department supports various initiatives to broaden students' opportunities and shape them into future leaders.

4. Assessment and Evaluation

4.1 Overview

The evaluation of students' learning will encompass internal assignments, quizzes, learner response sheets, and end-of-term examinations. CDOE-JNU follows a rigorous process in the development of question papers, creation of question and quiz banks, preparation and moderation of assignments, administration of examinations, analysis of answer scripts by qualified academics, and declaration of results. Question papers are meticulously framed to ensure comprehensive coverage of the syllabus.

The evaluation process will include two types of assessments:

Examination Name	Marks Division
Continuous internal assessment	30%
Summative assessment in the form of end-term examination. End-term examination will be held with proctored examination tool technology (follow **Annexure VI** for guidelines and pre-requisites for Proctored Examination)	70%

The examinations are designed to evaluate the knowledge acquired during the study period.

For theory courses, internal evaluation will be conducted through Continuous Internal Assessment (CIA), which includes assignments and quizzes in form of MCQ type of questions. The internal assessment will contribute a maximum of 30 marks for each course.

At the end of each semester, an end-of-semester examination will be held for each course, lasting two hours.

Guidelines issued by the Regulatory Bodies from time-to-time about conduct of examinations shall be considered and new guidelines if any will be implemented.

4.2 Question Paper Pattern

Exam Time: 2 Hours

Max. Marks: 70

Exam will be comprising of 70 Multiple-Choice Questions (1 Mark Each) – 70 Marks

4.3 Distribution of Marks in Continuous Internal Assessments

The following procedure shall be followed for internal marks for theory courses. Weightage for Assignment is provided below:

Particular	A1 (MCQ Type)	A2 (MCQ Type)

Marks	15	15

Note: Refer to **Annexure VI** and **VII** for reference to the question paper pattern and formats of documents accepted.

Students may re-appear for CIA up to next two semesters and has to follow the same procedure. For the last semester the academic rules shall apply.

4.4 Statistical Method for the Award of Relative Grades

Letter Grade	Grade point	Range of Marks(%)
O (Outstanding)	10	90-100
A+ (Excellent)	9	80-89
A (Very good)	8	70-79
B+ (Good)	7	60-69
B (Above average)	6	50-59
C (Average)	5	40-49
P (Pass)	4	35-39
F (Fail)	0	0-34
Ab (Absent)	0	Absent

Abbreviations:

CO	Core Course	MM	Maximum Marks
DSC	Discipline Specific Course	MO	Marks Obtained
GE	Generic Elective Course	SE	Skill Enhancement
AE	Ability Enhancement	DSE	Discipline Specific Elective

4.4.1 Cumulative Grade Point Average (CGPA) and Semester Grade Point Average

Semester Grade Point Average (SGPA):

It is the summation of product of Credit Points and Grade Points divided by the summation of Credits of all Courses taught in a semester.

SGPA = $\Sigma C.G. / \Sigma C$

Where, G is grade and C. is credit for a Course.

Cumulative Grade Point Average (CGPA): $CGPA = \Sigma(C_i \times Si)/\Sigma c$.

Where, Si is the SGPA of the semester and Ci is the total number of credits in that semester.

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Note:

- In case of any mistake being detected in the preparation of the Grade Statement at any stage or when it is brought to the notice of the concerned authority the University shall have the right to make necessary corrections.

4.4.2 Cumulative Grade Point Average (CGPA)

CGPA will be used to describe the overall performance of a student in all courses in which letter grades are awarded since his entry into the University or transferred from other University upto the latest semester as per the procedure provided in JNU Academic Regulations. It is the weighted average of the grade points of all the letter grades received by the student from his entry into the University or transferred from other University. Since multiple performance in a course in which the student has already received a grade is possible, whenever through such a process a new grade is obtained, it will replace the earlier one in the calculation of CGPA. On the other hand, if through this process merely a report emerges, this event by itself will not alter the CGPA.

A student's grades, reports, CGPA, etc. at the end of every semester/term will be recorded on a grade card, a copy of which will be issued to him. The grade card will be withheld if a student has not paid his dues or when there is a pending case of breach of discipline or a case of unfair means against him.

The faculty members also responsible for maintaining the complete records of each student's attendance, performance in different components of evaluation. If a scrutiny or statistical analysis becomes necessary, the above records and any other pertinent information should be made available by the faculty member of the course.

4.4.3 Conversion Factor

Formula for Conversion of CGPA to Percentage:

Percentage of marks = CGPA ^{x} 10

4.5 Grade card

All grades and reports and other pertinent information for a semester are given in a grade card which is a complete record of the outcome of what was intended in the original registration. The various grades and reports would be appropriately used to tally the grade card with the original registration.

Chronologically organized information from the grade cards of a student with the necessary explanation constitutes is transcript which is issued at the time the student leaves the University or at an intermediate point on request.

4.5.1 Grade cards and Certification – Student Communication

- The student can get soft copy of grade cards through the University website, the hard copy grade card would be provided only after successfully completion of full program along with degree certificate.
- Once the student completes all the mandated assignments, examinations and projects (if applicable) the final mark sheet/grade card and certificate would be dispatched by the University to the student registered address.
- All pending payments/dues need to be cleared by the student, before the final certification.
- If required, the University may request the mandatory documents from student as submitted during admission time, the students may have to re-submit the same if required during final degree certification.
- Students need to apply for degree by filling the degree application form and submit all the required documents and the applicable degree processing application fees as mentioned in this document.

4.5.2 Results, grade card and Degree Logistics–Internal Process

- After verification of all data by the Controller of Examination, the results would be published on the CDOE-JNU website.
- Students need to download and save the copy of semester / year wise results.

CDOE-JNU would provide hard copy grade cards and degree certificate at the end of the program to students who have successfully completed the program. Students who successfully completed the program will receive hard copy mark sheet/grade cards and a degree certificate from the University at the end of the program. A provision for On Demand Mark Sheets can be provided wherein student would have to fill the requisition and pay postal charges enabling university to dispatch the hard copy marksheets as requested by the student; prior to completion of the overall program.

5. Requirement of the Laboratory Support and Library Resources

5.1 Laboratory Support

Jaipur National University offers access to state-of-the-art laboratories equipped with the latest tools and resources necessary for research and analytical work. The laboratory support at JNU aims to foster a robust research environment, encouraging students to develop essential skills required for their academic and professional growth.

5.*2 Library Resources*

The Central Library at CDOE-JNU offers a comprehensive range of sections, including reference, circulation, audio-visual, periodical, book-bank, digital library, and reprographic sections. With a collection exceeding 1,00,000 books, the library also provides access to e-journals, online databases such as Scopus and Web of Science, and institutional repositories featuring rare book collections. University has 449 subscriptions of online and offline Journals. Equipped with modern facilities like reading rooms, computer labs, and quiet study areas, the library fosters a conducive environment for learning and intellectual growth. Additionally, the library frequently organizes workshops, seminars, and exhibitions to enhance academic engagement and promote a culture of continuous learning.

All electronic resources can be accessed seamlessly through the Local Area Network (LAN) on campus, as well as remotely via login credentials. This ensures convenient access to resources for students, faculty, and researchers both on-site and off-site.

6. Cost Estimate of the Program and the Provisions

The Estimate of Cost & Budget could be as follows (all figures on Annual basis) :

Sl. No.	Expenditure Heads	Approx. Amount
1	Program Development (Single Time Investment)	43,00,000 INR
2	Program Delivery (Per Year)	8,00,000 INR
3	Program Maintenance (Per Year)	28,00,000 INR

7. Quality Assurance Mechanism

The quality of a program hinges upon the course curriculum, syllabus, and academic delivery, all of which are meticulously designed to bridge the gap between industry standards and academia. To uphold this standard, the Centre for Internal Quality Assurance (CIQA) and the Academic Council play crucial roles.

The Academic Council is entrusted with ratifying the curriculum and any proposed changes recommended by CIQA to ensure the continual enhancement and maintenance of quality in education at CDOE-JNU.

The Centre for Internal Quality Assurance (CIQA) is tasked with several responsibilities:

(i) Conducting periodic assessments of learning course materials and audio-video tutorials to maintain the quality of learning.

(ii) Soliciting stakeholder feedback and implementing recommended changes to meet the evolving needs of course delivery and industry requirements.

(iii) Evaluating the quality of assignments, quizzes, and end-term assessments and providing suggestions for enhancements to sustain the learning program's standards.

(iv) Ensuring that the learning experience is truly global, aligning with program outcomes and reflecting the vision and mission of JNU.

The Chief Operating Officer (CoE) of the University oversees examinations and the evaluation system to ensure fairness and integrity in the assessment process.

CDOE-JNU is committed to continual improvement, striving to enhance processes, assessments, teaching methodologies, and e-learning materials in line with the implementation of the New Education Policy (NEP). The University is dedicated to delivering exceptional education across all learning modes while adhering to NEP, UGC, and other regulatory guidelines, fostering a truly global educational environment.

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Annexure I _Detailed syllabus of BCA Program

Semester I

'C' Programming Fundamentals

Course Outcomes:

At the completion of the course, a student will be able to:

1. Understand the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming
2. Illustrate concept of compile and debug programs in C language and use different data types for writing the programs.
3. Design programs connecting decision structures, loops and functions.
4. Distinguish between call by value and call by address.
5. Understand the dynamic behavior of memory by the use of pointers.
6. Use different data structures and create / manipulate basic data files and developing applications for real world problems.

Detailed Syllabus

UNIT I

Planning the Computer Program, Debugging, Types of errors, Documentation, Techniques of Problem Solving, Problem solving aspects, Implementation of algorithms, Program verification, Flowcharting, decision table, algorithms and Structured programming concepts; Programming methodologies: Top down and Bottom up programming.

UNIT II

Programming Language, C Standard Library, Introduction to C Programming , Memory Concepts, Decision Making , Secure C Programming , Structured Program Development in C, Algorithms, Pseudocode, Control Structures, if Selection Statement, while Repetition Statement , Assignment Operators, Increment and Decrement Operators. C Program Control: for Repetition Statement, switch Multiple Selection Statement, do...while Repetition Statement, break and continue Statements, Logical Operators.

UNIT III

C Functions, Program Modules in C, Math Library Functions, Functions: Function Definitions, Function Prototypes: A Deeper Look , Function Call Stack and Stack Frames, Passing Arguments By Value and By Reference, Recursion vs. Iteration, C Arrays: Defining Arrays, Passing Arrays to Functions, Sorting Arrays, Searching Arrays and Multidimensional Arrays.

UNIT IV

Structure & Union, C Pointers: Pointer Variable, Definitions and Initialization. Pointer Operators, Passing Arguments to Functions by Reference, size of Operator, Pointer Expressions and Pointer Arithmetic, Relationship between Pointers and Arrays, Pointers to Functions, C Characters and Strings, Character Handling Library, String, Conversion Functions, Standard Input/output Library Functions, String, Manipulation Functions ,C Formatted Input/output

UNIT V

C File Processing: Files and Streams, Creating a Sequential, Access File, Reading Data from a Sequential, Access File , Random, Access Files , Creating a Random, Access File and Writing Data Randomly to a Random Access File, Reading Data from a Random Access File, C Pre-processor.

Text Books:

1. Balagurusamy, Programming in ANSI C, Tata McGraw-Hill Education, 2008
2. Yashavant Kanetkar, Let us C, BPB

Reference Books:

1. P. K. Sinha & Prtti Sinha “Computer ‘5’ Fundamentals” BPB Publications 2007.
2. R.G. Tromey “How to solve it by computer” Prentice Hall 1982.
3. Paul Deital & Harvey Deital “C How to Program” 7 edition Pearson Education 2013.
4. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.

'C' Programming Lab

Course Outcomes:

At the completion of the course, a student will be able to:

1. Identifysituations where computational methods and computers would be useful.
2. Summarize the programming tasks using techniques learned and writepseudo-code.
3. Choose the right data representation formats based on the requirements of the problem.
4. Use comparisons and limitations of the various programming constructs and choose the right one for the task in hand.
5. Implement file Operations in C programming for a given application.

Exercises:

1. Write a C program print Addition / Multiplication of integers.
2. Determining if a number is +ve /, ve / even / odd.
3. Find maximum of 2 numbers from 3 numbers.
4. Construct a program to implement a calculator that reads in integers and operations from the keyboard such as 7 * 3 + 6 = print the answer and exit. Just as on a cheap calculator addition and multiplication have the same precedence and evaluation is strictly left to right. For example 4+5*6 = prints 54 because 4+5=9 is computed before the multiplication.
5. Write a C program to give sum of first n numbers from given n numbers etc.
6. Write a C program to print Integer division.
7. Write a C program for Digit reversing of a number.
8. Write a C program to give factorial of a number.
9. Write a C program to find the sum of individual digits of a positive integer.
10. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
11. Write a C program to generate all the prime numbers between 1 and n where n is value supplied by the user's) Write a program which checks a given integer is Fibonacci number or not.
12. Write a C program to find LCM and HCF of a number.
13. Write a C program to generate sine series cosine series etc.
14. Write a C program in C for Pascal Triangle Prime number.
15. Factors of a number. Other problems such as Perfect number GCD of 2 numbers etc. (Write algorithms and draw flowcharts)
16. Write a C program to check whether the number is Palindrome or not.
17. Write a C program in C to check whether the number is leap or not.
18. Write a C program in C to print various diamond patterns.
19. Write a C program in C whether the number is Armstrong or not.
20. Write a program to shift input data by 2 bits left and right.
21. Write a program to use bitwise "&" operator between 2 integer and display the result.
22. Write a program to input 6 numbers and find the biggest and smallest using nested if.
23. Write a program to find the sum of even and odd numbers using switch if else nested if between 1

and 20.

24. Write a program to find the sum of its digits till the result is in single digit
25. Write a program to print the series: x-x3/3!+x5/5!-x7/7...an/n!
    1 + x2/2!-x3/3! + x4/4... xn/n!
26. Write a program to perform Arithmetic operation on an array i.e. Addition Subtraction Multiplication and Division and store the result in another array.
27. Write a program to perform following string operation: with string functions and without string functions.
    Reverse a string, Compare two string, Concatenate two strings
28. Write a program to detect the occurrence of a number in a string.
29. Write a program to accept a string up to 15 character and display the position of a character in a separate line.
30. Write a program to display and count the number of vowels in a string.
31. Write a program to add to pointer addresses of a pointer variable.
32. Write a program to find the factorial of a number using recursion.
33. Write a program to perform different arithmetic operations using pointers
34. Write a program to obtain prime factors of any integer number using functions.
35. Write a program to find the sum of 5 digit number: Without using recursion and with using recursion.
36. Write a program to obtain Fibonacci series by using recursion.
37. Write a program to create, display, modify and append a file (sequential file).
38. Write a program to copy the content of one file to another.
39. Write a program to calculate space in a file (number of blank spaces and not the file size).
40. Write a program to print out the lines from a file that have 50 or more characters in them.
41. Display the initials of first and the middle name separated by "." i.e. Input - Krishna Kumar Singh Output - K .K. Singh
    Now create a main structure that will contain name age salary of an employee.
42. Write a program to call sum ( ) function recursively and perform sum of 1 to 5 numbers.
43. Write a program to find the larger of the two numbers using macro with argument.
44. Write a program to count the number of character, word and lines in a text.
45. Write a program to arrange a list by using any sorting method.

Discipline Specific Core Courses (DSC):

Fundamentals of Computers and PC Tools

Course Outcomes:

At the completion of the course, a student will be able to:

1. Identify the important role of computers and why computers are essential components in business and society along with their various components.
2. Demonstrate the building up of Sequential and combinational logic from basic gates.
3. Apply different categories of programs, system software and applications. Organize and work with files and folders. Utilize the Word Processor, Worksheet and PowerPoint for various applications.
4. Assess the emerging technologies in the area like Big Data, Data Mining and Cloud Computing.
5. Bridge the fundamental concepts of computers with the present level of knowledge of the students.

Detailed Syllabus

Unit I

Computer and its characteristics, application of computers, digital and analog computers, Generation of computers. Storage devices: primary storage devices (RAM, ROM, PROM, EPROM and EEPROM), secondary storage devices (Floppy disk Hard disk optical disk magnetic tapes), Input and output devices (keyboard mouse light pen joystick scanner monitor printers, etc.). Number system and its types conversion from one base to another and vice versa arithmetic operations r's (r - 1)'s complement methods.

Unit II

Software and its types (System Software, Application Software, Firmware Software), Computer Languages and its types (Machine Language, Assembly Language, High Level Language. Advantages and disadvantages of computer languages) Translators: Compiler Linker Interpreter

Unit III

Overview of Emerging Technologies: Bluetooth, cloud computing, big data ,data mining , mobile computing and embedded systems

Unit IV

Operating system and its functions, types of operating system (Single user, multi-user, multitasking, time sharing, distributed). Fundamental of DOS, internal and external commands, Windows fundamentals: Anatomy of windows, desktop elements, managing files and folders, installing software

Unit V

Word Processor and its features, editing of Text, Find and Replace, Bullets and Numbering, Spell Checker, Grammar Checker, Auto Correct, Auto Complete, Auto Text, Header and footer, tables, mail merge, border and shading, page setup printing. Spread sheet and its features, Entering Information in Worksheet, Editing Cell, Entry Moving and Copying Data, deleting or Inserting Cells Rows and Columns. Custom Numeric Formats Using Formulas and functions, Creating charts. Presentation Software and its uses, steps for creating PowerPoint Presentation, PowerPoint Views Assigning Slide Transitions Using Preset Animations, Hiding Slides, Slide Show, Controlling the Slide Show with a Keyboard and Setting Slide Show Timings.

Text Books:

1. P.K Sinha & Priti Sinha Computer Fundamentals BPB Publications.
2. V. Rajaraman Fundamentals of Computers EEE.
3. Peter Nortan Introduction to Computers Tata Mcgraw Hill.

Reference Books:

1. Alexix Leon Mathewes Leon Fundamentals of Information Technology.
2. Suresh K. Basandra Computer Systems Today Gatgotia Publications.
3. Joyce Coax Joan Preppernau Steve Lambert and Curtis Frye 2007 Microsoft Office System step by step Microsoft Press.
4. R.K. Taxali PC Software for Windows.

Office Automation Tools Lab

Course Outcomes:

At the completion of the course, a student will be able to:

1. Identify and recall the use of CUI and GUI based operating systems.
2. Summarize the working of various application software's such as MS Word, MS Excel and MS PowerPoint.
3. Apply the various features and functionalities of MS Word, MS Excel and MS PowerPoint.
4. Design and develop various Word files, spreadsheets and PowerPoint presentations.

Exercises for WORD:

1. Create a **telephone directory.**
   - The heading should be 16-point Arial Font in bold
   - The rest of the document should use 10-point font size
   - Other headings should use 10-point Courier New Font.
   - The footer should show the page number as well as the date last updated.
2. Design a time-table form for your college.
   - The first line should mention the name of the college in 16-point Arial Font and should be bold.
   - The second line should give the course name/teacher's name and the department in 14-point Arial.
   - Leave a gap of 12-points.
   - The rest of the document should use 10-point Times New Roman font.
   - The footer should contain your specifications as the designer and date of creation.
3. Create the following one page documents.
   (a) Compose a note inviting friends to a get-together at your house, including a list of things to bring with them.
   (b) Design a certificate in landscape orientation with a border around the document.
4. Create the following document: A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
5. Convert following text to a table, using comma as delimiter
   Type the following as shown (do not bold).

Color,	**Style,**	**Item**
Blue,	**A980,**	**Van**
Red,	**X023,**	**Car**
Green,	**YL724,**	**Truck**
Name,	**Age,**	**Sex**
Bob,	**23,**	**M**

Linda, 46, F

Tom, 29, M

6. Prepare a grocery list having four columns (Serial number, the name of the product, quantity and price) for the month of April, 06.

   - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
   - The headings of the columns should be in 12-point and bold.
   - The rest of the document should be in 10-point Times New Roman.

   i. Leave a gap of 12-points after the title.

7. XYZ Publications plans to release a new book designed as per your syllabus. Design the first page of the book as per the given specifications.

   b. The title of the book should appear in bold using 20-point Arial font.

   c. The name of the author and his qualifications should be in the center of the page in 16-point Arial font.

   d. At the bottom of the document should be the name of the publisher and address in 16-pomt Times New Roman.

   e. The details of the offices of the publisher (only location) should appear in the footer.

8. Create the following one page documents.

   a) Design a Garage Sale sign.
   b) Make a sign outlining your rules for your bedroom at home, using a numbered list.

9. Enter the following data into a table given on the next page.

Salesperson	Dolls	Trucks	Puzzles
Amit	1327	1423	3193
Shivi	1421	3863	2934
Om	5214	3247	5467
Ananya	2190	1275	1928
Anupama	1201	2528	1203
Maharshi	4098	3079	2067

Add a column Region (values: S, N, N, S, S, S) between the Salesperson and Dolls columns to the given table. Sort your table data by Region and within Region by Salesperson in ascending order.

Exercises for EXCEL

1. Create a student worksheet containing roll numbers, names and total marks. Open a document in Word and insert the excel worksheet using:-

   i) Copy/Paste

   ii) Embedding

   iii) Linking

2. The term wise marks for APS class of 20 students are stored in 3 separate sheets named term 1, term 2 and term 3. Create 4th worksheet that contains student names and their total and average marks for the entire year. Give proper headings using headers. Make the column headings bold and italic. The 4th worksheet should contain college name as the first line. Make it bold, italic and center it.

3. Using a simple pendulum, plot 1-T and 1-T^2 graph.

I	t1	t2	t3	Mean(t)	T=t/20	T^2
70						
80						
90						
100						

1. Consider the following employee worksheet:-

Full Name (First Last)	Grade 1/2/3	Basic Salary	HRA	PF	Gross	Net	(VA) Vehicle Allowance

HRA is calculated as follows:

Grade	HRA % (of Basic)
1	40%
2	35%
3	30%

i) Find max, min and average salary of employees in respective Grade

ii) Count no. of people where VA>HRA

iii) Find out most frequently occurring grade.

iv) Extract records where employee name starts with "A" has HRA>10000

v) Print Grade wise report of all employees with subtotals of net salary and also grand totals. Use subtotal command.

vi) Extract records where Grade is 1 or 2 and salary is between 10000 and 20000 both inclusive.

5. In a meeting of a marketing department of an organization it has been decided that price of selling an item is fixed at Rs40. It was resolved to increases the sell of more of more items and getting the profit of Rs40,000/.Use Goal Seek of find out how many items you will have to sell to meet your profit figure.

6. To study the variation in volume with pressure for a sample of an air at constant temperature by plotting a graph for P - V and P-I/V. Sample observations are:-

Pressure(P)	**Volume (V)**	**I/V**	**PV**	**P/V**
75	20			
78.9	19			
83.3	18			
88.2	17			

7. Plot the chart for marks obtained by the students (out of 5) vs. frequency (total number of students in class is 50).
8. Create the following worksheets) containing an year wise sale figure of five salesmen in Rs.

Salesman	2002	2003	2004	2005
MOHAN	10000	12000	20000	50000
MITRA	15000	18000	50000	60000
SHIKHA	20000	22000	70000	70000
ROHIT	30000	30000	100000	80000
MANGLA	40000	45000	125000	90000

Apply the following Mathematical & Statistical functions:

i) Calculate the commission for each salesman under the condition :-
   a) If total sales is greater than Rs. 3, 00,000/-, then commission is 10% of total sale made by the salesman.
   b) Otherwise, 4% of total sale.

ii) Calculate the maximum sale made by each salesman.

iii) Calculate the maximum sale made in each year,

iv) Calculate the minimum sale made by each salesman.

v) Calculate the minimum sale made in each year.

vi) Count the no. of sales persons.

vii) Calcu1ate the cube of sales made by Mohan in the year 2002.

viii) Find the difference in sales by salesman Mitra between the year 2002 and 2003. Find the absolute value of difference.

ix) Also calculate the Mode, Std dev, Variance, and Median for the sale made by each salesman.

x) Calculate the year wise Correlation coefficient between the sales man Mohan and Mitra year wise

9. The following table gives a year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	[00000	80000
S5	40000	45000	125000	90000

Calculate total sale year wise.

i) Calculate the net sales made by each salesman
ii) Calculate the commission for each salesman under the condition :-
   a. If total sales is greater than Rs. 4,00,000/-, then commission is 5% of total sale made by the salesman.
   b. Otherwise, 2% of total sale.
iii) Calculate the maximum sale made by each salesman.
iv) Calculate the maximum sale made in each year.
v) Draw a bar graph representing the sale made by each salesman,
vi) Draw a pie graph representing the sale made by salesmen in year 2001.

10. Consider the following worksheet for APS 1st year students:-

S. No.	**Name**	**PH**	**CH**	**BY**	**MT**	**CS**	**Total**	**%**	**Grade**
1									
2									

Grade is calculated as follows:-

If % >=90

Grade A

If % >=80&<90 Grade B

If % >=70&<80 Grade C

If % >=60 &<70 Grade D

i) Calculate Grade using if function
ii) Sort the data according to total marks
iii) Apply filter to display the marks of the students having more than 65% marks.
iv) Draw a pie chart showing % marks scored in each subject by the topper of the class.
v) Draw the doughnut chart of the data as in (iv)
vi) Enter the S. No. of a student and find out the Grade of the student using VLOOKUP.
vii) Extract all records where name
   a) Begins with "A"
   b) Contains "A"

c) Ends with "A"

11. Create five Power point slides. Each slide should support different format. In these slides explain areas of applications of IT. Make slide transition time as 10 seconds.

12. Create five Power Point slides to give advantages/disadvantages of computer, application of computers and logical structure of computer.

13. Create five Power Point slides detailing the process of internal assessment. It should be a self-running demo.

Discipline Specific Core Courses (DSC):

Elementary Mathematics

Course Outcomes:

At the completion of the course, a student will be able to:

1. Use elementary algebra, geometry, number concepts, probability and problem solving.
2. Demonstrate familiarity with number theory and statistics.
3. Think mathematically and exhibit confidence in their mathematical ability.
4. Explain why mathematical thinking is valuable in daily life.
5. Represent and statistically analyze data both graphically and numerically.

Detailed Syllabus

UNIT I

Matrices, Types of Matrices, Operations of addition, Scalar Multiplication and Multiplication of Matrices, Determinant of a Square Matrix, Minors and Cofactors, Transpose adjoint and inverse of a matrix, solving system of linear equations in two or three variables using inverse of a matrix

UNIT II

Sets Relation & Functions: Introduction , Definition of Set, Type of Sets, Operations on Sets, Venn diagram, Cartesian Product, Relations, Functions, Types of function, Some elementary functions with their graphs (Exponential logarithmic modulus), Limit & continuity of a function (Simple Problems).

UNIT III

Differentiation: Introduction, Derivative and its meaning, Differentiation of algebraic trigonometric exponential & logarithmic functions, Rules of Differentiation, Differentiation by Substitution, Higher Order Differentiation, Maxima and Minima of Simple Functions

UNIT IV

Integration: Introduction, Integral as Anti-derivative process, Indefinite Integrals, Rules of Integration, Integration by substitution. Definite Integration properties of Definite Integral, Finding areas of Simple Closed Curves

UNIT V

Coordinate Geometry: Introduction, 2D Cartesian Co-ordinate system, Straight line: (Equation & Slope of a line) Circle: Equation of Circle Equation to Tangent, Conic Sections: Focus Eccentricity Directrix, Axis of a conic section, Parabola & Ellipse: (Definitions equations and shape of curve only).

Text Books:

1. Mathematics Vol-2, R. D. Sharma, Dhalpat Raj & Sons.
2. The Elements of Co-ordinate Geometry Part-I, S. L. Loney, Book Palace, New Delhi,

Reference Books:

1. Mathematics for BCA, G. C. Sharma & Madhu Jain, Oscar Publication.

Discipline Specific Electives (DSE):

Digital Electronics

At the completion of the course, a student will be able to:

1. Recall fundamentals and principles of analog circuits and electronic devices in electrical and electronic engineering. Acquire basic knowledge of physical and electrical conducting properties of semiconductors. Develop the ability to understand the design and working of BJT / FET amplifiers.
2. Employ the codes and number systems converting circuits and compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance, and efficiency.
3. Understand different types of digital electronic circuits using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.
4. Analyze, design and implement sequential logic circuits. Assess the nomenclature and technology in the area of memory devices and apply the memory devices in different types of digital circuits for real-world applications.
5. Design different types of with and without memory element digital electronic circuits for a particular operation, within the realm of economic, performance, efficiency, user-friendly and environmental constraints
6. Evaluate frequency response to understand the behavior of Digital electronic circuits. Create and analyze electronic circuits

Detailed Syllabus

Unit I

Introduction to Basic Electronics: Semiconductors, Intrinsic & Extrinsic semi conductors, P Type & N Type semiconductors, PN Junction & Biasing. Semiconductor Diode: Diode, PN junction diode, forward/reverse, current symbol ratings, forward & reverse bias characteristics, Transistor (Introductory concepts): PNP & NPN Transistor, CBCC CE configurations and Transistor as an Amplifier, Introduction to FET MOSFET & construction

Unit II

Data and number representation and Logic Gates: Binary, complement representation, BCD, ASCII, conversion of numbers from one system to the other, 2's complement, representation and binary arithmetic. Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive OR and Exclusive NOR. Implementations of Logic Functions using gates, NAND, NOR implementations, Multi level gate implementations, Multi output gate implementations, Tristate gates

Unit III

Minimization Techniques: Boolean postulates and laws, De Morgan's Theorem, Principle of Duality, Boolean expression, Minimization of Boolean expressions, Minterm, Maxterm, Sum of Products (SOP), Product of Sums (POS), Karnaugh map, Minimization, Don't care conditions, Quine McCluskey method of minimization.

Unit IV

Combinational Circuits: Design procedure, Half adder, Full Adder, Half subtractor, Full subtractor, Parallel binary adder, parallel binary Subtractor, Fast Adder, Carry Look Ahead, adder-Serial Adder/ Subtractor, BCD, adder, Binary Multiplier, Binary Divider Multiplexer/ Demultiplexer, decoder encoder.

Sequential Circuits: Latches, Flipflops, SR, JK, D, T and Master Slave, Characteristic table and equation Application table, Edge triggering - Level Triggering, Introduction to Asynchronous and Synchronous counters and shift registers

Unit V

Memory Devices: Classification of memories, ROM organization, PROM, EPROM, EEPROM, EAPROM, RAM organization, Write operation, Read operation, Memory cycle, Timing wave forms, Memory, decoding memory expansion, Static RAM Cell, Bipolar RAM cell, MOSFET RAM cell, Dynamic RAM cell

Text Books:

1. M. Morris Mano Digital Design 3rd Edition Prentice Hall of India Pvt. Ltd. 2003 Pearson Education (Singapore) Pvt. Ltd. New Delhi 2003.
2. S. Salivahanan and S. Arivazhagan Digital Circuits and Design 3rd Edition. Vikas Publishing House Pvt. Ltd New Delhi 2006.

Reference Books:

1. John F.Wakerly Digital Design Fourth Edition Pearson/PHl 2006.
2. John.M Yarbrough Digital Logic Applications and Design Thomson Learning 2002,
3. Charles H.Roth. Fundamentals of Logic Design Thomson Learning 2003.
4. Donald P.Leach and Albert Paul Malvino Digital Principles and Applications 6thEdition TMH 2003.
5. William H. Gothmann Digital Electronics 2nd Edition PHI 1982.
6. Thomas L. Floyd Digital Fundamentals 8th Edition Pearson Education Inc New Delhi 2003.
7. Donald D. Givone Digital Principles and Design TMH 2003.

Digital Electronics Lab

Course Outcomes:

At the completion of the course, a student will be able to:

1. Recall and learn the basics of logic gates & code conversion.
2. Develop design capability in the binary arithmetic logic circuit
3. Apply knowledge in Combinational Logic Problem formulation and verify their functionalities.
4. Examine design capability in synchronous and asynchronous sequential circuits like flip flops, Shift registers, and counters
5. Evaluate the basic understanding of digital circuits and to verify their operation.

List of Exercises:

1. To study and verify the truth table of logic gates.
2. Design and implementation of 4-Bit Adder and Subtractor using logic gates.
3. Design and implementation of BCD to excess-3 code converter using logic gates,
4. Design and implementation of Binary to gray code converter using logic gates.
5. Design and implementation of 4 bit binary Adder/ Subtractor using IC 7483
6. Design and implementation of 4 bit binary BCD adder using IC 7483
7. Design and implementation of 2 bit Magnitude Comparator using logic gates.
8. Design and implementation of 16 bit odd/even parity checker generator.
9. Design and implementation of multiplexer using logic gates IC74150 and IC74154.
10. Design and implementation of De-multiplexer using logic gates IC74150 and IC74154
11. Design and implementation of encoder using logic gates IC7445 and IC74147
12. Design and implementation of decoder using logic gates 1C7445 and IC74147
13. Construction and verification of 4 bit ripple counter,
14. Design and implementation of 3-bit synchronous up/down counter.
15. Implementation of SISO SIPO PISO and PIPO shift registers using Flip- flops

Ability Enhancement Compulsory Courses (AECC)

English-I

Prerequisite: - Basic knowledge of English Grammar

Course Objective:

1. To provide good and hesitation free spoken English
2. Emphasis is given on Grammar vocabulary and, practice part of English and reading Comprehension

Course Outcomes

At the completion of the course, a student will be able to:

1. Recall various grammatical concepts like tenses, modals, active & passive etc.
2. Differentiate between tenses, modals, prepositions etc.
3. Apply the knowledge of grammar in their day to day conversation.
4. Develop language proficiency by practicing speaking, listening, reading and writing skills.
5. Build a capacity to learn new words to enhance their vocabulary.

Detailed Syllabus

UNIT-I

Grammar-I

1. Sentence Structure
2. Subject & Predicate
3. Tenses

UNIT-II

Grammar-II

1. Prepositions
2. Modals
3. Active & Passive Voice

UNIT-III

Grammar-II

1. Subject-Verb Agreement
2. Punctuations
3. Common Errors

UNIT-IV

1. Paragraph Writing
2. Job Applications (Solicited Unsolicited and Layout)

UNIT-V

1. Reading Comprehension (Reading at various speeds (slow fast very fast) reading different kinds of texts for different purposes (e.g. for relaxation for information for discussion at a later stage etc.); reading between the lines).
2. Effective Listening (Techniques)

Text Books:

1. Quirk & Greenbaum "Advanced English Usage" Pearson Education.
2. www.usingenglish.com- Writing/ Grammar

Reference Books:

1. Banerjee Meera & Mohan Krishna "Developing Communication Skills" Macmillan Publications 1990.
2. Chaturvedi P.D. "Business Communication" Pearson Publications.

Online Reading/Supporting Material:

1. www.englishcfub.com - Vocabulary Enrichment/ Speaking
2. www.ispeakyouspeak.blogspot.com - Vocabulary Enrichment/ Speaking
3. www.teachertube.com - Writing Technically www.Dictionary.com - Semantic / Grammar.

Discipline Specific Core Courses (DSC):

Database Management System

Course Outcomes

At the completion of the course, a student will be able to:

1. Identify and organize the information from a DBMS and maintain and retrieve efficiently, and effectively.
2. Illustrate the role of Database Management Systems in information technology applications within organizations and structured query languages to extract information from large datasets
3. Applying contemporary logical design methods and tools for databases and derive a physical design for a database from its logical design.
4. Analyze and design a real database application.
5. Evaluate a real database application using a database management system.

Detailed Syllabus

Unit I

Introduction to Database Management Systems: File-based system, drawbacks of file-Based System, Data and information, Database, Database management System, Characteristics of database approach, data models, DBMS architecture and data independence.

Unit II

Entity Relationship and Enhanced ER Modeling: Entity types, relationships, SQL: Schema Definition, constraints, and object modeling.

Unit III

Relational Data Model : Basic concepts, ACID property, CODD Rules, concept of key, relational integrity, primary key, foreign key, normalization, 1st normal form, 2nd normal form & 3rd normal form, 4th Normal Form and 5th Normal Form, relational algebra

Unit IV

Structured Query Language: Introduction, Commands in SQL, Data Types in SQL, Data Definition Language, Data Manipulation Language, Data Control Language, Table Modification Commands, primary & foreign keys.

Unit V

Database design: ER and EER to relational mapping, functional dependencies, normal forms up to fifth normal form, Introduction to OODBMS and ORDBMS

Books Recommended:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.

Reference Books:

1. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw- Hill, 2002.
2. R, Elmasri, S.B. Navathe Database Systems Models. Languages, Design and application Programming, 6th Edition, Pearson Education, 2013.

Database Management System Lab

Course Outcomes:

At the completion of the course, a student will be able to:

1. Demonstrate an understanding of the elementary & advanced features of DBMS & RDBMS.
2. Develop a clear understanding of the conceptual frameworks and definitions of specific terms that are integral to the Relational Database Management.
3. Understand the basic concepts of Concurrency Control & database security
4. Understand the basic concept how storage techniques are used to backup data and maintain data access performance in peak hours
5. Attain a good practical understanding of the SQL.
6. Develop clear concepts about Relational Model.
7. Examine techniques pertaining to Database design practices and prepare various database tables and joins them using SQL commands
8. Evaluate options to make informed decisions that meet data storage, processing, and retrieval needs.

The following concepts must be introduced to the students:

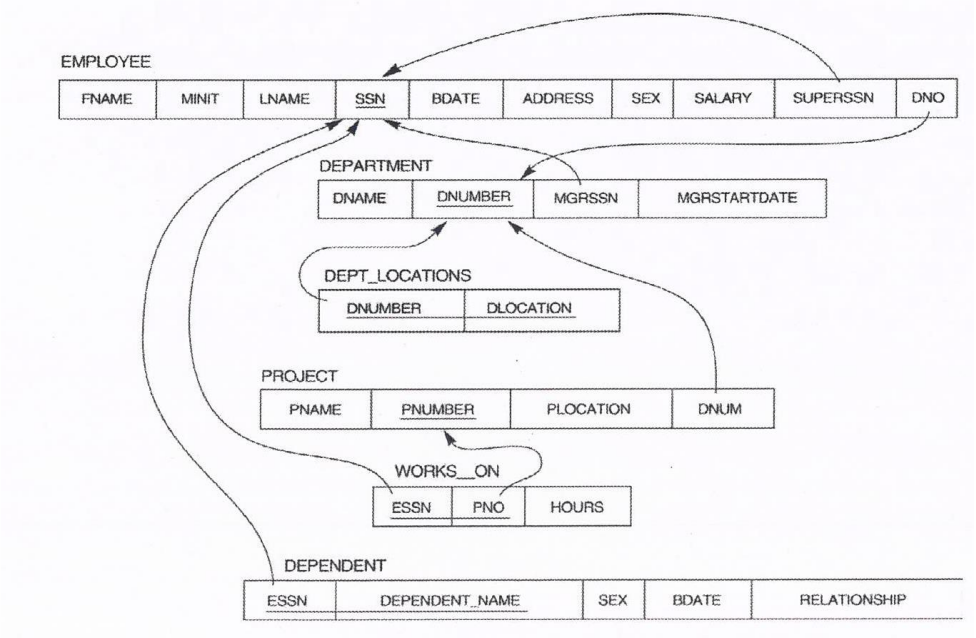
DDL Commands

- Create table, after table, drop table

DML Commands

- Select, update, delete, insert statements
- Condition specification using Boolean and comparison operators (and, or, not, =,<>, >, <, >=, <=,)
- Arithmetic operators and aggregate functions{Count, sum, avg, Min, Max)
- Multiple table queries (join on different and same tables)
- Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
- Categorization using group by……..having
- Arranging using order by

Relational Database Schema - COMPANY



Exercises to be performed on above schema

1. Create tables with relevant foreign key constraints
2. Populate the tables with data
3. Perform the following queries on the database :
   i. Display all the details of all employees working in the company.
   ii. Display ssn, lname, fname, address of employees who work in department no 7.
   iii. Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
   iv. Retrieve the name and salary of every employee
   v. Retrieve all distinct salary values
   vi. Retrieve all employee names whose address is in 'Bellaire'
   vii. Retrieve all employees who were born during the 1950s
   viii. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
   ix. Retrieve the names of all employees who do not have supervisors
   x. Retrieve SSN and department name for all employees
   xi. Retrieve the name and address of all employees who work for the 'Research' department
   xii. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.
   xiii. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
   xiv. Retrieve all combinations of Employee Name and Department Name
   xv. Make a list of all project numbers for projects that involve an employee whose last name is ‘Narayan’ either as a worker or as a manager of the department that controls the project.
   xvi. Increase the salary of all employees working on the 'Product' project by 15%. Retrieve employee name and increased salary of these employees.
   xvii. Retrieve a list of employees and the project name each works in, ordered by the employee’s department, and within each department ordered alphabetically by employee first name.
   xviii. Select the names of employees whose salary does not match with salary of any employee in department 10.
   xix. Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee.
   xx. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
   xxi. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper heading
   xxii. Find the sum of the salaries and number of employees of all employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department.
   xxiii. Select the names of employees whose salary is greater than the average salary of all employees in department 10.
   xxiv. For each department, retrieve the department number, the number of employees in the department, and their average salary.
   xxv. For each project, retrieve the project number, the project name, and the number of employees who work on that project.
   xxvi. Change the location and controlling department number for all projects having more than 5 employees to 'Bellaire' and 6 respectively.
   xxvii. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.
   xxviii. Insert a record in Project table which violates referential integrity constraint with respect to Department number. Now remove the violation by making necessary Insertion in the Department table.
   xxix. Delete all dependents of employee whose ssn is ‘123456789’.
   xxx. Delete an employee from Employee table with ssn = '12345' (make sure that this employee has some dependents, is working on some project, is a manager of some department and is supervising some employees), Check and display the cascading effect on Dependent and Works on table. In Department

table MGRSSN should be set to default value and in Employee table SUPERSSN should be set to NULL

xxxi. Perform a query using alter command to drop/add field and a constraint in Employee table.

Discipline Specific Core Courses (DSC)

Discrete Mathematics

Course Outcome:

After completion of this course Student will be able to:

1. Simplify and evaluate basic logic statements including compound statements, implications, inverses, converses, and contra positives using truth tables and the properties of logic.
2. Express a logic sentence in terms of predicates, quantifiers, and logical connectives
3. Apply the operations of sets and use Venn diagrams to solve applied problems; solve problems using the principle of inclusion-exclusion.
4. Determine the domain and range of a discrete or non-discrete function, graph functions, identify one-to-one functions, perform the composition of functions, find and/or graph the inverse of a function, and apply the properties of functions to application problems.
5. Verify that a simple program segment with given initial and final assertions is correct using the rule of inference for verification of partial correctness and loop invariants.

Detailed Syllabus

Unit I
Introduction: Introduction to Sets, Finite and Infinite Sets, Unaccountably Infinite Sets. Introduction to Functions and relations, Properties of Binary relations, Closure, Partial Ordering Relations

Unit II
Pigeonhole Principle, Permutation and Combinations, Mathematical Induction, Principle of Inclusion and Exclusion

Unit III
Asymptotic Notations, Recurrence Relations: Introduction, Generating Functions, Linear Recurrence Relations with constant coefficients and their solution

Unit IV
Graphs Theory: Basic Terminology of Graphs, Models and Types, Multigraphs, Weighted Graphs, Graph Representation, Graph Isomorphism, Graph Connectivity, Euler and Hamiltonian Paths and Circuits, Planar Graphs, Graph Coloring, Basic Terminology of Trees, Properties of Trees, Spanning Trees

Unit -V
Inference Theory: Introduction, Logical Connectives, Well Formed Formulas, Tautologies, Equivalence

Text Books:
1. C, L Liu and D.P. Mohapatra, Elements of Discrete Mathematics, Third Edition, Tata McGraw Hill, 2008.
2. K. Rosen, Discrete Mathematics and Its Applications, Sixth Edition, Tata McGraw Hi 11, 2007.

Reference Books:

3. T.H. Gormen, C.E. Leiserson, R.L. Rivest, Introduction to Algorithms, Third Edition,Prentice Hall of India,2010.
4. J.P. Trembley, R. Manohar, Discrete Mathematical Structures with Application to Computer Science, First Edition, Tata McGraw Hilt, 2001.
5. David Gries, Fred B. Schneider, A Logical Approach to Discrete Math, Springer; 2010.

Online Reading/Supporting Material:

1. http://ocw.mit.edu/course5/electrical-engineering-and--computer-science/6-042j-mathematics-fpr-computer- science-fal 1-2005/

Discipline Specific Core Courses(DSC)

Analysis of Algorithms and Data Structures

Course Outcome:

After completion of this course Student will be able to:

1. Understand basic data structures (such as an array based list, linked list, stack, queue, binary search tree) and algorithms.
2. Acquire the knowledge to analyze, design, apply and use data structures and algorithms to solve engineering problems
3. Evaluate the solutions of problems by implementing them using the advance data structures .
4. Apply modern tool to solve engineering problems using C.
5. Describe an understanding of analysis of algorithms.
6. Synthesize an algorithm or program code or segment that contains iterative constructs and analyze the code segment.

Detailed Syllabus

Unit I

Introduction: Basic Design and Analysis techniques of Algorithms, Correctness of Algorithm

Algorithm Design Techniques: Iterative techniques, Divide and Conquer, Dynamic Programming, Greedy Algorithms, Asymptotic Notations

Unit II

Sorting Techniques: Elementary sorting techniques-Bubble Sort, Insertion Sort, Merge Sort, Advanced **Sorting techniques:** Heap Sort, Quick Sort, Sorting in Linear Time-Bucket Sort, Radix Sort and Count Sort.

Searching Techniques: Linear and Binary search

Complexity Analysis: Medians & Order Statistics.

Unit III

Data Structures: Arrays Single and Multi-dimensional Arrays, Sparse Matrices, Stacks Implementing stack using array and linked list, Prefix, Infix and Postfix expressions, Utility and conversion of these expressions from one to another

Unit IV

Queues: Array and Linked representation of Queue, De-queue, Priority Queues. Linked Lists: Singly, Doubly and Circular Lists, representation of Stack and Queue as Linked Lists.

Unit V

Recursion Developing Recursive Definition of Simple Problems and their implementation; Advantages and Limitations of Recursion. Trees Introduction to Tree as a data structure; Binary Trees, Binary Search Tree, (Creation, and Traversals of Binary Search Trees), Heaps, Red-black trees

Text Books:

1. T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein-Introduction to Algorithms, PHI, 3rd Edition 2009.
2. Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
3. Seymour Lipschutz, Data Structures with C, Mcgraw Hill

Reference Books:

1. Sarabasse & A.V. Gelder Computer Algorithm-Introduction to Design and Analysis, Publisher - Pearson 3rd Edition 1999.
2. Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning, 2012.
3. SartajSahni, Data Structures, “Algorithms and applications in C++", Second Edition, Universities Press, 2011.
4. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, "Data Structures Using C and C++:, Second edition, PHI, 2009.
5. D.S Malik, Data Structure using C++,Second edition, Cengage Learning, 2010

Data Structures Using 'C Lab:

Course Outcomes:

At the completion of the course, a student will be able to:

1. Recall how to analyze algorithms and estimate their worst-case and average-case behavior (in easy cases).
2. Illustrate a given problem and develop an algorithm to solve the problem
3. Determine the fundamental data structures and with the manner in which data structures can be best be implemented
4. Design the description of algorithms in both functional and procedural styles.
5. Implement theoretical knowledge in practice (via the practical component of the course).

Exercises:

1. Write a program to implement Simple array.
2. Write a program to input N element into a 1-d array and insert an item at particular position.
3. Write a program to input N element into 1-d array and delete an item from particular position.
4. Write a program to input N element into an array, find the location of an item using linear search.
5. Write a program to input N element into an array, find the location of an item using Binary search.
6. Write a program to perform addition of two matrices.
7. Write a program to perform multiplication of two matrices.
8. Write a program to perform transpose of a matrix.
9. Implementation of Recursive function.
10. Write a program to implement bubble sort on an array.
11. Write a program to implement selection sort on an array.
12. Implement Insertion Sort (The program should report the number of comparisons)
13. Implement Merge Sort(The program should report the number of comparisons)
14. Implement Heap Sort (The program should report the number of comparisons)
15. Implement Randomized Quick sort (The program should report the number of comparisons).
16. Implement Radix Sort.
17. Write a program to implement of stack operations using array.
18. Write a program to implement of queue operations using array.
19. Write a program to create a linked list, display its element and search an element in it.
20. Write a program to implement stack operations using linked list.
21. Write a program to implement queue operations using linked list.
22. Implementation of Single, Double and circular Linked List
23. Creation and traversal of Binary Search Tree.
24. Write a program to perform the following operations: Insert an element into a binary search tree. Delete

an element from a binary search tree. Search for a key element in a binary search tree.

25. Write a program that use recursive functions to traverse the given binary tree in Preorder b) Inorder and c) Postorder.

Skill Enhancement Courses(SEC)

HTML Programming

Course Outcomes:

At the completion of the course, a student will be able to:

1. Remember about the concept of web application.
2. Illustrate d concepts of interactive web page(s) using HTML, CSS and JavaScript.
3. Build a responsive web site using HTML5 and CSS3.
4. Assess role of HTML and CSS in effective web development.
5. Develop an effective web application using HTML and CSS as per the plan.

Detailed Syllabus

Unit I

HTML Introduction: Introduction to the Internet, History of HTML, The Head, the Body, Colors, Attributes, Lists, ordered and unordered. HTML Basic Tags, HTML Formatting Tags, HTML Color Coding, Unicode Transformation Format (UTF), Metadata.

Unit II

Page Formatting: Adding a New Paragraph, Adding a Line Break, Inserting Blank Space, Preformatted Text, Changing a Page's Background Color, Div Element.

Links: Introduction, Relative Links, Absolute Links, Link Attributes, Using the ID Attribute to Link Within a Document.

Unit III

Images: Putting an Image on a Page Using Images as Links, Putting an Image in the Background.

Tables: Creating a Table, Table Headers, Table Borders, Table Headers, Captions, Spanning Multiple Column, Styling Table.

Unit IV

Forms: Basic Input and Attributes Other Kinds of Inputs, Styling forms with CSS. IFrames: Inserting IFrames, Setting Height and Width, Using an IFrame for a link target. Video and Audio: About Video and Audio Files, Linking to Video and Audio Files, Adding Video, Adding Audio, Using YouTube to Display Video.

Unit V

Overview of Meta tags and SEO (Search Engine Optimization), Using a search engine to find information, Create and publish a multi-page web site using these technologies.

Book Recommended:

1. Introduction to HTML and CSS-O'Reilly, 2010
2. Jon Duckett, HTML and CSS, John Wiely, 2012
3. Steven Holzner, HTML Black Book, 2000

HTML Programming Lab

Course Outcomes:

At the completion of the course, a student will be able to:

1. Students learn about the concept of web application creation using HTML.
2. Different formatting options used while creating the web pages.
3. Build a responsive web site using HTML5 and CSS3.
4. Understand the role of HTML and CSS in effective web development along with its uses.
5. Develop an effective web application using HTML and CSS as per the projects.

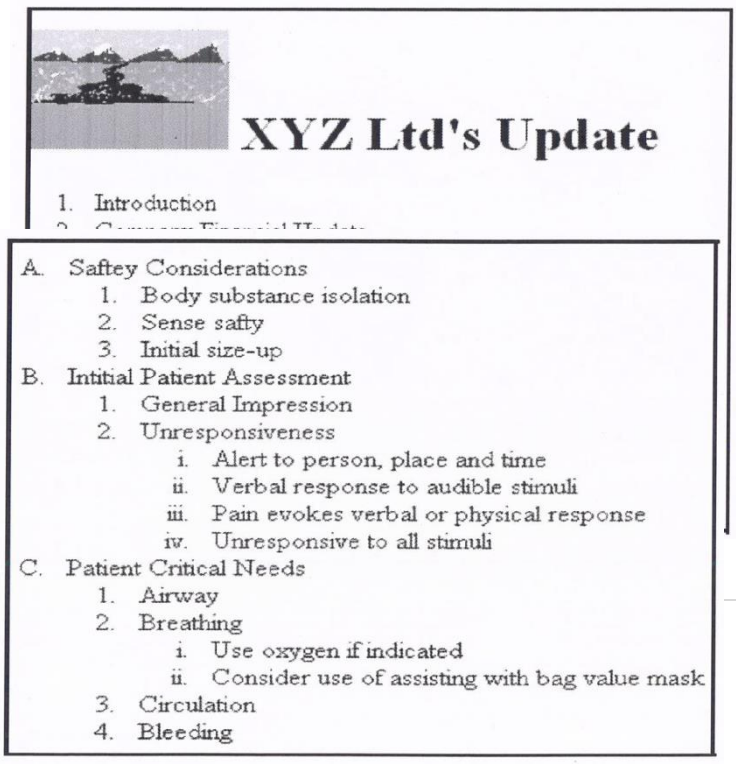
Exercises:

Q.1 Create an HTML document with the following formatting options:

1. Bold
2. Italics
3. Underline
4. Font (Type, Size and Color)
5. Pre tag

Q.2 Create an HTML document which consists of:

1. Ordered List
2. Unordered List
3. Nested List
4. Image



Q.3 Create an HTML document which implements Internal linking as well as External linking.

Q.4 Create a table using HTML which consists of columns for Roll No., Student's name and grade.

Result		
Roll No.	Name	Grade

Q.5 Create a Table with the following view:

			Place an image here	

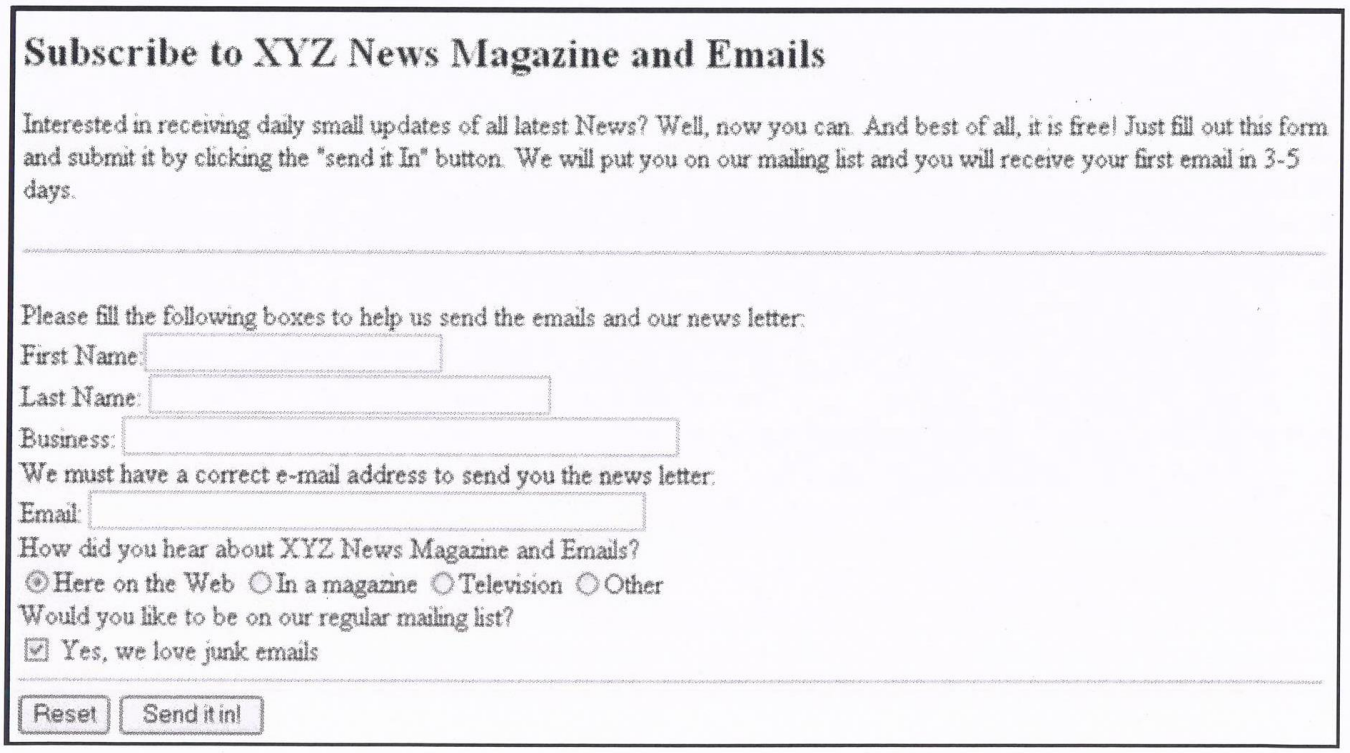
Q.6 Create a form using HTML which has the following types of controls:

I. Text Box

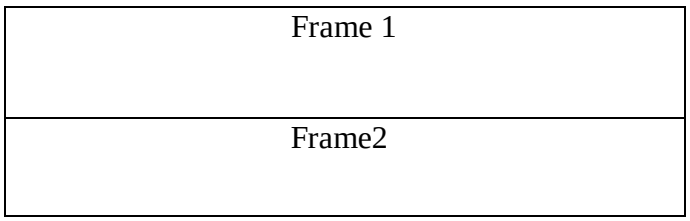
II. Option/radio buttons

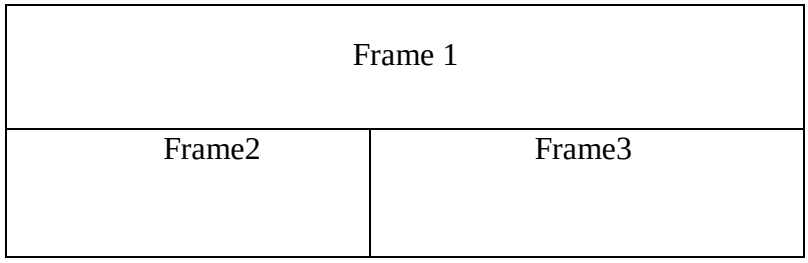
III. Check boxes

IV Reset and Submit buttons



Q.7 Create HTML documents (having multiple frames) in the following three formats:





List of projects using HTML and CSS(Only for web page and UI design):

1) Interactive response system like any CRM of MNC
2) Railway project administration system
3) Worker loan management system
4) A catalog management system
5) School management system
6) Hospital management system
7) Cyber Café ID system daily Report
8) Internet and Data report login system
9) Mobile dealership management system
10) Garment shop barcode with billing system
11) Coffee shop management system
12) School library system
13) College organization system
14) Travel Reservation system
15) Radio record system

Ability Enhancement Compulsory Courses (AECC)

Environmental Science

Course Outcomes:

At the completion of the course, a student will be able to:

1. Identify and justify key stakeholders in humanities and social sciences that need to be a part of sustainable solutions.
2. Articulate the interdisciplinary context of environmental issues.
3. Formulate an action plan for sustainable alternatives that integrate science, humanist, and social perspectives.
4. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
5. Access the qualitative and quantitative research methods to gain empirical evidence bearing on evaluation of environmentally sustainable alternatives

Detailed Syllabus

Unit I

Introduction To Environmental Sciences: Natural Resources: Environmental Sciences, Relevance, Significance of Public awareness, Forest resources, Water resources, Mineral resources, Food resources, conflicts over resource sharing, Exploitation, Land use pattern, Environmental impact, fertilizer, Pesticide Problems, case studies.

Unit II

Ecosystem, Biodiversity and Its Conservation: Ecosystem, concept, structure and function producers, consumers and decomposers, Food chain, Food web, Ecological pyramids, Energy flow, Forest, Grassland, desert and aquatic ecosystem

Biodiversity, Definition genetic, species and ecosystem diversity, Values and uses of biodiversity, biodiversity at global, national (India) and local levels Hotspots, threats to biodiversity conservation of biodiversity Insitu & Exsitu

Unit III

Environmental Pollution And Management: Environmental Pollution, Causes, Effects and control measures of Air, Water, Marine, soil, solid waste, Thermal, Nuclear pollution and Disaster Management, Floods, Earth quake, Cyclone and Landslides. Role of individuals in prevention of pollution, pollution case studies

Unit IV

Social Issues, Human Population: Urban issues, Energy water conservation, Environmental Ethics, Global warming, Resettlement and Rehabilitation issues, Environmental legislations, Environmental production Act. 1986 Air, Water, Wildlife and forest conservation Act, Population growth and Explosion, Human rights and Value Education Environmental Health HIV/AIDS - Role of IT in Environment and Human Health, Women and child welfare, Public awareness, Case studies.

Unit V

Visit to a local area / local polluted site / local simple ecosystem Report submission.

Books Recommended:

1. Kumarasamy, k., A Alagappa Moses and M.Vasanthy, 2004, Environmental studies, Bharathisadan University Publication, Trichy.
2. Kalavathy, s. (ed.) 2004, Environmental studies, Bishop Heber College Publication, Trichy.

Reference Books:

1. Rajamannar, 2004, environmental studies, Ever College Publication, Trichy.

Ability Enhancement Compulsory Courses (AECC)

Human Values & Professional Ethics

Course Outcomes:

After successful completion of the course, students will be able to:

1. Understand the significance of value inputs in a classroom and start applying them in their life and profession

2. Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.

3. Understand the role of a human being in ensuring harmony in society and nature.

4. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

Unit I

Human Values: Morals, Values, and Ethics, Integrity, Trustworthiness, Work Ethics, Service-Learning, Living Peacefully, Honesty, Courage, Caring, Sharing, Value Time, Co-operation, Commitment, Civic Virtue, Respect for others, Self-confidence, Empathy, Spirituality, Character.

Unit II

Principles for Harmony: Truthfulness, Customs and Traditions, Human Dignity, Value Education, Human Rights, Fundamental Duties, Aspirations, and Harmony (I, We & Nature), Emotional Intelligence, Gender Bias, Mayer Model, Emotional Competencies, Conscientiousness

Unit III

Engineering Ethics and Social Experimentation: History of Ethics, Need of Engineering Ethics, Senses of Engineering Ethics, Profession, and Professionalism, Self Interest, Moral Autonomy, Utilitarianism, Uses of Ethical Theories, Virtue Theory, Types of Inquiry, Deontology, Kohlberg's Theory, Heinz's Dilemma, Gilligan's Argument, Learning from the Past, Comparison with Standard Experiments, Consultants and Leaders, Engineers as Managers, Role of Codes, Balanced Outlook on Law, Codes and Experimental Nature of Engineering.

Unit IV

Engineers' Responsibilities towards Safety and Risk : The concept of Safety, Safety and Risk, Types of Risks, Voluntary v/s Involuntary Risk, Consequences, Risk Assessment, Liability, Accountability, Reversible Effects, Delayed v/s Immediate Risk, Threshold Levels of Risk

Engineers' Duties and Rights: Professional Duties, Collegiality, Techniques for Achieving Collegiality, Senses of Loyalty, Consensus and Controversy, Confidential and Proprietary Information, Professional and Individual Rights, Conflict of Interest, Ethical egoism, Collective Bargaining, Confidentiality, Gifts and Bribes, Occupational Crimes, Problem-solving, Industrial Espionage, Price Fixing, Whistle Blowing

Unit V

Global Issues: Globalization and MNCs, Business Ethics, Cross Culture Issues, Media Ethics, Endangering Lives, Environmental Ethics, Bio-Ethics, Computer Ethics, War Ethics, Research Ethics, Intellectual Property Rights

Text Books:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Engineering Ethics by Harris, Pritchard, and Rabins, Cengage Learning, New Delhi.
3. Human Values And Professional Ethics by Jayshree Suresh and B. S. Raghavan, S.Chand Publications
4. Ethics in Engineering by Mike W. Martin and Roland Schinzinger – Tata McGraw-Hill – 2003.

Reference Books:

1. Professional Ethics and Morals by Prof.A.R.Aryasri, DharanikotaSuyodhana – Maruthi Publications.
2. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.
3. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman, and M. Jayakumaran – University Science Press.
4. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan, and V.S.SenthilKumar- PHI Learning Pvt. Ltd – 2009.
5. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill – 2013

Semester-III

Discipline Specific Core Courses (DSC):

Operating System

Course Outcomes:

At the completion of the course, a student will be able to:

1. Recall the main components of an OS & describe the important computer system resources functions and the types of Operating Systems.
2. Explain the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS and understand the factors in OS design.
3. Evaluate the requirement for process synchronization and coordination handled by operating system
4. Categorize memory organization and explain the function of each element of a memory hierarchy and analyze its allocation policies.
5. Conceptualize the components involved in designing a contemporary OS.

Detailed Syllabus

Unit I

Introduction: System Software, Resource Abstraction, OS strategies.

Types of operating systems - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems.

Unit II

Operating System Organization: Factors in operating system design, basic OS functions, implementation consideration; process modes, methods of requesting system services - system Calls and system programs.

Unit III

Process Management: System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model, Deadlocks

Scheduling: Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies.

Unit IV

Memory Management: Mapping address space to memory space, memory allocation strategies, fixed partition, variable partition, paging, virtual memory, Introduction to File Management, IO Management

Unit V

Shell introduction and Shell Scripting: What is shell and various type of shell, Various editors present in Linux, Different modes of operation in vi editor, shell script, Writing and executing the shell script, Shell variable (user defined and system variables), System calls, Using system calls, Pipes and Filters, Decision making in Shell Scripts (If else, switch), Loops in shell, Function, Utility programs (cut, paste, join, tr, uniq utilities), Pattern matching utility (grep)

Text Books:

1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
2. A.S. Tanenbaurn, Modern Operating Systems, 3rd Edition, Pearson Education 2007.

Reference Books:

1. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
2. W, Stallings, Operating Systems, Internals & Design Principles, 5th Edition, Prentice Hall of India. 2008.
3. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

Operating Systems Lab

Course Outcomes:

At the completion of the course, a student will be able to:

1. Remember the functions, structures and history of operating systems.
2. Understand of design issues associated with operating systems
3. Apply concepts including scheduling, synchronization and deadlocks.
4. Distinguish multithreading , Multitasking & Multiprogramming and also able to explain the concept of memory management including virtual Evaluate the requirement for process synchronization and coordination handled by operating system
5. Categorize memory organization and explain the function of each element of a memory hierarchy and analyze its allocation policies.
6. Conceptualize the components involved in designing a contemporary OS.

Experiment List

1. Simulate the following CPU scheduling algorithms.

a) FCFS b) SJF c) Round Robin d) Priority.

2. Write a C program to simulate producer-consumer problem using Semaphores

3. Write a C program to simulate the concept of Dining-philosophers problem.

4. Write a C program to simulate the following contiguous memory allocation Techniques

a) Worst fit b) Best fit c) First fit.

5. Simulate all page replacement algorithms

a)FIFO b) LRU c) OPTIMAL

6. Simulate all File Organization Techniques

a) Single level directory b) Two level directory

7. Simulate all file allocation strategies

a) Sequential b) Indexed c) Linked.

8. Simulate Bankers Algorithm for Dead Lock Avoidance.

9. Simulate Bankers Algorithm for Dead Lock Prevention.

10. Write a C program to simulate disk scheduling algorithms.

a) FCFS b) SCAN c) C-SCAN

Discipline Specific Core Courses (DSC):

OOPs Using C++

Course Outcomes:

At the completion of the course, a student will be able to:

1. Have profound knowledge of object oriented programming.
2. Demonstrate the difference between the solutions offered by traditional imperative
3. Illustrate problem solving methods and object-oriented methods.
4. Explain the class inheritance, data encapsulation, polymorphism as fundamental building blocks to generate reusable code.
5. Understand and implement error handling and file handling routines.

Detailed Syllabus

Unit I

Different paradigms for problem solving, differences between OOP and Procedure oriented programming, Abstraction, Overview of OOP principles, Encapsulation, Inheritance and Polymorphism.

C++ Basics: Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Pointers and Arrays, Strings.

Unit II

Flow control statement- if, switch, while, for, do, break, continue, got statements. Functions-Scope of variables, Parameter passing, Default arguments, inline functions, Recursive functions, Pointers to functions, Dynamic memory allocation and de-allocation operators-new and delete, Preprocessor directives

C++ Classes And Data Abstraction: Class definition, Class structure, Class objects, Class scope, this pointer, Friends to a class, Static class members, Constant member functions, Constructors and Destructors

Unit III

Polymorphism: Function overloading, Operator overloading, Generic programming, necessity of templates, Function templates and class templates.

Inheritance: Defining a class hierarchy, Different forms of inheritance. Defining the Base and Derived classes, Access to the base class members, Base and Derived class construction. Destructors, Virtual base class.

Unit IV

Virtual Functions and Polymorphism: Static and Dynamic bindings, Base and Derived class virtual functions, Dynamic binding through virtual functions, Virtual function call mechanism, Pure virtual functions.

Unit V

C++ I/O: I/O using C functions, Stream classes' hierarchy, Stream I/O, File streams and String streams, Overloading « and » operators, Error handling during file operations, Formatted I/O.

Exception Handling: Benefits of exception handling, throwing an exception, the try block, catching an exception

Text Books:

1. Problem solving with C++, The OOP, 4th Edition, Walter Savitch, Pearson Education.
2. C++, The Complete Reference, 4th Edition, Herbert Schildt, TMH.

Reference Books:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.
3. OOP in C++, 3rd Edition, T.Gaddis, J.Walters and G.Muganda, Wiley DreamTech Press.
4. Mastering C++, K.R. Venugopal, Rajkumar Buyya, McGraw Hill Education, 2017.

OOPs Using C++ Lab

Course Outcomes:

At the completion of the course, a student will be able to:

After successful completion of the course, students will be able to:

1. Acquire profound knowledge of object oriented programming.
2. Demonstrate the difference between the solutions offered by traditional imperative problem solving method and object-oriented method
3. Explain the class inheritance, data encapsulation, polymorphism as fundamental building blocks to generate reusable code.
4. Understand and implement error handling and file handling routines.

Exercises:

1. Write a C++ program for function with default arguments
2. Write a C++ program to illustrate the concept of call by value.
3. Write a C++ program to illustrate the concept of call by reference
4. Write a C++ program to illustrate the concept of call by address.
5. Write a C++ program to illustrate the concept of Classes and objects.
6. Write a C++ program to create a mark list using arrays in C++ programming language.
7. Write a C++ program to perform operation on string class.
8. Write a C++ program to implement static member function.
9. Write a C++ program to display the details of a person using constant member function.
10. Write a C++ program to illustrate the concept of unary operator overloading.
11. Write a C++ program to illustrate the concept of Binary operator overloading.
12. Write a C++ program to illustrate the concept of function overloading.
13. Write a C++ program to multiply the positive numbers using single inheritance.
14. Write a C++ program using multiple inheritances for collecting employee details.
15. Write a C++ program for calculation of area of shapes using virtual functions.
16. Write a C++ program for a student mark list processing using virtual base class.
17. Write a C++ program using function template to find the maximum of two data.
18. Write a C++ program using class template to find the greater of the given two data's.
19. Write a C++ program for creating student data using sequential file access.
20. Write a C++ program for creating student data using random file access.

Discipline Specific Core Courses (DSC)

Software Engineering

Course Outcomes

At the completion of the course, a student will be able to:

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. Communicate effectively with a range of audiences
4. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
5. Acquire and apply new knowledge as needed, using appropriate learning strategies
6. Develop an efficient software using latest tools and techniques. Use of computer aided designing and automated testing tools.

Detailed Syllabus

Unit I

Software Process: Introduction, Software Engineering Paradigm, life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented), System engineering, computer based system, verification, validation, life cycle process, development process, system engineering hierarchy.

Unit II

Software requirements: Functional and non-functional requirements, requirement engineering process, feasibility studies, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, Software document analysis and modeling, data, functional and behavioral models, structured analysis and data dictionary

Unit III

Design Concepts and Principles: Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles, Real time systems, Real time software design, system design, real time execution, data acquisition system, monitoring and control system.

Unit IV

Software Configuration Management: The SCM process, Version control, Change control, Configuration audit, SCM standards.

Software Project Management: Measures and measurements, S/W complexity and science measure, size measure, data and logic structure measure, information flow measure. Estimations for Software Projects, Empirical Estimation Models, Project Scheduling,

Unit V

Testing: Taxonomy of software testing, levels, test activities, types of software test, black box testing boundary conditions, structural testing, test coverage criteria based on data flow, mechanisms, and regression testing in the large. Software testing strategies, strategic approach and issues, Unit testing, integration testing, validation testing, system testing and debugging

Trends in Software Engineering: Reverse Engineering and Re-engineering: wrappers, Case Study of CASE tools.

Text Books:

1. Roger S. Pressman, Software engineering- A practitioner's Approach, McGraw-Hill
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition. 2000.
3. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.

Reference Books:

1. James F Peters and Witold Pedryez, "Software Engineering-An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
2. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.

Software Engineering Lab

Course Outcomes

At the completion of the course, a student will be able to:

1. Compare between traditional ad-hoc method and SDLC based approach of software development.
2. Understand different theories, models, and techniques related to SDLC.
3. Apply the software engineering lifecycle for different projects by demonstrating competence in communication, planning, analysis, design, construction, and deployment
4. An ability to work in one or more significant application domains. Work as an individual and as part of a multidisciplinary team to develop and deliver quality software.
5. Develop of efficient software using latest tools and techniques. Use of computer aided designing and automated testing tools.

Exercises:

1. Practical Title

- Problem Statement,
- Process Model

2. Requirement Analysis

- Creating a Data Flow
- Data Dictionary,
- Use Cases

3. Project Management

- Computing FP
- Effort
- Schedule, Risk Table, Timeline chart

4. Design Engineering

- Architectural Design
- Data Design, Component Level Design

5. Testing

- Basis Path Testing

Sample Projects

- DTC Route Information: Online information about the bus routes and their frequency and fares
- Car Pooling: To maintain a web based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively.
- Patient Appointment and Prescription Management System
- Organized Retail Shopping Management Software

- Parking Allocation System
- Wholesale Management System

Discipline Specific Electives (DSE)

Computer Networks

Prerequisite: Basic Knowledge of Computers

Objectives:

1 Given an environment, after analyzing the channel characteristic

2 Appropriate channel access mechanism and data link protocols are chosen to design a network.

3 Given an environment, analyzing the network structure and limitations, appropriate routing protocol is chosen to obtain better throughput.

4 Given various load characteristics and network traffic conditions, decide the transport protocols and timers to be used.

Course Outcomes:

At the completion of the course, a student will be able to:

1. Independently understand basic computer network technology.
2. Identify the different types of network topologies and protocols.
3. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
4. Identify the different types of network devices and their functions within a network
5. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Detailed Syllabus

Unit I

Basic Concepts: Components of data communication, standards and organizations, Network Classification, Network Topologies; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.

Unit II

Physical Layer: Cabling, Network Interface Card, Transmission Media Devices- Repeater, Hub, Bridge, Switch, Router, Gateway.

Data Link Layer: Framing techniques; Error Control; Flow Control Protocols; shared media protocols - CSMA/CD and CSMA/CA.

Unit III

Network Layer: Virtual Circuits and Datagram approach, IP addressing methods - Subnetting; Routing Algorithms (adaptive and non-adaptive)

Transport Layer: Transport services, Transport Layer protocol of TCP and UDP

Unit IV

Application Layer: Application layer protocols and services - Domain name system, HTTP, WWW, telnet, FTP, SMTP

Unit V

Network Security: Common Terms, Firewalls, Virtual Private Networks.

Text Books:

1. B.A. Forouzan: Data Communication and Networking, 4th Edition, Tata McGraw Hill, 2007.

2. D.E. Comer, Internetworking with TCP/IP, Vol. I, Prentice Hall of India, 1998.

Reference Books:

1. W. Stalling, Data & Computer Communication, 8th edition, Prentice Hall of India, 2006.

2. D. Bertsekas, R. Gallager, Data Networks, 2nd edition, Prentice Hall of India, 1992.

Skill Enhancement Courses (SEC)

MySQL (SQL/PL-SQL)

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

1. Remember key concepts related to SQL including DDL, DML,DCL,DTL commands.
2. Understanding of PL/SQL elements like Cursors, Procedures, functions, triggers.
3. Applying cursors, procedures, functions and triggers on student database to perform different updating and manipulations in existing tables in database. Use of stored procedures, functions, cursors to ensure max reusability.
4. Analyze the limitations of SQL and supports provided by procedural language to develop a effective application.
5. Built a strong adherence in procedural language while creating application.

Detailed Syllabus

Unit I

SQL Vs. SQL * Plus: SQL Commands and Data types, Operators and Expressions, Introduction to SQL* Plus.

Unit II

Managing Tables and Data: Creating and Altering Tables (Including constraints),Data Manipulation Command like Insert, update, delete, SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT, Special operator like IN, ANY, ALL BETWEEN, EXISTS, LIKE.

Unit III

Join, Built in functions, Other Database Objects: View, Synonyms, Index. Transaction Control Statements: Commit, Rollback, Savepoint

Unit IV

PL/SQL: SQL v/s PL/SQL, PL/SQL Block Structure, Language construct of PL/SQL (Variables, Basic and Composite Data type, Conditions looping etc.), % TYPE and % ROWTYPE. Using Cursor (Implicit, Explicit).

Unit V

PL/SQL Procedure, Triggers, Exporting and importing data between MYSQL and Microsoft excel.

Text Books:

1. Baron Schwartz, High Performance MySQL, O'Reilly, 2012.
2. Vikram Vaswani, The Complete Reference MySQL, McGraw Hill Educations, 2004.

Reference Books:

1. Dyer, R. MySQL in a Nutshell 2e, OReilly; Rev Ed edition, (2008)
2. Reese, G. MySQL Pocket Reference 2e, O'Reilly, (2007)

Online Reading/Supporting Material:

1. MySQL http://www.mysql.com/ MySQL 5.0 Reference Manual.
2. http://dev,mysql.com/doc/refman/5.0/en/index.html

MySQL (SQL/PL-SQL) Lab:

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

1. Learn to use key concepts related to SQL including DDL, DML, DCL and DTL commands.
2. Developing of PL/SQL elements like Cursors, Procedures, functions, triggers.
3. Applying cursors, procedures, functions and triggers on various databases to perform different updating and manipulations in existing tables in database.
4. Building of databases for different project applications.

Exercises:

SQL COMMANDS

1) SQL* formatting commands

2) To create a table, alter and drop table.

3) To perform select, update, insert and delete operation in a table.

4) To make use of different clauses viz where, group by, having, order by, union and intersection,

5) To study different constraints.

[SQL FUNCTION]

6) To use oracle function viz aggregate, numeric, conversion, string function.

7) To understand use and working with joins.

8) To make use of transaction control statement viz rollback, commit and save point.

9) To make views of a table.

10) To make indexes of a table.

[PL/SQL]

11) To understand working with PL/SQL

12) To implement Cursor on a table.

13) To implement trigger on a table

List of projects using DBMS (PL/SQL for database design and connectivity):

1) Interactive response system like any CRM of MNC
2) Railway project administration system
3) Worker loan management system
4) A catalog management system
5) School management system
6) Hospital management system
7) Cyber Café ID system daily Report
8) Internet and Data report login system
9) Mobile dealership management system
10) Garment shop barcode with billing system
11) Coffee shop management system
12) School library system
13) College organization system
14) Travel Reservation system
15) Radio record system

Semester- IV

Discipline Specific Core Courses (DSC)

Computer Architecture

Course Outcomes:

At the completion of the course, a student will be able to:

1. Understand the theory and architecture of central processing unit.

2. Analyze some of the design issues in terms of speed, technology, cost, performance.

3. Design a simple CPU with applying the theory concepts.

4. Use appropriate tools to design verify and test the CPU architecture.

5. Learn the concepts of parallel processing, pipelining and interprocessor communication.

6. Understand the architecture and functionality of central processing unit.

7. Exemplify in a better way the I/O and memory organization.

8. Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.

Detailed Syllabus

Unit-I

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Common bus system, Computer Instructions, Instruction formats, Instruction Cycle, Fetch and Decode, Flowchart for Instruction cycle, Register reference instructions.

Unit-II

Register Transfer and Micro-operation: Register Transfer Language, Register Transfer, Bus and Memory Transfer, Three state bus buffers, Memory Transfer; Arithmetic Micro operations, Logic Micro operations.

Unit-Ill

Micro programmed Control Unit: Design of Control Unit, and Central Processing Unit: Introduction, General Register Organization, and Stack Organization: Register stack. Memory stack; Instruction Formats, Addressing Modes

Unit-IV

Input Output Organization: Peripheral devices, Input Output interface, Modes of Data Transfer, Priority Interrupt and Direct Memory Access.

Unit-V

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Text Books:

1. M. Mano, Computer System Architecture, Pearson Education 1992.
2. Digital Design, M.M. Mano, Pearson Education Asia, 1979.

Reference Books:

3. A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004.
4. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India, 2009.

Discipline Specific Core Courses (DSC)

Programming in Java

Course outcomes:

At the completion of the course, a student will be able to:

1. Recall the basic knowledge on Object Oriented concepts specially in java.
2. Create & design applications using Object Oriented Programming Concepts using java
3. Describe for compile, test and run Java programs comprising more than one class
4. Create simple data structures like arrays in a Java program
5. Explain members of classes found in the Java API

Detailed Syllabus

Unit I

Introduction to Java: Features of Java, JDK Environment, Object Oriented Programming Concept Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA

Unit II

Java Programming Fundamental: Structure of Java program, Data types, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch),Looping(for, while) ,Type Casting Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor

Unit III

Arrays and Strings: Arrays, Creating an array, Types of Arrays, String class Methods, String Buffer

methods.

Implementation of Inheritance, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes

Unit IV

Abstract Class, Interface and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages

Exception Handling: Exception types, using try catch and multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions.

Unit V

File Handling: Byte Stream, Character Stream, File 10 Basics, File Operations, Creating file, Reading file, Writing File

Applet Programming: Introduction. Types Applet, Applet Life cycle, Creating Applet, Applet tag

Text Books:

1. Herbert Schildt, Java 7, The Complete Reference, 8th Edition, 2009.
2. E Balagurusamy, Programming with JAVA, TMH, 2007.

ReferneceBooks:

1. Ivan Bayross, Web Enabled Commercial Application Development Using Html, Dhtmljavascript, Perl Cgi, BPB Publications, 2009.
2. Cay Horstmann, BIG Java, Wiley Publication , 3rd Edition., 2009.

Java Programming Lab

Course outcomes:

At the completion of the course, a student will be able to:

1. Recall traditional imperative design and object-oriented Design using java
2. Understand class structures as fundamental, modular building blocks
3. Describe for compile, test and run Java programs comprising more than one class
4. Create simple data structures like arrays in a Java program
5. Create and Specify classes found in the Java API

Exercises:

1. Write a program to find the largest of n natural numbers.
2. Write a program to find whether a given number is prime or not.
3. Write a menu driven program for following:
   a. Display a Fibonacci series
   b. Compute Factorial of a number
   c. Write a program to check whether a given number is odd or even.
   d. Write a program to check whether a given string is palindrome or not.
4. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
5. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
6. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
7. Write a program in Java to input N numbers in an array and print out the Armstrong numbers from the set.
8. Write Java program for the following matrix operations:
   a. Addition of two matrices
   b. Summation of two matrices
   c. Transpose of a matrix
   d. Input the elements of matrices from user.
9. Write a Java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
10. Write a Java for the implementation of multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
11. Write a Java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.

12. Write a Java program to draw a line between two coordinates in a window.

13. Write a java program to display the following graphics in an applet window.

    a. Rectangles

    b. Circles

    c. Ellipses

    d. Arcs

    e. Polygons

14. Write a program that reads two integer numbers for the variables a and b. If any other Character except number (0-9) is entered then the error is caught by Number Format Exeeption object. After that ex.getMessage() prints the information about the error occurring causes.

15. Write a program for the following string operations:

    a. Compare two strings

    b. Concatenate two strings

    c. Compute length of a string

16. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

Discipline Specific Electives (DSE)

Internet and Web Design

Course outcomes:

At the completion of the course, a student will be able to:

1. Apply the basic concepts for network implementation. Review the current topics in Web & Internet technologies.
2. Interpret and Learn the basic working scheme of the Internet and World Wide Web.
3. Describe fundamental tools and technologies for web design.
4. Identify and comprehend the technologies for Hypertext Mark-up Language (HTML).
5. Create and specify design rules in constructing web pages and sites.

Detailed Syllabus

Unit I

Introduction to Web Design: Introduction to hypertext markup language (html) document Type definition, creating web pages, graphical elements, lists, hyperlinks, tables, web forms, inserting images, frames.

Unit II

Customized Features: Cascading style sheets, (ess) for text formatting and other manipulations, **JavaScript:** Data types, operators, functions, control structures, events and event handling.

Unit III

Java: Use of Objects, Array and Array List class, Designing classes, Inheritance, Input/output, Exception Handling.

JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, working with statements, Creating and Executing SQL Statements, Working with Result Set Objects.

Unit IV

JSP: Introduction to JavaServer Pages, HTTP and Servlet Basics, The Problem with Servlets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment, Implicit JSP Objects, Conditional Processing, Displaying Values

Unit V

Using an expression to set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data between JSP Pages, Requests, and Users, Database Access.

Text Books:

1. Web Enabled Commercial Application Development Using Html, Dhtml, javascript. Perl Cgi by Ivan Bayross, BPB Publications, 2009.
2. The Complete Reference J2EE, TMH, Jim Keogh, 2002, Java Server Pages, Hans Bergsten, Third Edition, O'Reilly Media December 2003.

Reference Books:

3. BIG Java Cay Horstmann, Wiley Publication , 3rd Edition., 2009
4. Java 7, the Complete Reference, Herbert Schildt, 8th Edition, 2009.

Internet and Web Design Lab

Course outcomes:

At the completion of the course, a student will be able to:

1. Recall traditional imperative design and object-oriented Design using java
2. Understand class structures as fundamental, modular building blocks
3. Describe for compile, test and run Java programs comprising more than one class
4. Create simple data structures like arrays in a Java program
5. Create and Specify classes found in the Java API

Exercises:

JAVA Script

1. Create a student registration form. Create functions to perform the following checks:
   a. Roll number is a 7-digit numeric value
   b. Name should be an alphabetical value(String)
   c. Non-empty fields like DOB
2. Implement a static password protection.
3. Write a Java script
   a. To change the colour of text using SetTimeOut()
   b. To move an image across screen using SetInterval()

JAVA Programs

1. Write a program to find the largest of n natural numbers.
2. Write a program to find whether a given number is prime or not
3. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
4. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
5. Write Java program for the following matrix operations;
   a. Addition of two matrices
   b. Summation of two matrices
   c. Transpose of a matrix

   Input the elements of matrices from user
6. Write a Java program that computes the area of a circle, rectangle and a Cylinder using function overloading.

JDBC

1. Create a table 'Student' and 'Teacher' in 'College' database and insert two rows in this newly created table using JDBC API and do the following:

a. Update an already created table Teacher' in 'College' database by updating a teacher's name, with "Dr." appended before the name, whose name is "Rita".

b. Repeat the same thing for all the teachers using PreparedStatement.

c. Delete the student with ID=3 from 'Student' database.

d. Insert two students to the ResultSet returned by the query which selects all students with FirstName="Ayush". The database must also get updated along with ResultSet.

2. Create a procedure in MySQL to count the number of Rows in table 'Student'. Use Callable Statement to call this method from Java code.

JSP Practical list

1. Display the pattern:

1

1 2

1 2 3

Take 'n' in a textbox from user. Display this pattern using

- Scriptlets
- <c:forEach> loop

2. Make two files as follows:
   a. main.html: shows 2 text boxes and 3 radio buttons with values "addition", "subtraction" and "multiplication"
   b. operate.jsp: depending on what the user selects perform the corresponding function

   (Give two implementations: using request, get Pararneter() and using expression language)
3. Validate User input entered in a form. The input must include Name, DOB, Email ID, Lucky Number, Favorite food etc. (Refer Chapter 8)
4. Display Good Morning <uname>, Good Afternoon <uname> or Good Evening <uname> based on the current time of the day.
5. Create your custom library which contains two tags: <hello>, <choco>.

Usage of the tags:

- <hello name="Ajay">: Output should be Hello Ajay. It contains a mandatory attribute 'name' which can accept Dynamic value.
- <choco texture="Chewy">: Output should be FiveStar, BarOne. <choco texture="Crunchy">: Output should be Munch. KitKat.

That means the mandatory attribute must accept a value, and based on the attributes value, it should give output. You must use a bean ChocoBean for this purpose.

List of projects using JSP, JDBC and JAVA Script (UI Design Validation and Verification):

1) Interactive response system like any CRM of MNC
2) Railway project administration system
3) Worker loan management system
4) A catalog management system
5) School management system
6) Hospital management system

7) Cyber Café ID system daily Report
8) Internet and Data report login system
9) Mobile dealership management system
10) Garment shop barcode with billing system
11) Coffee shop management system
12) School library system
13) College organization system
14) Travel Reservation system
15) Radio record system

Discipline Specific Electives (DSE)

E-Commerce Technologies

Course outcomes:

At the completion of the course, a student will be able to:

1. Identify and explain fundamental web site tools including design tools, programming tools, and data processing tools.
2. Apply the solutions on finding major electronic payment issues and options.
3. Acquire the knowledge of security issues and explain procedures used to protect against security threats.
4. Communicate effectively in ways appropriate to the discipline, audience and purpose.
5. Implement the corrective measures to management issues underlying e-Commerce issues including organizational structure, strategic planning, goal setting, corporate social responsibility, international arena, changing market intermediaries, resource allocation and customer service.

Detailed Syllabus

Unit I

An introduction to Electronic commerce: What is E-Commerce (Introduction and Definition), Main activities E-Commerce. Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, 9 Electronic Commerce and Electronic Business(C2C)(C2G,G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C)

Unit II

The Internet and WWW: Evolution of Internet, Domain Names and Internet Organization (.edu, .com, .mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website, Cost, Time, Reach, Registering a Domain Name, Web promotion, Target email, Barter, Exchange, Shopping Bots

Unit III

Internet Security: Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime(Laws , Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus(How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Authorization and Authentication, Firewall, Digital Signature(How it Works)

Unit IV

Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash

Unit V

Planning for Electronic Commerce: Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites.

Internet Marketing; The PROS and CONS of online shopping, The cons of online shopping. Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

Text Books:

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies- :- Himalaya Publishing House, 2011.

2. Kamlesh K Bajaj and Debjani Nag, E- Commerce, 2005.

Reference Books:

3. Gray P. Schneider, Electronic commerce, International Student Edition, 2011.

4. E-Commerce, Fundamentals and Applications, Wiely Student Edition,

Skill Enhancement Courses(SEC)

Shell Programming and System Administration

Course outcomes:

At the completion of the course, a student will be able to:

1. Understand the installation and configuration of mainstream operating systems, important network services.
2. Explain about disaster recovery procedures, and techniques for ensuring the security of the system.
3. Manage system resources, including methods for tracking system metrics.
4. Apply these skills in the administration of an actual computer system with actual users.
5. Configure desktop environment that users would normally require for day to day operations.

UNIT – I

Overview of Linux:what is Linux, root in Unix,Common Linux Features ,advantage of Linux

Overview of Unix and Linux architectures,Linux files system, hardware requirements for Linux

Linux standard directories,Commands for files and directories cd, ls, cp, rm, mkdir,

rmdir, pwd, file, more, less, Creating and viewing files using cat file comparisons .

UNIT – II

Essential Linux commands, Processes in Linux, Process fundamentals,Connecting processes with pipes, Redirecting input, Redirecting output, Backgroundprocessing, Managing multiple processes, Process scheduling – (at, batch), nohupcommand, kill, ps, who,find, sort, touch, filefile processing commands – wc, cut, paste etc, Mathematical commands – expr, factor etc, Creating files with vi editor, Editing files with vi editor.

UNIT – III

Shell programming: Basics of shell programming, various types of shell available in Linux

Comparisons between various shells, Shell programming in bash ,Conditional statements

Looping statements, Case statements, Parameter passing and arguments, Shell variables, System shell variables, shell keywords, Creating Shell programs for automating system tasks.

UNIT – IV

System administration: Common administrative tasks, identifying administrative files, Configuration and log files, Role of system administrator , managing user accounts -adding users, Managing user accounts - deleting users , Changing permissions and ownerships, Creating and managing groups, Modifying group attributes, Temporary disabling of users accounts, Creating and mounting file system, Checking and monitoring system performance, file security & Permissions, becoming super user using su, Getting system

information with uname, host name, Disk partitions & sizes, users, kernel, installing and removing packages, rpm command.

UNIT – V

Simple filter commands & Understanding various Servers: Filter Commands-pr, head, tail, Filter Commands -cut, sort, Filter Commands- uniq, tr, Filter using regular expression grep, Filter using regular expression egrep, sed, DHCP, DNS, Squid, Apache, Telnet, FTP, Graham Glass, King Ables, Pearson Education

TEXT BOOKS:

1. W. Richard. Stevens (2005), Advanced Programming in the UNIX Environment, 3rd edition, Pearson Education, New Delhi, India.

2. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg.Thomson

REFERENCES:

1. Linux System Programming, Robert Love, O'Reilly, SPD.

2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.

3. UNIX Network Programming, W.R. Stevens, PHI.

UNIX for Programmers and Users, 3rd Edition, Graham Glass, King Ables, Pearson Education

Shell Programming and System Administration Lab

Course outcomes:

At the completion of the course, a student will be able to:

1. Students learn the installation and configuration of mainstream operating systems, important network services.
2. Students learn to manage system resources, including methods for tracking system metrics.
3. Can apply these skills in the administration of an actual computer system with actual users.
4. Configuration of desktop environment that users would normally require for day to day operations.

Exercises:

1. Study of Linux Terminal
2. Linux commands- PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir,rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip,
3. file handling utilities, security by file permissions,process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask,ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text Processing utilities and backup utilities , tail, head ,sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg,comm, cmp, diff, tr, awk, cpio.
4. Write a shell script which ask your name, age, department, and course and lastly give the syntax to display all your information.
5. Write a shell script which asks your Enrolment no., name, name of 3 subjects and marks obtained.
6. Display these fields by using echo and equal operator.
7. Write a shell script, declare 5 variables and assign values to them. Display the values in the given order: - 1, 5,2,3,4.
8. Write a shell script that creates a file containing the message that this file is created today i.e. on the current date followed are the users of UNIX at this moment and show the list of users.
9. Write a shell script that accepts two file names from the command line, copies the first to second file and display the second file.
10. Write a shell script that accepts two parameters i.e. two files, append file1 to file2 and display file2.
11. Write a shell script that assigns execute permission to a file.
12. Write a shell script that accepts one file and directory name and move that file tothe directory and show recursive listing and long listing.
13. Write a shell script where we create a directory, move to the directory, create a file. Show the present path and display the file.
14. Write a shell script that asks your name and invite you on current date for a party and append this message to a file name party.
15. Write a shell script that reads a file name from command line and changes name to filename.logname.
16. Display the number of links and size of the file given as the command line argument.
17. Write a shell script which displays the date in desired format i.e. Monday 25 September 2006. Write a shell script by which you create a branch \usr directory till depth of d5 and using concept of

assigning the path to the variables do the movements within this directory path and create two files in each directory from d1.

18. Write a shell script and declare two variables A and B. Take static valueof A=5 and B=3. Perform all operations on it.
19. Write a shell script which accepts a number and checks whether the number is an odd or even number.
20. Write a shell script to give the result of student. Take marks of the five subjects, student name, roll no and percentage and show a message whether a student gets division as per the following rules:
    70% <-> distinction 60 %-> 1st divisions 50 %-> 2nd divisions
    <40 %-> Fail
21. Write a shell script which checks the age of the student for swimming. The condition are as follows:
    <10- not allowed 10- 18- junior pool only

    >18- swimming is allowed in depth also.

22. Write a shell script to find out the gross salary of an employee when the given information is as under:-
    a) If basic salary is less than Rs.1500/-HRA = 10% of basicDA = 90% of basic
    b) If basic is greater than or equal to Rs.1500/-HRA = 500/- , DA = 98% of basic
23. Write a shell script to enter a year and show a message whether the year is a leap year or not.
24. Write a shell script using concept of position parameters which copies one file and display destination file and it should also contain an error message if the source file
25. Write a shell script to calculate the gross salary of an employee whose basic salary is entered through keyboard. His DA=40% of basic and HRA=20% of basic.
26. Write a shell script where distance between two cities is input through the keyboard in km.
27. Convert and print this distance in meters, feet, inches and cm.
28. Write a shell script to find area and perimeter of rectangle.
29. Write shell scrip to find area and circumference of the circle.
30. Write a shell script to find sum of digits of a number and check whether the number is palindrome or not.
31. Pass a filename as command line argument to script which finds
    (i) Whether file exists or not.
    (ii) Display the message what type of file it is.
    (iii)(a) If the file is ordinary files check its read permission. If available display the file else display message read permission denied. (b) Check its write permission and if available append that file by your name and course, else display error message. (c) Check executes permission & if available shows the output of that file.
    (iv)(a) if it's a directory checks its read permission, if available list the directory.
32. (b) Check its write permission; if available make a sub-directory in that directory. Create two file in that sub-directory that you created just now.
33. Write a menu driven program:-
    a) Place the pwd of user.
    b) List the directory of user.
    c) Long listing the directory of the user and at the same time this long listing is to be stored in a file.
    d) Create a file in your directory and copy this file in your directory.
    e) Move the specified file to your parent directory.
    f) Rename the specified file in the current directory.

g) Make a sub directory in the current directory and change its permission by taking away all the permission of group and others.

34. Write a Menu driven program
    a) Check the contents of /etc/passwd file.
    b) List of users who have currently logged in.
    c) Pwd

    d) Exit

Ability Enhancement Compulsory Courses (AECC)

ENGLISH-II

Course outcomes:

At the completion of the course, a student will be able to:

1. Learn the grammatical concepts and communication process for effective communication skills.
2. Develop the habit of reading and understanding the text for better comprehensive skills.
3. Identify the importance of Time Management, Goals and Business etiquette.
4. Apply their effective communication and writing skills at their work place.

Detailed Syllabus

Unit I

Grammar: Articles, Parts of Speech, Subject – Verb Agreement, Moral Verbs, Direct & Indirect & Speech

Unit II

Communication: Definition, Process and Importance, Communication Barriers, Types of Communication- Formal, Informal: Verbal, Non Verbal

Unit III

Smart Goals, Time Management, Business Etiquette, Long Term & Short Term Goals

Unit IV

Comprehension: 'Of Studies' by Francis Bacon, 'where the mind is without fear' by Rabindra Nath Tagore, 'Last Leaf' by O' Henry, 'Mending Wall' by Robert Frost

Unit V

Composition: Dialogue Writing, Group Discussion, Report Writing, Letter- Formal & Informal, C V / Resume Writing

Text Books:

1. A Practical English Grammar (4th Edition) by A. J. Thomson (Author), A. V. Martinet.
2. Wrien, P.C & Martin. H. "English Grammar & Composition". S. Chand.

Reference Books:

1. Close, R. A. Reference Grammar for Students of English. Orient Longman.

Semester-V

Discipline Specific Core Courses (DSC):

Computer Graphics and Multimedia

Course outcomes:

At the completion of the course, a student will be able to:

1. Remember the technical aspect of Multimedia Systems.
2. Understand various file formats for audio, video and text media.
3. Develop various Multimedia Systems applicable in real time.
4. Design interactive multimedia software.
5. Apply various networking protocols for multimedia applications.
6. Evaluate multimedia application for its optimum performance.

UNIT-I

Introduction: The Advantages of Interactive Graphics, Representative Uses of Computer Graphics, Classification of Application Development of Hardware and software for Computer Graphics, Conceptual Framework for Interactive Graphics, Overview,
Scan: Converting Lines, Scan Converting Circles, Scan Converting Ellipses.

UNIT-II

Hardcopy Technologies, Display Technologies, Raster-Scan Display System, Video Controller, Random-Scan Display processor, Input Devices for Operator Interaction, Image Scanners.
Clipping Southland- Cohen Algorithm, Cyrus-Beck Algorithm, Midpoint Subdivision Algorithm.

UNIT-III

Geometrical Transformation: 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Composition of 2D Transformations, The Window-to-Viewport Transformation, Efficiency, Matrix Representation of 3D Transformations, Transformations as a Change in Coordinate System.

UNIT-IV

Multimedia Elements, Multimedia Applications, Multimedia System Architecture, Evolving Technologies for Multimedia Systems, Multimedia Data Interface Standards, the Need for Data Compressions, Multimedia Database.

UNIT-V

Media and Data Streams: Medium, Main Properties of a Multimedia Stream, Multimedia System Definition, Combination of Media. Data & File Format Standards: Rich –Text Format, TIFF File Format, RIFF, MIDI File Format, JPEG DIB File Format, MPEG Standards.

Text Books:

1. Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles& practice,2000.
2. Ralf Skinmeiz and KlanaNaharstedt, Multimedia: computing, Communication and Applications, pearson, 2001
3. D.Harn& Baker. Computer Graphics Prentice Hall of India,1986.

4. J. F. Koegel Buferd -Multimedia Systems, Pearson Education, New Delhi, 2006

Text Books:

1. Villamil and Molina, "An Introduction to Multimedia", MacMillan, 1997
2. Lozano, "Multimedia: Sound & Video", Prentice Hall of India (Que), 1997.
3. Ranjan Parekh, "Principle of Multimedia", Tata McGraw Hilf.
4. Villamil and Molina, "Multimedia: Production, Planning and Delivery", Que, 1997.

Reference Books:

5. Sinclair, "Multimedia on the PC". BPB Publications
6. Tay Vaughan. "Multimedia: Making It Work", Fifth edition, Tata McGraw Hill, 1994.
7. James E Shuman, "Multimedia in Action", Wadsworth Publications, 1997.
8. Jeff Coate Judith, "Multimedia in Practice", Prentice Hall of India, 1995 John F. Koegel, "Multimedia Systems", Addison Wesley Ltd.

Computer Graphics and Multimedia Lab

Course outcomes:

At the completion of the course, a student will be able to:

1. Identify the basic tools and components of a multimedia project.
2. Apply basic elements and principles of photo editing software to achieve a great photo
3. Apply effects like color, shadows, alteration of backgrounds, cropping and Collage making.
4. Create simple shapes using animation editing software and design.
5. Prepare and present a multimedia portfolio containing electronic media that demonstrates multimedia and problem-solving skills.

Practical exercises

1. Write a program to draw a chain of diamonds.

2. Write a program to draw village of houses.

3. Write a program to create checker board effect.

4. Write a C program to implement line drawing algorithm.

5. Write a C program to implement circle drawing algorithm.

6. Write a C program to implement the Line, Circle and ellipse attributes by drawing "House".

7. Write a C program to implement ellipse drawing algorithm.

8. Write a C program to implement two Dimensional transformations - Translation, Reflection, and Shear.

9. Write a C program to implement two Dimensional transformations - Rotation (With and without pivot point), Scaling (With and without pivot point).

10. Write a C program to implement composite 2D Transformations – Translation, Scaling, Rotation.

11. Write a C program to implement composite 2D Transformations –fixed point scaling, fixed point rotation.

12. Write a C program to implement Cohen Sutherland 2D line clipping algorithm.

13. Write a C program to implement Sutherland – Hodgeman Polygon clipping Algorithm.

14. Write a C program to implement three dimensional transformations - Translation, Rotation, Scaling.

15. Write a C program to implement composite 3D transformations - Translation, Rotation, and Scaling.

16. Draw an animation to show a bouncing ball.Design a moving ball in V-shape
17. Draw an animation to show a moving stick man.
18. Draw an animation to show a fainting banana.
19. Draw an animation to show sunrise and sunset.
20. Draw an animation to show a disappearing house.
21. Draw an animation to show two boats sailing in river
22. Draw an animation to show a scene of cricket match.
23. Draw an animation to help teach a poem or a song
24. Draw an animation to show cartoon with a message.
25. Create Spot Light using Macromedia Flash.
26. Make a movie showing Shape Tweening.
27. Make a movie showing Motion Tweening.
28. Add sound and button to the movie
29. Create Animated Pool Table.
30. Create Bow & Arrow hitting a Ball.

Discipline Specific Core Courses (DSC):

Programming in .NET

Course outcomes:

At the completion of the course, a student will be able to:

1. Remember the programming skills and be familiar with programming environment.
2. Apply the concept so the students will be able to use ASP.NET controls in web applications.
3. Interpret the to debug and deploy ASP.NET web applications
4. Describe to create database driven ASP.NET web applications and web services
5. To develop, implement, and demonstrate Component Services, Threading, remoting, Windows services.
6. Create and develop Assemblies and Deployment in .NET, Application Development.

Detailed Syllabus

Unit I

The Framework of .Net: Building blocks of .Net Platform (the CLR, CTS and CLS), Features of .Net, deploying the .Net Runtime, Architecture of .Net platform, Introduction to namespaces & type distinction. Types & Object in .Net, the evolution of Web development.

Unit II

Class Libraries in .Net, Introduction to Assemblies & Manifest in .Net, Metadata & attributes. Introduction to C#: Characteristics of C#, Data types: Value types, reference types, default value, constants, variables, scope of variables, boxing and unboxing.

Unit III

Operators and expressions: Arithmetic, relational, logical, bitwise, special operators, evolution of expressions, operator precedence & associativity. Control constructs in C#: Decision making, loops. Classes & methods: Class, methods, constructors, destructors, overloading of operators & functions.

UNIT-IV

Inheritance & polymorphism: visibility control, overriding, abstract class & methods, sealed classes & methods, interfaces.

UNIT-V

Advanced features of C#: Exception handling & error handling, automatic memory management, Input and output (Directories, Files, and streams).

Text Books:

1. Introduction to C# using .NET By Robert J. Oberg, PHI, 2002,
2. Programming in C# by E. Balaguruswamy, Tata McGraw Hill,

Reference Books:

1. The Complete Guide to C# Programming by V. P. Jain.

.NET Programming Lab

Course outcomes:

At the completion of the course, a student will be able to:

1. Apply the concept so the students will be able to use ASP.NET controls in web applications.
2. Interpret the debug and deploy ASP.NET web applications.
3. Develop, implement, and demonstrate Component Services, Threading, remoting, Windows services.
4. Identify Security in the .NET framework and Deployment in the .NET.
5. Develop Assemblies and Deployment in .NET, Application Development

Exercises:

1. Write a simple program in C# to write a string on the screen
2. Write a program in C# to prompt the user for some input and then take some action.
3. Write a program in C# to demonstrate different kinds of arrays including jagged arrays.
4. Write a program to demonstrate boxing.
5. Write a program to demonstrate how unary operators are used.
6. Write a program in C# to demonstrate how binary operators work.
7. Write a program in C# to find out trie range of number from 1-10 or 11-20 or 21-30 or less than 1.
8. Write a program in C# to find out the number entered between 1 -3.
9. Write a program in C# to override a method which calculates pay of an employees to take bonus into account.
10. Write a program in C# to ask a user to enter a choice to add, delete, modify or view address using methods for each functionality.
11. Write a program in C# to demonstrate and verify that the static constructor runs only one time, even though two instances of Class are created, and that it runs before the instance constructor runs.

Discipline Specific Core Courses (DSC):

Data Warehousing and Data Mining

Course outcomes:

At the completion of the course, a student will be able to:

1. Identify the basic concepts and need of the data warehousing and data mining with its various application.
2. Summarize the Data Warehousing Architecture and Data Mining Architecture along with the physical design and deployment process.
3. Experiment with single dimensional and multi dimensional association rules for data mining.
4. Assess the various classification techniques such as Bayesian classification, Classifier accuracy, Clustering Methods and Outlier analysis etc.
5. Determine the various applications and algorithms for data mining, text mining and web mining.

Detailed Syllabus

Unit I

Data Warehousing: Introduction- Definition and description, need for data ware housing, need for strategic information, failures of past decision support systems, OLTP vs DWH, Requirements-trends in DWH Application of DWH.

Unit II

Data Warehousing Architecture: Reference architecture, Components of reference architecture, Data warehouse building blocks, implementation, physical design process and DWH deployment process, Multidimensional Data Model and Data Warehouse Architecture.

Unit III

Data Mining: Data mining tasks, Data mining vs. KDD , Issues in data mining, Data Mining metrics, Data mining architecture, Data cleaning, Data transformation , Data reduction and Data Mining primitives.

Unit IV

Association Rule Mining: Introduction to Mining, single dimensional Boolean association rules from transactional databases, multi-dimensional association rules.

Classification and Prediction: Classification Techniques, Issues regarding classification and prediction. Decision tree, Bayesian classification, Classifier accuracy, Clustering Methods

and Outlier analysis.

UNIT V

Applications and Other Data Mining Methods: Distributed and parallel Data Mining Algorithms, Text mining and Web mining

Text Books:

1. Jiawei Han and Micheline Kamber," Data Mining Concepts and Techniques", Morgan Kaufmann Publishers, USA, 2006.
2. BersoiV'DataWarehousing, Data Mining and OLAP", Tata McGraw Hill Ltd, New Delhi, 2004.
3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining,, Pearson Education.

Reference Books:

1. Arun K Pujari,"Data mining techniques", Oxford University Press, London, 2003.
2. Dunham M H,"Data mining: Introductory and Advanced Topics". Pearson Education, New Delhi, 2003.
3. Mehmed Kantardzic," Data Mining Concepts, Methods and Algorithms", John Wiley and Sons, USA, 2003.
4. Soman K. P., DiwakarShyam, Ajay V., Insight into Data mining: Theory and Practice, PHI 2006.

Discipline Specific Electives (DSE)

Management Information System

Course outcomes:

At the completion of the course, a student will be able to:

1.Relate the basic concepts and technologies used in the field of management information systems.

2. Compare the processes of developing and implementing information systems.

3. Outline the role of the ethical, social, and security issues of information systems.

4. Translate the role of information systems in organizations, the strategic management processes, with the implications for the management.

5. Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization.

UNIT – I

Meaning and role of MIS: Introduction to MIS, definition & characteristics of MIS, Components of MIS, Nature & Scope of MIS, MIS organization within the company. Management, organizational theory & systems Approach: Development of organization theory, management & organizational behavior, management, information, and the systems approach. Introduction to system and Basic System Concepts, Types of Systems Information System: Definition & Characteristics, Types of information, Role of Information in Decision-Making, Sub-Systems of an Information system: EDP and MIS Levels of Management TPS/MIS/DSS.

UNIT – II

Information Systems for Decision making: Evolution of an Information System, Basic information systems, Decision making & MIS, Types of decisions--Structured Vs Unstructured decisions, Strategic , tactical & operational information for taking decisions, Simon's model of decision-making. MIS as a technique for making programmed decisions, decision assisting information systems.

UNIT – III

Strategic and project planning for MIS: General business planning, appropriate MIS

response, MIS planning – general, MIS planning – details. Conceptual Design – Definition of the problem, system objective and system constraints, analysis of information source, alternative system design and selection of optimal system, conceptual system designs document.

UNIT – IV

Detailed System Design: Inform & Involvement of end user, aim of detailed design, project management, identification & trade-off criteria, defining subsystems, degree of automation of each operation, inputs, outputs & processing, early system testing, software, hardware & tools, documentation, Role of Top management during design.

UNIT – V

Implementation, evaluation and maintenance of the MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train and operating personnel, computer-related acquisitions, develop forms for data collection and information, dissemination, develop the files, test the system, cut over, document the system, evaluate the MIS, control and maintain the system. System maintenance: Corrective, Adaptive & perfective maintenance. Pitfalls in MIS: Fundamental weaknesses. Functional MIS: A Study of Marketing, Personnel, Accounting MIS.

BOOKS RECOMMENDED:

1. R. G. Murdick, J. E. Ross and J. R. Clagget, "Information SystemsforModern Management", 3rd Edition by, PHI – 1994

2. D. P. Goyal, "Management Information Systems", Macmillan Business Books

3. Laudon&Laudon, "Information Systems", PHI

Skill Enhancement Courses (SEC)

Android Programming

Course outcomes:

At the completion of the course, a student will be able to:

1. Remember Android platform, Architecture and features.
2. Understand the User Interface and develop activity for Android App.
3. Design and implement Database Application and Content providers.
4. Use multimedia, camera and Location based services in Android App.

5. Discuss various security issues in Android platform

Detailed Syllabus

UNIT I

Introduction: History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.

UNIT II

Overview of object oriented programming using Java: OOPs Concepts: Inheritance, Polymorphism,

Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine

UNIT III

Development Tools: Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project, Hello World, run on emulator, Deploy it on USB-connected Android device.

UNIT IV

User Interface Architecture: Application context, intents. Activity life cycle, multiple screen sizes.

User Interface Design: Form widgets, Text Fields, Layouts. Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, and Dialog.

UNIT V

Database: Understanding of SQLite database, connecting with, the database.

Text Books:

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.
2. Android Wireless Application Development By Lauren Darcey and Shane Conder, Pearson Education, 2nd ed. (2011)
3. Using SQLite By Jay A. Kreibich, Publisher: O'Reilly Media.

Reference Books:

1. Mobile Computing using Android and iPhone [ISBN: 978-93-81786-93-2] by Bharat & Company.
2. Professional Android 2 Application Development Reto Meier, Wiley India Pvt Ltd (2011).
3. Beginning Android Mark L Murphy, Wiley India Pvt Ltd.

Online Reading / Supporting Material:

1. http://www.developer.android.com
2. http://developer.android.com/aboLJt/versions/indexJitml
3. http://developer.android.com/training/basics/flrstapp/indexJ^tml

4. http://docs.oracle.com/javase/tutorial/index.htm (Available in the form of free downloadable ebooks also).

Android Programming Lab and Minor Project

Course outcomes:

At the completion of the course, a student will be able to:

1. Students learn to develop android based applications.
2. Understand the User Interface and develop UI for Android App.
3. Design and program Database Application and Content providers using android.
4. Students learn to develop small projects using the various technologies.

Android Experiment List :

1. Create "Hello World" application that will display "Hello World" in the middle or the screen in the emulator. Also display "Hello World" in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res » value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and selected option should appear in text box.
5. Create a list of all courses in your college and on selecting a particular course teacher-in charge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message,
8. Create an application to Create, Insert, Update, Delete and retrieve operation on the database.

List of some minor projects during the V Semester:

- Assignment Management System
- Project ATM Banking System
- Project Cab Management System
- Project Cargo Management System
- Project City Bus Management System
- Project Civil Registration System
- Project Content Management System
- Project Customer Relationship Management System
- Project Drug Management System
- Project Employee Leave Management System
- Project Factory Information Management System
- Project Hospital Management System

- Project Infrastructure Management System
- Project Life Insurance Management System
- Project Mobile Shop
- Project Newspaper Ad Management System
- Project Online IT Service Help Desk
- Project Online Job Portal System
- Project Online Student Management System
- Project Online Tax Information System
- Project Online Voting System
- Project Patient Management System
- Project Payroll Management System
- Project School Management System
- Project Task Management System
- Project Vehicle Insurance Management System

Skill Enhancement Courses (SEC)

Management Process and Organizational behavior

Course Outcomes:

1. Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.
2. Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.
3. Analyze the complexities associated with management of the group behavior in the organization.
4. Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.
5. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
6. Articulate the basic structure, functions, and processes of key social systems affecting the environment

Course Contents

Unit- I

Principles of Management: Management: Introduction, Definition of management, Nature, Purpose and Functions, Levels and types of managers, managerial roles, skills for managers, evolution of management thought, Fayol's fourteen principles of management.

Unit – II

Planning: Meaning, Nature of Planning, Planning Process, Objectives, MBO, Strategies, level of strategies, policies, methods and programs, Planning Premises, Decision-making, Process of decision-making, Types of decisions

Organizing: Organization structure, Formal and informal organizations, Functional, divisional, geographical, customer based and matrix organizations, tram based structures, virtual organizations, boundary less organizations. Principles of organizations

Controlling: Meaning, importance of controlling, controlling process, types of control, factors influencing control effectiveness.

Unit-III

Organizational Behaviour: Organizational Introduction, definition, fundamental principles of OB, contributing disciplines, challenges and opportunities. Evolution and Organizational Behavior in India.

Individual Behaviour: Foundations of individual behaviour. Ability: Intellectual abilities, Physical ability, the role of disabilities

Unit - IV

Personality: Meaning, formation, determinants, traits of personality, big five and MBTI, personality attributes influencing OB.

Attitude: Meaning, Formation, components of attitudes, relation between attitude and behavior

Unit – V

Motivation: Meaning, theories of motivation-needs theory, two factor theory, Theory X and Y

Leadership: Meaning, styles of leadership, leadership theories, trait theory, Managerial grid

Text Books:

1. Organizational Behavior, Stephen P. Robbins, Pearson Education.

2. Organizational Behaviour, S.S.Khanka, S.Chand

Reference Books:

1. Organizational Behavior , Mishra .M.N ,Vikas
2. Principles of Management, Koonz, Weihrich and Aryasri, Tata Mcgraw Hill.

Semester-VI

Discipline Specific Core Courses (DSC):

PHP Programming

Course outcomes:

At the completion of the course, a student will be able to:

1. Remember basic concept of PHP code to produce outcomes and solve problems.
2. Design and insert data using PHP and MySQL.
3. Apply basic knowledge for test, debug, and deploy web pages containing PHP and MySQL.
4. Creating Infrastructure and maintain complex Data flow with security.
5. Develop an application using PHP and MySQL

Detailed Syllabus

Unit I

Introduction to PHP: PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, and Editors etc.). PHP with other technologies, scope of PHP, Basic Syntax, PHP variables and constants, Types of data in PHP, Expressions, scopes of a variable (local, global), PHP Operators: Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator.PHP operator Precedence and associatively.

Unit II

Handling HTML form with PHP: Capturing Form Data, GET and POST form methods Dealing with multi value fields, Redirecting a form after submission.

PHP conditional events and Loops: PHP IF Else conditional statements (Nested IF and Else) Switch case, while, For and Do While Loop, Goto , Break ,Continue and exit.

Unit III

PHP Functions: Function, Need of Function, declaration and calling of a function. PHP Function with arguments, Default Arguments in Function. Function argument with call by value, call by reference. Scope of Function Global and Local

Unit IV

String Manipulation and Regular Expression: Creating and accessing String , Searching & Replacing String, Formatting, joining and splitting String, String Related Library functions Use and advantage of regular expression over inbuilt function. Use of preg_match (), preg_replace (), preg_split() functions in regular expression.

Unit V

Array: Anatomy of an Array, Creating index based and Associative array, Accessing array Looping with Index based array, with associative array using eachQ and foreachQ.Some useful Library function

Text Books:

1. Core PHP Programming. Leon Atkinson {Prentice Hall, ISBN 0130463469).
2. Beginning PHP5 and MySQL: From Novice to Professional, W. Jason Gilmore, 2004, Apress, ISBN:

1-893115-51-8

Reference Books:

1. Vikram Vaswani (2008), PHP: A BEGINNER'S GUIDE, McGraw-Hill

PHP Lab:

Course Outcomes:

At the completion of the course, a student will be able to:

1. Understand the major areas and challenges of web programming.
2. Distinguish web-related technologies.
3. Use advanced topics in HTML5, CSS3, JavaScript
4. Use a server-side scripting language, PHP
5. Design and implement typical static web pages and interactive web applications, dynamic web applications.

Exercises:

1. Create a PHP page using functions for comparing three integers and print the largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. WAP to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user, After submission that page displays the reverse of provided string.
5. Write a PHP function that checks if a string is all lower case.
6. Write a PHP script that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
7. WAP to sort an array.
8. Write a PHP script that removes the whitespaces from a string. Sample string : The quick " " brown fox' Expected Output: Thequick""brownfox
9. Write a PHP script that finds out the sum of first n odd numbers.
10. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.
11. Write a PHP script that checks if a string contains another string.
12. Create a simple 'birthday countdown' script, the script will count the number of days between current day and birth day.
13. Create a script to construct the following pattern, using nested for loop.

    *

    **

    ***

    ****

    *****

14. Write a simple PHP program to check that emails are valid-

15. WAP to print first n even numbers.
16. $color = array('white[1], 'green', 'red")
    Write a PHP script which will display the colors in the following way: Output: white, green, red,

    - green
    - red
    - white
17. Using switch case and dropdown list display a "Hello" message depending on the language selected in drop down list.
18. Write a PHP program to print Fibonacci series using recursion.
19. Write a PHP script to replace the first 'the' of the following string with 'That'.
    Sample : 'the quick brown fox jumps over the lazy dog.'
    Expected Result: That quick brown fox jumps over the lazy dog.

Discipline Specific Core Courses (DSC):

Project Work/Dissertation

Course outcomes:

At the completion of the course, a student will be able to:

1. Identify the real world problems and challenges that need IT based solutions and create very precise specifications of the IT solution to be designed.
2. Understand project characteristics and various stages of a project.
3. Identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders.
4. Implement project management knowledge, processes, lifecycle and the embodied concepts, tools and techniques in order to achieve project success.
5. Demonstrate an ability to work in teams and manage the conduct of the research study.

As such, during the development of the project students shall involve themselves in all the stages of the System Development Life Cycle (SDLC) like requirements analysis, systems design, software development/coding;, testing and documentation, with an overall emphasis on the development of reliable software systems. Since, the project work spans over the entire final semester, the students shall be advised to take up projects for solving problems of software industry or any research organization or the real life problems suggested by the faculty in-charge of BCA project work in the institutions.

This option is to be offered only in 6^{th} Semester. The students will be allowed to work on any project based on the concepts studied in core/elective or skill based elective courses. The group size should be maximum of three (03) students. Each group will be assigned a teacher as a supervisor who will handle both their theory as well lab classes. Theory classes will cover project management techniques.

During the project work, its progress will be monitored, on monthly basis, by the internal guide. 1 Copies of Project Report to be submitted to SC (I copy to be retained by SC and 1 copy to be forwarded to Department). End Examination shall be based on Project Report, Presentation, Viva, and Demonstration of the software.

1 Duration (for 1 group),

* Presentation 20 minutes
* Viva 15 minutes
* Demonstration 15 minutes
* Report checking 10 minutes Students shall be given 30 minutes time to make preparations of their presentation and demonstration in the Lab (students are advised to carry out preparation on the previous day).

2 Project Work carries Total 300 Marks

* Project Report 100 marks
* Presentation (PowerPoint based) 80 marks
* Viva 60 marks
* Demonstration 60 marks 8.

3 Format of Project Report The manuscript of the report should be organised in the following sequence;

* Preliminary pages
* The body of the project(chapters)
* The bibliography
* Preliminary pages
* Approval Page
* The approval page is also known as signature page or completion certificate
* Internal as well as External guides should sign this page in order to assure that they have seen and approved the final version of the report.

4 Synopsis

* It should preferably be a single page (150 words max)
* The synopsis should be a summary or condensation of the project.

5 Acknowledgement

* The acknowledgment should not be more than one page.
* The student may acknowledge financial support, permission to use copy righted materials, trademarks, service marks, personal assistance etc.

6 Table of Contents

* It should be left justified, Times Roman 14 (student may use Table of content feature available in MS-WORD)

7 Introduction and Background

* It should have about 10% of total length
* Statement of Problem Area (brief, non-technical)
* Existing system, Methods and Procedures
* Background * Purpose/Objectives/justification of Project

8 Body of the Project Report

The body of the project report may include relevant features listed below:

* Company Profile
* Requirements Analysis
* Systems Design
* Database design (normalization, tables)
* File System and Data Structures
* User Interface design

* Prototyping
* Software and Hardware Platform (Selection of Operating System, Software packages, Computer Languages, Computer Systems and Peripherals)
* Verification and Software Testing
* DFD, Structure Charts, E-R diagram, Flowcharts, UML diagrams, Pseudocode, Decision Table, Decision Tree, Workflow, data dictionary
* Input and Output Forms/formats/reports
* Screen Dumps
* System Functional Specification
* Off-line or On-line Help feature
* Quality parameters/procedures
* Encryption/Security features
* Future Directions
* Results / conclusion
* References

Any points made in the text must be supported by evidence, either your results or the published findings of others. The sources are identified by citation.

9 To insure durability, permanency, and opacity, project report should be printed on A4 size white bond paper.

10 Typeface and Printing Chapter/Section Titles

* Should be printed in Times New Roman font in black colour
* Font size should be 16/14 points bold.
* Chapter should start on new page

11 Running text in the Report should be printed in Times New Roman font in black colour

* Font size should be 12 points.
* The print should be best quality
* Single line spacing for running text
* Double line spacing between paragraphs
* Printing on both sides

12 Margins

* Every page of the report, including all appendices, all notes, and the bibliography must have a LEFT and RIGHT margins of $1^{1/2}$ inches (to allow room for binding) and TOP and BOTTOM margins of 1 inch.
* Nothing should appear in LEFT and RIGHT margins. This means that all page numbers, text, tables, parts of illustrations, etc., must not appear in the margin area.

13 Page Numbers

* The page numbers must be bottom-cantered to the text (font Times New Roman; 10 points)
* All preliminary pages should NOT be numbered.
* The numbering should start from chapter-one (Introduction)
* Chapter titles (Headings) start on a new page.
* Leave an extra space after title

* Since you will have several levels of subheadings, distinguish one level from another in a consistent way, such as (1, 1.1, 1.2,2, 2.1,2.1.1,2.1.2, 2.2),
* Avoid having more than three levels of subheadings.

14 Length of Project Report

* In any case, the length of the graduate project report should not be more than 100 pages (excluding program listing)

15 Binding

* The project report must be clothbound (hardcover binding) and must be in light gray or black colour. Spiral binding is NOT allowed.

* The outside cover of the project report must follow the format described earlier and the lettering must be printed in gold letters.

Certificate for Evaluation

This is to certify that the undersigned have assessed and evaluated the Project Work titled "....." submitted by the student. The project Report has been (accepted / rejected) for the partial fulfilment of BCA programme.

Signature of the Examiner

Name of the Examiner

Discipline Specific Electives (DSE)

Cloud Computing

Course outcomes:

At the completion of the course, a student will be able to:

1. Remember concept of Cloud Computing, benefit and challenges associated with it.
2. Understand various cloud services, cloud service providers and frameworks being used.
3. Describe importance of virtualization along with their technologies.
4. Identify the need for the virtualization and advantage and limitations of using virtualization concept.
5. Analyze the open stack & Google Cloud platform components and understand Mobile Cloud Computing
6. Investigate the security aspect in cloud, standards for security framework, challenges.

Detailed Syllabus:

UNIT I

Cloud Introduction; Cloud Computing Fundamentals: Cloud Computing definition, Types of Cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing usage scenarios and Applications, Business models around Cloud Major Players in Cloud Computing.

UNIT II

Cloud Services and File System: Types of Cloud services, Service providers, Google App Engine, Amazon EC2, Microsoft Azure, Sales force. Introduction to Map Reduce, GFS, HDFS, Hadoop Framework,

UNIT III

Collaborating With Cloud: Collaborating on Calendars, Schedules and Task Management **Collaborating** on Event Management, Contact Management, Collaborating via Web-Based Communication Tools, Evaluating Web Mail Services and Collaborating via Social Networks

UNIT IV

Virtualization for Cloud: Need for Virtualization - Pros and cons of Virtualization, Types of Virtualization, System VM, Process VM, Virtual Machine monitor.

UNIT V

Security, Standards, and Applications

Security in Clouds: Cloud security challenges, Common Standards: The Open Cloud Consortium - The Distributed management Task Force - Standards for application Developers Standards for Messaging - Standards for Security. End user access to cloud computing, Mobile Internet devices and the cloud.

Text Books:

1. Bloor R., Kanfman M., Halper F. **Judith** Hurwitz "Cloud Computing " Wiley India Edition, 2010
2. John Rittinghouse & James Ransome, "Cloud Computing Implementation Management and Strategy", CRC Press, 2010
3. Antony T Velte, Cloud Computing : "A Practical Approach", McGraw HiIl,2009

Reference Books:

1. Michael Miller, Cloud Computing: "Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008.
2. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kauftnann Publishers, 2006.

Online Reading/Supporting Material

1. Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing", Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
2. webpages.iust.ac.ir/hsalimi/.../89.../Cloud%20Common%20standards.pptop ennebula.org,
3. www.cloudbus.org/cloudsim/, http://wvvw.eucalyptus.com/
4. hadoop.apache.org
5. http://hadoop.apaehe.org/docs/stable/hdfs_design,html

Cloud Computing Lab:

Course Outcomes:

At the completion of the course, a student will be able to:

1. Define & implement Virtualization using different types of Hypervisors
2. Experience storage, calendar and document editing services offered by Google cloud.
3. Describe the functioning of Platform as a Service
4. Explore the Microsoft cloud platform.
5. Analyze and understand the functioning of different components involved in Amazon web services cloud platform.
6. Design & Synthesize Storage as a service using own Cloud

Exercises:

1 Create virtual machines that access different programs on same platform,

2 Create virtual machines that access different programs on different platforms.

3 Exploring Google cloud for the following

a) Storage

b) Sharing of data

c) manage your calendar, to-do lists,

d) a document editing tool

4 Exploring Microsoft cloud

5 Exploring Amazon cloud

Discipline Specific Electives (DSE)

Software Testing Concepts

Course Outcomes:

At the completion of the course, a student will be able to:

1. Learn systematic approach to the development, operation, maintenance, and retirement of software.
2. Learn how to use available resources to develop software, reduce cost of software and how to maintain quality of software.
3. Illustrate Methods and tools of testing and maintainace of software's.
4. Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.
5. Develop methods and procedures for software development that can scale up for large systems and that can be used to consistently produce high-quality software at low cost and with a small cycle time.

Detailed Syllabus

UNIT I

Introduction

Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System Testing, Basic Terminologies, V Shaped Software Lifecycle Model.

UNIT II

Functional Testing\ Black-box Testing

Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing

UNIT III

Structural Testing: White-box Testing

Basis Path Testing: Program Graph, DD Path graph, Cyclomatic Complexity, Graph Matrices, Control Flow Testing: Statement Coverage, Branch Coverage, Condition Coverage, Path Coverage.

UNIT IV

Software Quality Assurance, test optimization, Eleven Step Testing Process and Testing Security.

UNIT V

Software Reusability, Software Metrics, Software Testing Tools, Defect Tracking Tools, Defect Management Tools and Challenges

Books Recommended;

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Seventh Edition, Mc Graw Hill Education.2009.
2. Yogesh Singh, Software Testing, Cambridge University Press, 2011.

Skill Enhancement Courses (SEC)

'R'-Programming and Python Programming

Course Outcomes:

At the completion of the course, a student will be able to:

1. Identify programming logics and develop efficient programs using R (and similar high-level languages).
2. Explain & describe routine a specialized data manipulation/management and analysis tasks.
3. Apply and build document, share, and collaborate on code development using a suite of Open Source.
4. Develop methods and procedures

Detailed Syllabus

Unit I

Introduction: Overview and History of R, Basic Features of R, Design of the R System, Limitations of R, R Resources.

Unit II

Install and configuration of R programming environment, Getting started with the R interface,

Getting Help, Entering Input, Evaluation, R Objects, Numbers, Attributes, Creating Vectors, Mixing Objects, Matrices, Lists, Factors, Missing Values, Data Frames

Unit III

Getting Data In and Out of R, Using the reader Package, Using Textual and Binary Formats for Storing Data, Interfaces to the Outside World, Sub-setting R Objects.

Unit IV

Dates and Times, Managing Data Frames , Control Structures , Functions , Scoping Rules of R , Loop Functions, Debugging, Debugging Tools in R, Simulating Random Numbers, Profiling R Code, Data Analysis Case Study

Unit V

Python programming Basic: Python interpreter, IPython Basics, Tab completion, Introspection, $run command, magic commands, matplotlib integration, python programming, language semantics, scalar types. Control flow

Data Structure, functions, files: tuple, list, built-in sequence function, dict, set, functions, namescape, scope, local function, returning multiple values, functions are objects, lambda functions, error and exception handling, file and operation systems

Text Books:

1. Roger D. Peng, R Programming for Data Science, 2015-07-20.
2. R programming Using R for introductory Statistics, by John Verzani, Chapman & Hall/CRC, 2004

Reference Books:

1. W. N.Venables, D. M. Smith, An Introduction to R, R-core team, 2015

'R'-Programming and Python Programming Lab

Course Outcomes:

At the completion of the course, a student will be able to:

1. Identify and implement programming logics and develop efficient programs using R and Python
2. Students learn to develop various programs using R and Python.
3. Apply and build document, share, and collaborate on code development using a suite of Open Source.
4. Develop methods and procedures for various tasks used for different analysis of data.

R Experiment List:

1. Write a program that prints 'Hello World' to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list.
6. Write a function that tests whether a string is a palindrome.
7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort
8. Implement linear search.
9. Implement binary search.
10. Implement matrices addition, subtraction and Multiplication.
11. Create a vector of coefficients for a quadratic equation, using the sample function.
12. Read the file, assigning the result to the object hills,
13. Construct a scatter plot matrix.
14. Compute a linear regression of time against distance. ,
15. List objects in current working space.
16. Compute the real roots of the quadratic equation $x^2 + x + 1 = 0$ with the formula for the roots of a quadratic $x = -b \pm \sqrt{(b^2 - 4ac)/2a}$ and use sqrt function to compute a (positive) square root.
17. Write an R expression to determine if two sets, A and B, represented as integer vectors are disjoint. If they are disjoint, display elements of set A otherwise display elements of set B. (Examine the help for functions print and cat).
18. Compound interest can be computed using the formula $A = P \times (1 + R/100)^n$ where P is the original money lent, A is what it amounts to in n years at R percent per year interest. Write R code to calculate the amount of money owed after n years, where n changes from 1 to 15 in yearly increments, if the money lent originally is 5000 pounds and the interest rate remains constant throughout the period at 11.5%.
19. Write a loop structure to scan through an integer vector to determine the index of the maximum value. The loop should terminate as soon as the index is obtained. Examine the help for the rank, sort and order functions.
20. Let vector y be the logarithm of a random sample from a standard normal distribution, N(0, 1). Use the if-else function to replace missing values with the value 9999.

21. Construct a 2×2 data frame, X say. Experiment with X^ (1: K), where K takes values 1:4. How does the recycling rule behave? What happens if you remove the brackets from the command

22. Assume that we have registered the height and weight for four people: Heights in cm are 180, 165, 160, 193; weights in kg are 87, 58, 65, J00. Make two vectors, height and weight, with the data. The bodymass index (BMI) is defined as Weight in kg/ (height in m)^2

24. Make a vector with the BMI values for the four people, and a vector with the natural logarithm to the BMI values. Finally make a vector with the weights for those people who have a BMI larger than 25

Python Experiment List:

1. Write a python program to print the multiplication table for the given number
2. Write a python program to check whether the given number is prime or not
3. Write a python program to find factorial of the given number
4. Write a python program to implement simple Chatbot
5. Write a python program to implement List operations (Nested List, Length,Concatenation, Membership, Iteration, Indexing and Slicing)
6. Write a python program to implement List methods (Add, Append, Extend & Delete).
7. Write a python program to Illustrate Different Set Operations
8. Write a python program to generate Calendar for the given month and year
9. Write a python program to implement Simple Calculator program
10. Write a python program to Add Two Matrices
11. Write a python program to Transpose a Matrix
12. Write a python program to implement Breadth First Search Traversal
13. Write a python program to implement Water Jug Problem
14. Write a python program to remove punctuations from the given string
15. Write a python program to sort the sentence in alphabetical order.

Annexure II- Mandatory Documents for Admission

To be uploaded on the Admission Portal by the Prospective students

Admission Documents	Format (Jpeg/PNG/PDF)	Documents Size
Duly filled application form with student signature	Digital signature/Student signature JPEG/PNG	20 KB
Colour scan copy of all year/semester mark sheet/grade cards (for PG programs only) or consolidated mark sheet/grade cards also accepted.	PDF/JPEG	500 KB
Colour scan copy of 10th std. Mark sheet/grade card	PDF/JPEG	
Colour scan copy of 12th std./ Three-Year Polytechnic Diploma Mark sheet/grade card	PDF/JPEG	
Colour scan copy of passport size photograph	JPEG or PNG Format	50 KB
Colour scan copy of Govt. Photo id proof, Aadhar card is mandatory. (Other options: Voter's id, Driving License, Passport etc.)	PDF/JPEG	100 KB
In case of name change, Gazette notification documents for name changes For married women – marriage certificate would be accepted – provided previous maiden name is clearly mentioned in the same. In case of deferred Father name or mother name in such cases without a Gazette notification document.	PDF	500 KB
Fees submission transaction details or receipt as per University policy for respective Distance programs	PDF/JPEG	500 KB
Digitally Signed undertaking as per the process; where applicable	PDF	500 KB

Students can also visit the University website for the said information.

Annexure III- Academic Bank of Credit Id Creation Process

All enrolled students, particularly those of Indian nationality, are required to register with ABC (Academic Bank of Credits), a central scheme established by the Ministry of Education, Government of India, for depositing credit. ABC ID creation is mandatory for all students, ensuring their participation in this scheme.

Process	• Students can register by logging in at www.abc.digilocker.gov.in • Click on My Account → Login as Student • Click on "Sign up with DigiLocker" → Enter valid mobile number → An OTP is sent at the phone number via SMS → Enter the OTP and click on "Continue" button → Enter Security PIN set created during Sign Up and click "Submit" Button • You will be prompted with ABC student account creation window
Documents and proofs required	• Aadhaar Card is mandatory for ABC Id creation • Learners Name • Date of Birth • Gender • Enrolment Number • Requirements by Academic Institution: • Mobile Number

The ABC Id can be created by students themselves using Digi-locker, UMANG application, ABC portal or Academic Institution Portal. The process for which is provided below.

The University will extend support to the students to create ABC ID. The documents required will remain the same as stated above.

Annexure IV – Continuous Internal Assessment Pattern

Particular	A1 (Objective Type)	A2 (Objective Type)
Marks	15	15

Question Pattern for the CIA Components
A-1 1.There will be 15 Objective type Multiple Choice Questions (MCQs), each carrying mark1 mark 2. The time for the A-1 assignment will be 30 mins 3. All questions are compulsory 4. There will be NO NEGATIVE MARKING for the wrong answers. **A-2** 1. There will be 15 Objective type Multiple Choice Questions (MCQs), each carrying mark1 mark 2. The time for the A-1 assignment will be 30 mins

3. All questions are compulsory 4. There will be NO NEGATIVE MARKING for the wrong answers.

Annexure V– End-term Examination Pattern

JNU

Centre for Distance and Online Education

End Term Examination

[PROGRAM NAME]

[COURSE NAME][COURSE CODE]

Time : 2 Hours	Max. Marks : 70
Note for students: The paper will comprises of 70 compulsory objective questions of 1 mark each.	
Answer all the questions. Each question carries one mark.	
Q. No. 1 to Q. No. 70 - Objective questions with four multiple choices.	

JAIPUR NATIONAL UNIVERSITY

A venture of The Seedling Group of Educational Institutions

Bachelor of Computer Application

(BCA)

Mode: Online

PROGRAM PROJECT REPORT – BCA – Online Mode

Contents

BCA – Online Mode

1. Program Overview

1.1 Program's Mission and Objectives

The objective is to support students aspiring for careers in the IT sector, aiming for prominent roles in technology-driven multinational corporations (MNCs) and various other entities like e-commerce firms, banks, government agencies, networking companies, stock exchanges, and more across corporate sectors.

Our goals include:

- Offering a comprehensive and interdisciplinary educational foundation.
- Fostering social investigative skills and encouraging contributions from diverse individuals and communities.
- Guiding eager learners to engage in social responsibilities within both private and public sectors.
- Supplying knowledgeable and skilled workforce adaptable to the IT and IT-enabled services (ITES) industry.
- Meeting global demands by providing adept professionals to professional, industrial, and service sectors.
- Advocating for learners to gain extensive knowledge in humanities and social sciences for enhanced employment prospects.
- Providing opportunities for higher education to working professionals.

The BCA Programme is structured with the following distinct aims:

a) Attracting young individuals to the promising and lucrative realm of computer applications.
b) Establishing a foundational undergraduate Programme that serves as a precursor for advanced studies in Computer Science/Applications.
c) Cultivating proficiency in software development, empowering BCA graduates to pursue entrepreneurship opportunities in both the Indian and global software markets.
d) Providing training and resources to students, ensuring they meet the standards demanded by various industries.

1.2 Relevance of the Program with JNU's Vision and Mission

Jaipur National University (JNU) was established in 2007. JNU provides a world-class learning experience, with a highly accomplished faculty, numerous extracurricular activities, and a wide range of academic pursuits. The university fosters holistic development of students.

JNU with its vision to transform the Education Landscape of India and contribute to the maximum to improve the GER of India has plans to launch affordable and flexible education programs. Online programs are an excellent way to launch affordable and flexible education programs in sync with the vision and mission of the university stated below:

University Vision:

To be a leader in creating unique and exclusive learning opportunities in all disciplines of study that ultimately lead to the advancement of learning and creation of a sustainable society and environment.

University Mission:

- Provide global opportunities of learning through broad and balanced academic programmes.
- Explore and hone the potential of stakeholders, develop their human and intellectual capacities to the fullest.
- Create and maintain excellence with high standard driven activities, universal significance and acknowledgement.
- Inculcate and keep track of the current trends and finest practices in education for constant growing and evolving.
- Leverage diversity of thoughts, ideas, and perspectives to enrich the stake holders.

1.3 Nature of Prospective Target Group of Students

The curriculum of B.C.A. is designed in such a way that it helps the students to become not only more employable but also encourage them to become entrepreneurs. Primarily the target group of learners will be:

- population of any age and those living in remote areas where higher education institutes are not easily accessible.
- Learners who could not get admission in the regular mode due to limited intake capacity.
- Learners who are working and who desire to pursue higher education as a means for movement up the ladder.
- Learners who are unable to pursue Higher education due to social, financial and economic compulsions as well as demographic reasons.

1.4 Appropriateness of programs to be conducted in online mode to acquire specific skills and competence

The Bachelor of Computer Applications (BCA) program holds significant value for students aspiring to pursue professional opportunities in diverse industries, businesses, finance, and the civil service. Additionally, employers highly regard the BCA degree for various roles where proficiency in logical and quantitative reasoning is essential, such as software development, database management, and information technology consulting.

2. Procedure for Admission and Curriculum Transaction

The academic programs catered to candidates enrolled in the online mode of learning are facilitated by CDOE-JNU, with the backing of various faculties within the University. Eligibility criteria, course structure, detailed curriculum, program duration, and evaluation criteria are subject to approval by the Board of Studies and Academic Council, adhering to UGC guidelines for programs falling under the purview of online mode for degree conferment.

Below are the details of the admission procedure, eligibility criteria, fee structure, curriculum, program delivery, information about the Learning Management System (LMS), and assessments and evaluations:

2.1Procedure for Admission

Students who are seeking admission in programs offered by CDOE-JNU need to apply through https://online.jnujaipur.ac.in/in the courses offered.

2.1.1 Minimum Eligibility Criteria for Admission

The minimum eligibility criteria for admission to the Online BCA program require candidates to 10+2 (12th Standard) from a recognized Board, in accordance with UGC norms. Additionally, candidates must have secured at least 40% marks in the qualifying examination.

Candidates must also fulfill all documentation requirements as specified on the program's website for admission purposes. Failure to submit proof of eligibility within the stipulated timeframe specified by CDOE-JNU will result in the cancellation of admission. Prospective candidates are encouraged to carefully review all instructions provided on the website before proceeding with the application process.

2.1.2 Online Admission Process and Instructions: Learner Communication

The online admission process for the students is provided below:

Step	Process	Particulars
Step 1	**Counselling**	Prospective students will receive guidance and counseling for their chosen program from designated

		and authorized counselors.
Step 2	**Registration on admission portal to get access to My Account.**	To initiate the registration process, prospective students are required to complete the application form by providing all necessary details and uploading mandatory documents.
Step 3	**Details of Document upload**	Student Uploads document as follows- <u>Personal Documents</u> Passport-size Photograph Student's Signature Aadhar Card (Back & Front) Passport (For International Student) <u>Academic Documents</u> *UG Student -* 10th Marksheet 12th Marksheet *PG Student -* 10th Marksheet 12th Marksheet UG Marksheet Other Certificates (detailed list of documents is provided in **Annexure II**)
Step 4	**Verification of documents by the Deputy Registrar**	The Deputy Registrar is responsible for verifying all documents uploaded by prospective students on the admission portal. Within a timeframe of 48 hours, the Deputy Registrar will review and either approve or disapprove the eligibility of the prospective student for the chosen program.
Step 5	**Undertaking**	Student will sign Undertaking after Approval in Application.
Step 6	**Payment of fees**	All eligible students, duly approved by the Deputy Registrar, will get fees payment link activated in their My Account for payment. The Fee is payable through any of the following means: (a) UPI (b) Credit/Debit Card (c) Net-banking Note: Cash, bank demand draft and Cheques are not accepted

Step 7	**Enrolment**	After the payment of program fee, the eligible student will get the Enrolment number and access to the LMS within 21 days.
Step 8	**Access to Learning Management System (LMS)**	

General Instructions:

1. Prior to applying for online programs, all students are advised to thoroughly read and comprehend the eligibility conditions provided in the student handbook document and outlined on the university website.
2. It is the responsibility of prospective learners to ensure that their educational or qualifying degree has been issued by a recognized university or board only. For learners from Indian higher education institutions, recognition by the regulatory authority of the Government of India is necessary. To verify degrees from recognized boards of education, refer to www.cobse.org.in/. For Polytechnic Diploma, check the respective State Board of Technical Education. Verification of degrees from recognized universities can be done at www.ugc.ac.in/. Foreign prospective learners should verify their institutions at www.aiu.ac.in/.
3. Prospective learners must verify their eligibility on the date of admission and ensure that they have passed the qualifying exams before the commencement of the admission batch.

Upon enrollment, students must register with the Academic Bank of Credits (ABC), a central scheme for depositing credit formulated by the Ministry of Education, Government of India. Creation of an Academic Bank of Credits (ABC) ID is mandatory for all students. (Refer to Annexure IV for details).

2.1.3 Program Fee for the Academic Session beginning July 2024

Program fees for students pursuing BCA offered by CDOE-JNU is mentioned below:

Program	Academic Total Fees (INR)	Exam Fees
BCA	**93,000**	**1500 per Semester**

2.1.4 Financial Assistance Policy

Students will make fee payments through the online mode available on the university website. Additionally, the University has collaborated with a third-party Non-Banking Financial Company (NBFC) to offer financial assistance to individuals who require it.

2.2 Curriculum Transactions

2.2.1 Program Delivery

The curriculum is delivered through Self Learning Materials (SLMs) in the form of e-Contents, supplemented by a variety of learning resources including audio-video aids via the Learning Management System (LMS), following the four-quadrant approach. Furthermore, the program includes online contact hours featuring discussion forums and synchronous live interactive sessions conducted through the LMS, adhering to the current UGC norms for course delivery.

2.2.2 Learning Management System to support online mode of Course delivery

The Learning Management System (LMS) is available on URL https://lms.jnujaipur.ac.in/ is meticulously developed to offer students a truly global learning experience. With a user-friendly interface, the LMS simplifies the learning process and ensures it meets the highest global standards. Utilizing audio-visual teaching methods, self-learning materials, discussion forums, and evaluation patterns, the platform stands out as unique and aligns seamlessly with both industry requirements and the UGC Guidelines' four-quadrant approach.

Students can engage in uninterrupted learning 24x7 via web and mobile devices, allowing them to progress at their preferred pace. The LMS boasts a simple and intuitive user interface, facilitating easy navigation through the e-learning modules. Designed in accordance with standard norms, all learning tools are easily accessible, ensuring a perfect learning experience for all users.

2.2.3 Course Design

The Course content is designed as per the 4-quadrant approach as detailed below to facilitate seamless delivery and learning experience

Quadrant-I i.e., e-Tutorial, that contains – Faculty led Video and Audio Contents, Simulations, video demonstrations, Virtual Labs

Quadrant-II i.e., e-Content that contains – Portable Document Format or e-Books or Illustration, video demonstrations, documents as required.

Quadrant-III i.e., Discussion forums to raise and clarify doubts on real time basis by the Course Coordinator and his team.

Quadrant-IV i.e. Self-Assessment, that contains MCQs, Problems, Quizzes, Assignments with solutions and Discussion forum topics.

2.2.4 Academic Calendar for Academic Session beginning July 2024

Sr.	Event	Session	Month (Tentative)

No.			
1.	Commencement of semester	January	January
		July	July
2.	Enrol learner to Learning Management system	January	Within 21 working days from fee deposit and Eligibility confirmation
		July	
3.	Interactive Live Lectures for query resolution	January	February to May
		July	August to November
4.	Assignment Submission	January	By April
		July	By October
5	Project Report Submission (Wherever applicable during Final semester)	January	Last week of April
		July	Last week of November
6	Term End Examination	January	May onwards
		July	December onwards
7	Result Declaration of End Term Examination	January	By June
		July	By January

3. Instructional Design

3.1 Curriculum Design

The curriculum is meticulously designed by experts in the field of Computer Science, incorporating contemporary topics and fostering environmental awareness. It has received approval from the Board of Studies, the Centre for Internal Quality Assurance (CIQA), and the University Academic Council.

3.2 Program Structure and detailed Syllabus

3.2.1 Program Structure

SEMESTER-I										
Theory					Contact Per week			Evaluation		
Semester	**Course Code**	**Course Category/(Core/ Elective)**	**Paper Title**	**Credits**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**
I	OBCACO101T24	CORE	'C' Programming Fundamentals	3	3	0	0	30	70	100
	OBCACO102T24	CORE	Fundamentals of Computers and PC Tools	3	3	0	0	30	70	100
	OBCACO103T24	CORE	Elementary Mathematics	3	3	0	0	30	70	100
	OBCASE104T24	SEC	Digital Electronics	3	3	0	0	30	70	100
	OBCAAE105T24	AEC	English-I	3	3	0	0	30	70	100
	*OE/GE	OE/GE	OE/GE	2	2	0	0	30	70	100
Practical										
I	OBCACO106P24	CORE	C Programming Lab	2	0	0	4	30	70	100
	OBCACO107P24	CORE	Office Automation Tool Lab	2	0	0	4	30	70	100
	OBCASE108P24	SEC	Digital Electronics Lab	2	0	0	4	30	70	100
TOTAL				**23**	**17**	**0**	**12**			**900**
*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 1.										

Sr. NO.	Subject Code	Name of Subject

1	OBCAGE101T24	Understanding Prescription, Doses and doses forms
2	OBCAGE102T24	Dining etiquettes
3	OBCAGE103T24	Basics of Photography
4	OBCAGE104T24	Crime and society
5	OBCAGE105T24	Industrial Mathematics

SEMESTER-II										
Theory					**Contact Per week**			**Evaluation**		
Semester	**Course Code**	**Course Category/(Core/ Elective)**	**Paper Title**	**Credits**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**
II	OBCACO201T24	CORE	Database Management System	3	3	0	0	30	70	100
	OBCACO202T24	CORE	Discrete Mathematics	3	3	0	0	30	70	100
	OBCACO203T24	CORE	Analysis of Algorithms and Data Structures	3	3	0	0	30	70	100
	OBCAVA204T24	VAC	Environment Science	2	2	0	0	30	70	100
	OBCASE205T24	SEC	HTML Programming	3	3	0	0	30	70	100
	*OE/GE	OE/GE	OE/GE	2	2	0	0	30	70	100
Practical										
II	OBCACO206P24	CORE	Database Management System Lab	2	0		0	4	30	70	100
	OBCACO207P24	CORE	Data Structures Using 'C' Lab	2	0		0	4	30	70	100
	OBCASE208P24	SEC	HTML Programming Lab with projects	2	0		0	4	30	70	100
TOTAL				**22**	**16**		**2**	**12**			**900**

*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 2.

Sr. NO.	**Subject Code**	**Name of Subject**

1	OBCAGE201T24	Introduction to Epidemiology
2	OBCAGE202T24	Basics of Baking
3	OBCAGE203T24	Videography
4	OBCAGE204T24	Sociology of Health
5	OBCAGE205T24	Nanotechnology

Semester	Course Code	Course Category	Paper Title	Credits	Contact Per week			Evaluation		
					L	T	P	Int.	Ext.	Total
Theory										
III	OBCACO301T24	CORE	Operating System	3	3	0	0	30	70	100
	OBCACO302T24	CORE	OOPS Using C++	3	3	0	0	30	70	100
	OBCACO303T24	CORE	Software Engineering	3	3	0	0	30	70	100
	OBCACO304T24	CORE	Computer Networks	3	3	0	0	30	70	100
	OBCASE305T24	SEC	MySQL (SQL/PL-SQL)	3	3	0	0	30	70	100
	GE3*	GE3	GE3*	2	2	0	0	30	70	100
Practical										
III	OBCACO306P24	CORE	Operating Systems Lab	2	0	0	4	30	70	100
	OBCACO307P24	CORE	OOPs Using C++ Lab	2	0	0	4	30	70	100
	OBCACO308P24	CORE	Software Engineering Lab	1	0	0	2	30	70	100
	OBCASE309P24	SEC	MySQL (SQL/PL-SQL) Lab with Projects	1	0	0	2	30	70	100

TOTAL	23	17	0	12			1000

*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 3.

S. No.	Subject Code	Name of Subject
1	OBCAGE301T24	Public Health Pharmacy
2	OBCAGE302T24	Rajasthan and Punjabi cuisine
3	OBCAGE303T24	Script writing for film
4	OBCAGE304T24	Sociology of Media
5	OBCAGE305T24	Research Methodology

Semester	Course Code	Course Category	Paper Title	Credits	Contact Per week			Evaluation		
					L	T	P	Int.	Ext.	Total
Theory										
IV	OBCACO401T24	CORE	Computer Architecture	3	3	0	0	30	70	100
	OBCACO402T24	CORE	Programming in Java	3	3	0	0	30	70	100
	OBCACO403T24	CORE	Internet and Web Design	3	3	0	0	30	70	100
	OBCACO405T24	CORE	Shell Programming and System Administration	3	3	0	0	30	70	100
	OBCASE404T24	SEC	E-Commerce Technologies	3	3	0	0	30	70	100
	GE4*	GE4	GE4*	2	2	0	0	30	70	100
Practical										
IV	OBCACO407P24	CORE	Java Programming Lab	2	0	0	4	30	70	100
	OBCACO408P24	CORE	Internet and Web Design	1	0	0	2	30	70	100

	OBCACO409P24	CORE	Shell Programming and System Administration	1	0	0	2	30	70	100
Total				21	19	0	8			900
	OBCAAE406T245	AEC	English-II	0	2	0	0	30	70	100

*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 4.

S. No.	Subject Code	Name of Subject
1	OBCAGE401T24	Social Pharmacy
2	OBCAGE402T24	Reception management
3	OBCAGE403T24	Radio Jockey
4	OBCAGE404T24	Corporate Social Responsibility And Social Entrepreneurship
5	OBCAGE405T24	Industrial Safety & Hazard Management.

Semester	Course Code	Course Category	Paper Title	Credits	Contact Per week			Evaluation		Total
					L	T	P	Int.	Ext.	
Theory										
V	OBCACO501T24	CORE	Computer Graphics and Multimedia	3	3	0	0	30	70	100
	OBCACO502T24	CORE	Programming in .NET	3	3	0	0	30	70	100
	OBCACO503T24	CORE	Data Warehousing and Data Mining	3	3	0	0	30	70	100
	OBCACO505T24	CORE	Android Programming	3	3	0	0	30	70	100

	OBCAVA506T24	VAC	Management Process & Organization Behaviour	2	2	0	0	30	70	100
	OBCASE504T24	SEC	Management Information System	3	3	0	0	30	70	100
	GE5*	GE5	GE5*	2	2	0	0	30	70	100
Practical										
V	OBCACO507P24	CORE	Computer Graphics and Multimedia Lab	2	0	0	4	40	60	100
	OBCACO508P24	CORE	.NET Programming Lab	2	0	0	4	40	60	100
	OBCACO509P24	CORE	Android Programming Lab & Minor Project	1	0	0	2	40	60	100
TOTAL				24	19	0	10			1000

*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 5.

S. No.	Subject Code	Name of Subject
1	OBCAGE501T24	Ayurvedic and Traditional Medicine
2	OBCAGE502T24	Basics of Hospitality and Tourism Marketing
3	OBCAGE503T24	Basics of TV Production
4	OBCAGE504T24	Sociology of Tribal Societies
5	OBCAGE505T24	Digital Marketing

Semester	Course Code	Course Category	Paper Title	Credits	Contact Per week			Evaluation		
					L	T	P	Int.	Ext.	Total
Theory										
VI	OBCACO601T24	CORE	PHP Programming	3	3	0	0	30	70	100

	OBCACO602T24	CORE	Cloud Computing	3	3	0	0	30	70	100
	OBCACO604T24	CORE	'R' Programming and Python Programming	3	3	0	0	30	70	100
	OBCASE603T24	SEC	Software Testing Concepts	3	3	0	0	30	70	100
	OGE6*	OGE6	OGE6*	2	2	0	0	30	70	100
Practical										
VI	OBCACO605P24	CORE	PHP Lab	2	0	0	4	30	70	100
	OBCACO606P24	CORE	Cloud Computing Lab	2	0	0	4	30	70	100
	OBCACO607P24	CORE	'R' Programming and Python Programming Lab	2	0	0	4	30	70	100
	OBCAPS608P24	CORE	Project	4	0	0	8	30	70	100
TOTAL				24	14	0	20			900

*Students can choose any one of the subject from the following list of subjects or can pursue a MOOC course in order to get equal credits in Semester 6.

S. No.	Subject Code	Name of Subject
1	OBCAGE601T24	Pharmaco-economics
2	OBCAGE602T24	Interior Decoration
3	OBCAGE603T24	Global Media Scenario
4	OBCAGE604T24	Contemporary Social Issues
5	OBCAGE605T24	Industrial IOT and Automation

3.4.2 Detailed Syllabus of BCA

Detailed syllabus of BCA is attached in Annexure-I.

3.5 Duration of the Program

Program	Level	Duration	Maximum duration for completion	Credits
BCA	Bachelor's Degree	3 years (6	6 Years	137

		Semesters)		

3.6 Faculty and Support staff requirements (Refer Regulation Document for all Staff Details)

3.4.1Director

The selected candidate will assume the role of a permanent, full-time Professor, bringing expertise in overseeing and coordinating online and distance learning initiatives throughout their career. They will spearhead the CDOE-JNU department, ensuring seamless coordination among faculty, the technology department, and staff. This individual will hold responsibilities encompassing both academic and administrative realms.

KRA

1. Oversee the operations of CDOE-JNU and the Learning Management System (LMS), in addition to supervising relevant staff members.
2. Foster collaboration among various faculties and supervisors to ensure the implementation of suitable pedagogical approaches and delivery of high-quality educational content.
3. Continuously assess the strengths and weaknesses of the program, offering appropriate solutions and enhancements as needed.

3.4.2 Deputy Director

The candidate is required to hold the position of Associate Professor in accordance with UGC Regulations 2018. Proficiency in Learning Management Systems (LMS) is essential, along with technical proficiency to facilitate and contribute to module development.

KRA:-

1. Collaborate with the Technical Manager to provide information manuals and documents to CDOE team members.
2. Develop the academic calendar for the academic sessions.
3. Review the timetable for live classes and interactive sessions, offering recommendations to the Program Coordinator as needed.
4. Approve the Content Matrix for each program, ensuring compliance with UGC guidelines.

5. Participate in syllabus design and updates in consultation with the Board of Studies and Academic Council of JNU to meet industry requirements.
6. Ensure academic planning, conduct academic audits, and implement academic policies.
7. Incorporate and implement changes in academic delivery as per UGC amendments.
8. Approve e-content and e-tutorials, forwarding them to the Technical Manager for upload on the LMS.
9. Monitor faculty members' live classes and interactive sessions, coordinating with the Program Coordinator to record attendance.
10. Maintain records of learner dropouts, actively minimizing dropout rates through student follow-up and support.
11. Issue academic notifications for lectures, events, content uploads, and examinations regularly.
12. Ensure adherence to the four-quadrant approach in academic practices.
13. Propose schedules for continuous internal assessments and end-term examinations, approving them for circulation.
14. Supply approved schedules to the Technical Manager for upload on the LMS.
15. Review reports on student performance and attendance in assessments periodically.
16. Ensure timely submission of internal assessment marks to the Controller of Examinations (CoE) and upload them as per schedule.
17. Monitor submission of examination forms and payment of examination fees by students within deadlines, communicating with the CoE as necessary.
18. Coordinate with the CoE for all examination-related matters at CDOE-JNU.
19. Arrange provision for industrial interface and provide assistance to students, coordinating with the Program Coordinator.
20. Organize orientation, Faculty Development Programs (FDP), and training programs for CDOE-JNU team members periodically.
21. Fulfill any other assigned functions as part of relevant committees or teams to ensure smooth functioning of CDOE-JNU.

3.4.3 Assistant Director

The candidate must hold the position of Associate Professor as per UGC Regulations 2018 and possess prior experience in overseeing online education programs.

KRA:-

1. Coordinate with different departments that offer online programs.
2. Aid the Deputy Director in fulfilling daily responsibilities associated with the Online Program.
3. Ensure that courses are conducted according to schedule and without any errors.
4. Ensure timely completion of assigned tasks as directed by the Deputy Director.

3.4.4 Program Coordinator

Each program will require the appointment of a Program Coordinator. Eligible candidates for this role must meet the qualifications outlined in the UGC Regulations 2018 for either Associate Professor or Assistant Professor.

KRA

1. Prepare the timetable for live classes and interactive sessions, ensuring accessibility for both students and faculty, with approval from the Deputy Director.
2. Schedule or reschedule classes as needed.
3. Ensure course content aligns with the Content Matrix, coordinating with faculties and academic partners.
4. Develop a subject allocation plan in consultation with faculty members, seeking approval from the Deputy Director.
5. Maintain faculty attendance records and ensure regular participation in live classes and interactive sessions, reporting to the Deputy Director.
6. Ensure instructional delivery adheres to the Content Matrix and UGC regulations.
7. Review the quality and plagiarism of e-content and e-tutorials, coordinating with the Course Coordinator and submitting for approval to the Deputy Director.
8. Ensure timely availability of e-content, e-tutorials, and events on the LMS.
9. Assist the Deputy Director in uploading e-content and e-tutorials on the LMS in coordination with technical departments.
10. Provide technical support to faculty and students throughout the course duration.
11. Schedule and deliver live lectures punctually and without technical issues.
12. Monitor student attendance in live classes and interactive sessions, maintaining accurate records.
13. Ensure scheduled lectures are completed on time and utilize the allocated credit hours.
14. Schedule sessions with Visiting Faculty, subject to approval from the Director.
15. Coordinate with the Deputy Director for soft skill and value-added certificate programs to enhance students' career prospects.

16. Coordinate academic activities such as Discussion Forums with Course Coordinators.
17. Pace and plan continuous internal assessments, ensuring technical feasibility and effective communication.
18. Ensure assessment contents align with Quadrant-IV and are uploaded on the LMS by faculty.
19. Allocate faculty for student project work, establish completion timelines, communicate dissertation preparation guidelines, ensure plagiarism checks, and monitor topic diversity.
20. Ensure timely thesis submission and schedule viva-voce examinations for students.
21. Submit online program question papers within deadlines and communicate with the Controller of Examinations.
22. Monitor faculty evaluation and uploading of marks on the LMS.
23. Ensure timely completion of evaluations for publishing results within planned timelines, consulting with the Controller of Examinations.

3.4.5 Course Coordinator

Each course will require the appointment of a Course Coordinator possessing subject expertise and industry knowledge necessary for academic delivery. Eligible candidates for this role must meet the qualifications and experience outlined in the UGC Regulations 2018 for Professor, Associate Professor, or Assistant Professor.

KRA

1. Familiarize oneself with the LMS operations before the session begins.
2. Prepare thoroughly for daily sessions, engaging students for the entire allocated time and fostering effective communication.
3. Organize Discussion Forums for clearing doubts and promptly respond to student queries via chat, email, phone, video, or other synchronous tools, adhering to university policies and SRM directives.
4. Provide regular feedback to students on discussion board activities, assignments, tests, etc.
5. Conduct plagiarism checks on all e-tutorials and e-content according to UGC's four-quadrant framework, reporting findings to the Program Coordinator.
6. Schedule regular assessments of course modules using the LMS platform.
7. Ensure assessments are conducted with integrity, reporting any instances of academic misconduct to the Program Coordinator.

3.4.6 Course Mentor

For each batch of 250 students, the appointment of one Course Mentor is required. Eligible candidates for this role must meet the qualifications and experience outlined in the UGC Regulations 2018 for Assistant Professor.

KRA

1. Assist the Program Coordinator and Course Coordinator in sharing academic knowledge and resolving procedural queries as requested by students.
2. Supervise teacher-student interaction groups.
3. Aid the Course Coordinator in organizing and actively participating in discussion forums.
4. Develop mechanisms to improve learners' learning experiences through open dialogues, counseling, etc.
5. Ensure resolution of non-academic queries.

3.4.7 Examinations

Deputy Controller of Examination (Dy. CoE)

The Deputy Controller of Examinations (Dy. CoE) is responsible for overseeing and executing all functions related to the entire examination process.

KRA

1. Verify that students at CDOE-JNU meet examination eligibility criteria, in coordination with the Dy. Director.
2. Ensure students submit examination forms and pay fees within deadlines, in coordination with the Dy. Registrar and student cell.
3. Issue admit cards to compliant students at least 3 days before end-term examinations, coordinating with the academic team.
4. Prepare and release the Examination Time-Table.
5. Appoint qualified faculty examiners for online student assessments, whether internal or external.
6. Ensure timely receipt of question papers for online programs, adhering to guidelines, in coordination with the Dy. Director.
7. Ensure faculty examiners receive appropriate payment for paper checking fees, as per CDOE-JNU norms.

8. Ensure timely declaration of results and issuance of grade cards to students, in coordination with the given time-frame.
9. Disseminate notifications, guidelines, and regulations to promote awareness of examination policies and procedures among students and faculty members at CDOE-JNU.
10. Coordinate with CDOE-JNU for all matters concerning result declaration and grade-card issuance.

3.4.8 Technical Support Team

1. *Technical Manager* (Operations)– One Technical Manager is to be appointed.

KRA

a) Upload academic content for delivery after approval from the Dy. Director.

b) Develop e-tutorials and e-contents in alignment with the four-quadrants approach, UGC plagiarism guidelines, and branding guidelines of CDOE-JNU.

c) Collaborate with other Technical Managers, ERP, and LMS providers for ongoing maintenance and issue resolution.

2. *Technical Associate* (Audio-Video recording and editing)– One Technical Associate is to be appointed.

KRA

a) a) Record, edit, and execute tasks related to creating audio-video content for CDOE-JNU.
b) b) Implement changes and develop audio-video content as directed by the Technical Manager and Director.

3.4.9 Administrative Staff Strength

The strength of the administrative staff shall constitute of:

1. *Deputy Registrar* – One individual is to be appointed with minimum Master's degree qualification and five years of experience as an Assistant Registrar or an equivalent position. The individual should have expertise in adequate technology.

KRA

i. Coordinate with the Admissions teams to ensure smooth functioning of the admission process at CDOE-JNU.

ii. Ensure that Academic Bank of Credit (ABC) IDs are generated for all students after enrollment numbers are issued.

iii. Approve and ensure regular notifications related to administration are sent to faculty and staff.

iv. Conduct official correspondence with regulatory bodies, the Registrar's Office, and other stakeholders on behalf of CDOE-JNU.

v. Approve and ensure regular administration-related notifications are sent to students.

vi. Maintain records of student enrollment, including all necessary documents such as bonafide letters and NOCs.

vii. Collect fees from students when applicable.

viii. Conduct official correspondence with regulatory bodies, the Registrar's Office, and stakeholders as needed.

ix. Ensure scholarship facilities are provided to students based on criteria set by JNU and other funding agencies.

x. Ensure compliance with statutory regulations as per UGC, AICTE, and other regulatory bodies.

xi. Organize induction and training programs for new recruits and staff members at CDOE-JNU.

xii. Determine the need for recruiting staff members at various positions within the CDOE-JNU department.

xiii. Determine employee salaries based on university criteria and communicate this information to the JNU accounts department.

xiv. Ensure all required documents are submitted by employees for performance appraisals and communicate this to the Registrar's office.

xv. Organize events for effective employee engagement as deemed necessary.

xvi. Efficiently address employee grievances at CDOE-JNU.

xvii. Oversee the grievance redressal process for students.

xviii. Manage and oversee other duties related to the examinations, admissions, and technical departments.

2. Student Relationship Manager (SRM)

CDOE-JNU will appoint two Student Relationship Managers (SRM), each with a minimum qualification of an undergraduate degree and at least two years of relevant experience in managing student relationships within an academic institution. Candidates should possess excellent communication skills and demonstrate the ability to collaborate effectively in teams.

KRA

1. Establish and maintain relationships with prospective learners and their parents/guardians.
2. Assist learners in understanding the various courses offered and highlight their selling points.

3. Identify opportunities and weaknesses in the SRM systems and implement necessary changes.
4. Gather feedback and efficiently resolve complaints throughout the program duration.
5. Fulfill any other duties as required.

3.5 Instructional delivery mechanisms

JNU boasts a fully dedicated team of faculty members and staff proficient in delivering online lectures through CDOE – JNU. At the commencement of each session, students will receive the academic calendar via the Learning Management System (LMS). The distribution of self-learning material, audio, and video content to students will be facilitated through the LMS via the following delivery channels:

3.5.1 Four Quadrants and Academic Delivery

No. of Credits	**Duration**	**Live Sessions**	**Quadrant – I e-Tutorial**		**Quadrant – II e-Content**	**Quadrant – III Discussion Forum**	**Quadrant – IV Assessment**
			(Recorded Lecture)	**Open Source Videos**	**e-Content(E-book/ PDF & PPT)**	**Live Session (2hrs/week)**	**CIA**
2	6 weeks	6 (1/week)	6 hrs	4 hrs	• PPT and E-book/PDF • Reading time mentioned for each file	Forum Topics – For raising of doubts and clarifying the same on real time basis by the Course Coordinator or his team	Multiple Choice Questions, Fill in the blanks, Practice Questions.
Total Hours= 60		**6 hrs**	**10 Hrs**		**10 Hrs**	**12 hrs**	**22 Hrs**
3	9 weeks	9 (1 session/week)	9	6	• PPT and E-book/PDF Reading time mentioned for each file	-same-	-same-
Total Hours = 90		**9 Hrs**	**15 Hrs**		**15 Hours**	**18 hrs**	**33 Hrs**
4	12 weeks	12 (1 session/week)	12	8	• PPT and E-book/PDF Reading time mentioned for each file	-same-	-same-
Total Hours = 120		**12 Hrs**	**20 Hrs**		**20 Hours**	**24 hrs**	**44 Hrs**

*Proportionate Credit wise allocation would be done.

3.6 Identification of media-print, audio, or video, online, computer aided

The Learning Management System (LMS) serves as a comprehensive digital platform, offering a multitude of features including recorded faculty video lectures, real-time discussion forums, live sessions, e-content comprising study material, open source materials, and graded assessments.

For each module within a course, there will be one live session conducted by the respective faculty member, focusing on a specific topic. CDOE-JNU has curated study material that is clear and easily comprehensible, complete with concise summaries, self-assessment questions, and case studies.

Access to these course materials is facilitated through:

- Login credentials provided in the welcome email sent by the university
- Students can also log in via the University website at https://lms.jnujaipur.ac.in/

Online Courseware

Through the Learning Management System (LMS), students will have access to a comprehensive array of course materials, including:

- e-Books (Self Learning Materials)
- Study Guides (PowerPoint presentations)
- Tutorial Videos
- Live Interactive Online Sessions
- Frequently Asked Questions (FAQs) and Misconceptions
- Web Resources for Research Purposes
- Practice Assignments
- Online Discussion Forums
- Enriching Content such as gamified elements and Value Added Content
- The LMS is organized with semester/year-wise buckets for subjects and specializations of the respective programs as enrolled.

The Dashboard feature of the LMS serves to track and monitor students' learning progress. It includes functionalities such as:

- Monitoring progress in learning
- Comparing progress with peers
- Receiving regular notifications about upcoming webinars, virtual classes, assignments, discussion forum participations, and examinations

- Providing a platform for raising queries, which can be addressed by course coordinators, mentors, and faculty members. may be answered and conveyed by the course coordinators mentors and faculty.

3.7 Student Support Services

Students will have access to support services provided by CDOE-JNU through the Student Relationship Management (SRM) system for queries related to administration and general technical issues. A ticketing system integrated into the LMS will enable learners to connect with the CDOE-JNU technical team for support services, with resolutions handled by the appropriate authority. Notifications will also be sent to the Deputy Registrar to ensure queries are addressed within 24 hours or sooner.

For academic course-related queries, students can raise queries directly through an open discussion forum, which will notify the Course Coordinator, Program Coordinator, and Deputy Director. Queries should be resolved within 48 hours of being raised, with the Program Coordinator responsible for managing and resolving any unresolved matters. The Deputy Director will ensure the timely resolution of academic queries.

In addition to academic excellence, CDOE-JNU prioritizes the holistic development of its students. The department supports various initiatives to broaden students' opportunities and shape them into future leaders.

4. Assessment and Evaluation

4.1 Overview

The evaluation of students' learning will encompass internal assignments, quizzes, learner response sheets, and end-of-term examinations. CDOE-JNU follows a rigorous process in the development of question papers, creation of question and quiz banks, preparation and moderation of assignments, administration of examinations, analysis of answer scripts by qualified academics, and declaration of results. Question papers are meticulously framed to ensure comprehensive coverage of the syllabus.

The evaluation process will include two types of assessments:

Examination Name	Marks Division
Continuous internal assessment	30%
Summative assessment in the form of end-term examination. End-term examination will be held with proctored examination tool technology (follow **Annexure V** for guidelines and pre-requisites for Proctored Examination)	70%

The examinations are designed to evaluate the knowledge acquired during the study period.

For theory courses, internal evaluation will be conducted through Continuous Internal Assessment (CIA), which includes assignments and quizzes in form of MCQ type of questions. The internal assessment will contribute a maximum of 30 marks for each course.

At the end of each semester, an end-of-semester online examination will be held for each course, lasting two hours.

Guidelines issued by the Regulatory Bodies from time-to-time about conduct of examinations shall be considered and new guidelines if any will be implemented.

4.2 Question Paper Pattern

Online Exam Time: 2 Hours

Max. Marks: 70

Exam will be comprising of 70 Multiple-Choice Questions (1 Mark Each) – 70 Marks

4.3 Distribution of Marks in Continuous Internal Assessments

The following procedure shall be followed for internal marks for theory courses. Weightage for Assignment is provided below:

Particular	A1 (MCQ Type)	A2 (MCQ Type)
Marks	15	15

Note: Refer to **Annexure VI** and **VII** for reference to the question paper pattern and formats of documents accepted.

Students may re-appear for CIA up to next two semesters and has to follow the same procedure. For the last semester the academic rules shall apply.

4.4 Statistical Method for the Award of Relative Grades

Letter Grade	Grade point	Range of Marks(%)
O (Outstanding)	10	90-100
A+ (Excellent)	9	80-89
A (Very good)	8	70-79
B+ (Good)	7	60-69

B (Above average)	6	50-59
C (Average)	5	40-49
P (Pass)	4	35-39
F (Fail)	0	0-34
Ab (Absent)	0	Absent

Abbreviations:

CO	Core Course	MM	Maximum Marks
DSC	Discipline Specific Course	MO	Marks Obtained
GE	Generic Elective Course	SE	Skill Enhancement
AE	Ability Enhancement	DSE	Discipline Specific Elective

4.4.1 Cumulative Grade Point Average (CGPA) and Semester Grade Point Average

Semester Grade Point Average (SGPA):

It is the summation of product of Credit Points and Grade Points divided by the summation of Credits of all Courses taught in a semester.

SGPA = $\Sigma C_i G_i / \Sigma C$

Where, G is grade and C. is credit for a Course.

Cumulative Grade Point Average (CGPA): $CGPA = \Sigma(C_i \times Si)/\Sigma c.$

Where, Si is the SGPA of the semester and Ci is the total number of credits in that semester.

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Note:

- In case of any mistake being detected in the preparation of the Grade Statement at any stage or when it is brought to the notice of the concerned authority the University shall have the right to make necessary corrections.

4.4.2 Cumulative Grade Point Average (CGPA)

CGPA will be used to describe the overall performance of a student in all courses in which letter grades are awarded since his entry into the University or transferred from other University upto the latest semester as per the procedure provided in JNU Academic Regulations. It is the weighted average of the grade points of all the

letter grades received by the student from his entry into the University or transferred from other University. Since multiple performance in a course in which the student has already received a grade is possible, whenever through such a process a new grade is obtained, it will replace the earlier one in the calculation of CGPA. On the other hand, if through this process merely a report emerges, this event by itself will not alter the CGPA.

A student's grades, reports, CGPA, etc. at the end of every semester/term will be recorded on a grade card, a copy of which will be issued to him. The grade card will be withheld if a student has not paid his dues or when there is a pending case of breach of discipline or a case of unfair means against him.

The faculty members also responsible for maintaining the complete records of each student's attendance, performance in different components of evaluation. If a scrutiny or statistical analysis becomes necessary, the above records and any other pertinent information should be made available by the faculty member of the course.

4.4.3 Conversion Factor

Formula for Conversion of CGPA to Percentage:

Percentage of marks = CGPA ^{x} 10

4.5 Grade card

All grades and reports and other pertinent information for a semester are given in a grade card which is a complete record of the outcome of what was intended in the original registration. The various grades and reports would be appropriately used to tally the grade card with the original registration.

Chronologically organized information from the grade cards of a student with the necessary explanation constitutes is transcript which is issued at the time the student leaves the University or at an intermediate point on request.

4.5.1 Grade cards and Certification – Student Communication

- The student can get soft copy of grade cards through the University website, the hard copy grade card would be provided only after successfully completion of full program along with degree certificate.
- Once the student completes all the mandated assignments, examinations and projects (if applicable) the final mark sheet/grade card and certificate would be dispatched by the University to the student registered address.
- All pending payments/dues need to be cleared by the student, before the final certification.
- If required, the University may request the mandatory documents from student as submitted during admission time, the students may have to re-submit the same if required during final degree certification.

Students need to apply for degree by filling the degree application form and submit all the required documents and the applicable degree processing application fees as mentioned in this document.

4.5.2 Online Results, grade card and Degree Logistics–Internal Process

- After verification of all data by the Controller of Examination, the results would be published on the CDOE-JNU website.
- Students need to download and save the copy of semester / year wise results.

CDOE-JNU would provide hard copy grade cards and degree certificate at the end of the program to students who have successfully completed the program. Students who successfully completed the program will receive hard copy mark sheet/grade cards and a degree certificate from the University at the end of the program. A provision for On Demand Mark Sheets can be provided wherein student would have to fill the requisition and pay postal charges enabling university to dispatch the hard copy marksheets as requested by the student; prior to completion of the overall program.

5. Requirement of the Laboratory Support and Library Resources

5.1 Laboratory Support

Jaipur National University offers access to state-of-the-art laboratories equipped with the latest tools and resources necessary for research and analytical work. The laboratory support at JNU aims to foster a robust research environment, encouraging students to develop essential skills required for their academic and professional growth.

5.*2 Library Resources*

The Central Library at CDOE-JNU offers a comprehensive range of sections, including reference, circulation, audio-visual, periodical, book-bank, digital library, and reprographic sections. With a collection exceeding 1,00,000 books, the library also provides access to e-journals, online databases such as Scopus and Web of Science, and institutional repositories featuring rare book collections. University has 449 subscriptions of online and offline Journals. Equipped with modern facilities like reading rooms, computer labs, and quiet study areas, the library fosters a conducive environment for learning and intellectual growth. Additionally, the library frequently organizes workshops, seminars, and exhibitions to enhance academic engagement and promote a culture of continuous learning.

All electronic resources can be accessed seamlessly through the Local Area Network (LAN) on campus, as well as remotely via login credentials. This ensures convenient access to resources for students, faculty, and researchers both on-site and off-site.

6. Cost Estimate of the Program and the Provisions

The Estimate of Cost & Budget could be as follows (all figures on Annual basis) :

Sl. No.	Expenditure Heads	Approx. Amount
1	Program Development (Single Time Investment)	70,00,000 INR
2	Program Delivery (Per Year)	14,00,000 INR
3	Program Maintenance (Per Year)	47,00,000 INR

7. Quality Assurance Mechanism

The quality of a program hinges upon the course curriculum, syllabus, and academic delivery, all of which are meticulously designed to bridge the gap between industry standards and academia. To uphold this standard, the Centre for Internal Quality Assurance (CIQA) and the Academic Council play crucial roles.

The Academic Council is entrusted with ratifying the curriculum and any proposed changes recommended by CIQA to ensure the continual enhancement and maintenance of quality in online education at CDOE-JNU.

The Centre for Internal Quality Assurance (CIQA) is tasked with several responsibilities:

(i) Conducting periodic assessments of online learning course materials and audio-video tutorials to maintain the quality of learning.

(ii) Soliciting stakeholder feedback and implementing recommended changes to meet the evolving needs of course delivery and industry requirements.

(iii) Evaluating the quality of assignments, quizzes, and end-term assessments and providing suggestions for enhancements to sustain the learning program's standards.

(iv) Ensuring that the learning experience is truly global, aligning with program outcomes and reflecting the vision and mission of JNU.

The Chief Operating Officer (CoE) of the University oversees examinations and the evaluation system to ensure fairness and integrity in the assessment process.

CDOE-JNU is committed to continual improvement, striving to enhance processes, assessments, teaching methodologies, and e-learning materials in line with the four-quadrant approach and the implementation of the New Education Policy (NEP). The University is dedicated to delivering exceptional education across all learning modes while adhering to NEP, UGC, and other regulatory guidelines, fostering a truly global educational environment.

Annexure I _Detailed syllabus of BCA Program

Semester I

'C' Programming Fundamentals

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

1. Understand the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming
2. Illustrate concept of compile and debug programs in C language and use different data types for writing the programs.
3. Design programs connecting decision structures, loops and functions.
4. Distinguish between call by value and call by address.
5. Understand the dynamic behavior of memory by the use of pointers.
6. Use different data structures and create / manipulate basic data files and developing applications for real world problems.

Detailed Syllabus

UNIT I

Planning the Computer Program, Debugging, Types of errors, Documentation, Techniques of Problem Solving, Problem solving aspects, Implementation of algorithms, Program verification, Flowcharting, decision table, algorithms and Structured programming concepts; Programming methodologies: Top down and Bottom up programming.

UNIT II

Programming Language, C Standard Library, Introduction to C Programming , Memory Concepts, Decision Making , Secure C Programming , Structured Program Development in C, Algorithms, Pseudocode, Control Structures, if Selection Statement, while Repetition Statement , Assignment Operators, Increment and Decrement Operators. C Program Control: for Repetition Statement, switch Multiple Selection Statement, do...while Repetition Statement, break and continue Statements, Logical Operators.

UNIT III

C Functions, Program Modules in C, Math Library Functions, Functions: Function Definitions, Function Prototypes: A Deeper Look , Function Call Stack and Stack Frames, Passing Arguments By Value and By Reference, Recursion vs. Iteration, C Arrays: Defining Arrays, Passing Arrays to Functions, Sorting Arrays, Searching Arrays and Multidimensional Arrays.

UNIT IV

Structure & Union, C Pointers: Pointer Variable, Definitions and Initialization. Pointer Operators, Passing Arguments to Functions by Reference, size of Operator, Pointer Expressions and Pointer Arithmetic, Relationship between Pointers and Arrays, Pointers to Functions, C Characters and Strings, Character Handling Library, String, Conversion Functions, Standard Input/output Library Functions, String, Manipulation Functions ,C Formatted Input/output

UNIT V

C File Processing: Files and Streams, Creating a Sequential, Access File, Reading Data from a Sequential, Access File , Random, Access Files , Creating a Random, Access File and Writing Data Randomly to a Random Access File, Reading Data from a Random Access File, C Pre-processor.

Text Books:

1. Balagurusamy, Programming in ANSI C, Tata McGraw-Hill Education, 2008
2. Yashavant Kanetkar, Let us C, BPB

Reference Books:

1. P. K. Sinha & Prtti Sinha “Computer ‘5’ Fundamentals” BPB Publications 2007.
2. R.G. Tromey “How to solve it by computer” Prentice Hall 1982.
3. Paul Deital & Harvey Deital “C How to Program” 7 edition Pearson Education 2013.
4. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.

'C' Programming Lab

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

1. Identifysituations where computational methods and computers would be useful.
2. Summarize the programming tasks using techniques learned and writepseudo-code.
3. Choose the right data representation formats based on the requirements of the problem.
4. Use comparisons and limitations of the various programming constructs and choose the right one for the task in hand.
5. Implement file Operations in C programming for a given application.

Exercises:

- Write a C program print Addition / Multiplication of integers.
- Determining if a number is +ve /, ve / even / odd.
- Find maximum of 2 numbers from 3 numbers.
- Construct a program to implement a calculator that reads in integers and operations from the keyboard such as 7 * 3 + 6 = print the answer and exit. Just as on a cheap calculator addition and multiplication have the same precedence and evaluation is strictly left to right. For example 4+5*6 = prints 54 because 4+5=9 is computed before the multiplication.
- Write a C program to give sum of first n numbers from given n numbers etc.
- Write a C program to print Integer division.
- Write a C program for Digit reversing of a number.
- Write a C program to give factorial of a number.
- Write a C program to find the sum of individual digits of a positive integer.
- A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- Write a C program to generate all the prime numbers between 1 and n where n is value supplied by the user's) Write a program which checks a given integer is Fibonacci number or not.
- Write a C program to find LCM and HCF of a number.
- Write a C program to generate sine series cosine series etc.
- Write a C program in C for Pascal Triangle Prime number.
- Factors of a number. Other problems such as Perfect number GCD of 2 numbers etc. (Write algorithms and draw flowcharts)
- Write a C program to check whether the number is Palindrome or not.
- Write a C program in C to check whether the number is leap or not.
- Write a C program in C to print various diamond patterns.
- Write a C program in C whether the number is Armstrong or not.
- Write a program to shift input data by 2 bits left and right.
- Write a program to use bitwise "&" operator between 2 integer and display the result.
- Write a program to input 6 numbers and find the biggest and smallest using nested if.
- Write a program to find the sum of even and odd numbers using switch if else nested if between 1 and 20.
- Write a program to find the sum of its digits till the result is in single digit
- Write a program to print the series: x-x3/3!+x5/5!-x7/7...an/n!

- 1 + x2/2!-x3/3! + x4/4... xn/n!
- Write a program to perform Arithmetic operation on an array i.e. Addition Subtraction Multiplication and Division and store the result in another array.
- Write a program to perform following string operation: with string functions and without string functions.
  - Reverse a string, Compare two string, Concatenate two strings
- Write a program to detect the occurrence of a number in a string.
- Write a program to accept a string up to 15 character and display the position of a character in a separate line.
- Write a program to display and count the number of vowels in a string.
- Write a program to add to pointer addresses of a pointer variable.
- Write a program to find the factorial of a number using recursion.
- Write a program to perform different arithmetic operations using pointers
- Write a program to obtain prime factors of any integer number using functions.
- Write a program to find the sum of 5 digit number: Without using recursion and with using recursion.
- Write a program to obtain Fibonacci series by using recursion.
- Write a program to create, display, modify and append a file (sequential file).
- Write a program to copy the content of one file to another.
- Write a program to calculate space in a file (number of blank spaces and not the file size).
- Write a program to print out the lines from a file that have 50 or more characters in them.
- Display the initials of first and the middle name separated by "." i.e. Input - Krishna Kumar Singh Output - K .K. Singh
  - Now create a main structure that will contain name age salary of an employee.
- Write a program to call sum ( ) function recursively and perform sum of 1 to 5 numbers.
- Write a program to find the larger of the two numbers using macro with argument.
- Write a program to count the number of character, word and lines in a text.
- Write a program to arrange a list by using any sorting method.

Discipline Specific Core Courses (DSC):

Fundamentals of Computers and PC Tools

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

1. Identify the important role of computers and why computers are essential components in business and society along with their various components.
2. Demonstrate the building up of Sequential and combinational logic from basic gates.
3. Apply different categories of programs, system software and applications. Organize and work with files and folders. Utilize the Word Processor, Worksheet and PowerPoint for various applications.
4. Assess the emerging technologies in the area like Big Data, Data Mining and Cloud Computing.
5. Bridge the fundamental concepts of computers with the present level of knowledge of the students.

Detailed Syllabus

Unit I

Computer and its characteristics, application of computers, digital and analog computers, Generation of computers. Storage devices: primary storage devices (RAM, ROM, PROM, EPROM and EEPROM), secondary storage devices (Floppy disk Hard disk optical disk magnetic tapes), Input and output devices (keyboard mouse light pen joystick scanner monitor printers, etc.). Number system and its types conversion from one base to another and vice versa arithmetic operations r's (r - 1)'s complement methods.

Unit II

Software and its types (System Software, Application Software, Firmware Software), Computer Languages and its types (Machine Language, Assembly Language, High Level Language. Advantages and disadvantages of computer languages) Translators: Compiler Linker Interpreter

Unit III

Overview of Emerging Technologies: Bluetooth, cloud computing, big data ,data mining , mobile computing and embedded systems

Unit IV

Operating system and its functions, types of operating system (Single user, multi-user, multitasking, time sharing, distributed). Fundamental of DOS, internal and external commands, Windows fundamentals: Anatomy of windows, desktop elements, managing files and folders, installing software

Unit V

Word Processor and its features, editing of Text, Find and Replace, Bullets and Numbering, Spell Checker, Grammar Checker, Auto Correct, Auto Complete, Auto Text, Header and footer, tables, mail merge, border and shading, page setup printing. Spread sheet and its features, Entering Information in Worksheet, Editing Cell, Entry Moving and Copying Data, deleting or Inserting Cells Rows and Columns. Custom Numeric Formats Using Formulas and functions, Creating charts. Presentation Software and its

uses, steps for creating PowerPoint Presentation, PowerPoint Views Assigning Slide Transitions Using Preset Animations, Hiding Slides, Slide Show, Controlling the Slide Show with a Keyboard and Setting Slide Show Timings.

Text Books:

1. P.K Sinha & Priti Sinha Computer Fundamentals BPB Publications.
2. V. Rajaraman Fundamentals of Computers EEE.
3. Peter Nortan Introduction to Computers Tata Mcgraw Hill.

Reference Books:

1. Alexix Leon Mathewes Leon Fundamentals of Information Technology.
2. Suresh K. Basandra Computer Systems Today Gatgotia Publications.
3. Joyce Coax Joan Preppernau Steve Lambert and Curtis Frye 2007 Microsoft Office System step by step Microsoft Press.
4. R.K. Taxali PC Software for Windows.

Office Automation Tools Lab

Course Outcomes:

At the completion of the course, a student will be able to:

1. Identify and recall the use of CUI and GUI based operating systems.
2. Summarize the working of various application software's such as MS Word, MS Excel and MS PowerPoint.
3. Apply the various features and functionalities of MS Word, MS Excel and MS PowerPoint.
4. Design and develop various Word files, spreadsheets and PowerPoint presentations.

Exercises for WORD:

1. Create a **telephone directory.**
   - The heading should be 16-point Arial Font in bold
   - The rest of the document should use 10-point font size
   - Other headings should use 10-point Courier New Font.
   - The footer should show the page number as well as the date last updated.
2. Design a time-table form for your college.
   - The first line should mention the name of the college in 16-point Arial Font and should be bold.
   - The second line should give the course name/teacher's name and the department in 14-point Arial.
   - Leave a gap of 12-points.
   - The rest of the document should use 10-point Times New Roman font.
   - The footer should contain your specifications as the designer and date of creation.
3. Create the following one page documents.
   (a) Compose a note inviting friends to a get-together at your house, including a list of things to bring with them.
   (b) Design a certificate in landscape orientation with a border around the document.
6. Create the following document: A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
7. Convert following text to a table, using comma as delimiter

   Type the following as shown (do not bold).

Color,	**Style,**	**Item**
Blue,	**A980,**	**Van**
Red,	**X023,**	**Car**
Green,	**YL724,**	**Truck**
Name,	**Age,**	**Sex**
Bob,	**23,**	**M**
Linda,	**46,**	**F**
Tom,	**29,**	**M**

6. Prepare a grocery list having four columns (Serial number, the name of the product, quantity and price) for the month of April, 06.

- Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
- The headings of the columns should be in 12-point and bold.
- The rest of the document should be in 10-point Times New Roman.

i. Leave a gap of 12-points after the title.

7. XYZ Publications plans to release a new book designed as per your syllabus. Design the first page of the book as per the given specifications.

b. The title of the book should appear in bold using 20-point Arial font.

c. The name of the author and his qualifications should be in the center of the page in 16-point Arial font.

d. At the bottom of the document should be the name of the publisher and address in 16-pomt Times New Roman.

e. The details of the offices of the publisher (only location) should appear in the footer.

8. Create the following one page documents.

c) Design a Garage Sale sign.

d) Make a sign outlining your rules for your bedroom at home, using a numbered list.

9. Enter the following data into a table given on the next page.

Salesperson	**Dolls**	**Trucks**	**Puzzles**
Amit	1327	1423	3193
Shivi	1421	3863	2934
Om	5214	3247	5467
Ananya	2190	1275	1928
Anupama	1201	2528	1203
Maharshi	4098	3079	2067

Add a column Region (values: S, N, N, S, S, S) between the Salesperson and Dolls columns to the given table. Sort your table data by Region and within Region by Salesperson in ascending order.

Exercises for EXCEL

1. Create a student worksheet containing roll numbers, names and total marks. Open a document in Word and insert the excel worksheet using:-
   i) Copy/Paste
   ii) Embedding
   iii) Linking
2. The term wise marks for APS class of 20 students are stored in 3 separate sheets named term 1, term 2 and term 3. Create 4^{th} worksheet that contains student names and their total and average marks for the entire year. Give proper headings using headers. Make the column headings bold and italic. The 4^{th} worksheet should contain college name as the first line. Make it bold, italic and center it.
3. Using a simple pendulum, plot 1-T and 1-T^2 graph.

I	t1	t2	t3	Mean(t)	T=t/20	T^2
70						
80						
90						
100						

2. Consider the following employee worksheet:-

Full Name (First Last)	Grade 1/2/3	Basic Salary	HRA	PF	Gross	Net	(VA) Vehicle Allowance

HRA is calculated as follows:

Grade	HRA % (of Basic)
1	40%
2	35%
3	30%

i) Find max, min and average salary of employees in respective Grade
ii) Count no. of people where VA>HRA
iii) Find out most frequently occurring grade.
iv) Extract records where employee name starts with "A" has HRA>10000
v) Print Grade wise report of all employees with subtotals of net salary and also grand totals. Use subtotal command.
vi) Extract records where Grade is 1 or 2 and salary is between 10000 and 20000 both inclusive.

5. In a meeting of a marketing department of an organization it has been decided that price of selling an item is fixed at Rs40. It was resolved to increases the sell of more of more items and getting the profit of Rs40,000/.Use Goal Seek of find out how many items you will have to sell to meet your profit figure.

6. To study the variation in volume with pressure for a sample of an air at constant temperature by plotting a graph for P - V and P-I/V. Sample observations are:-

Pressure(P)	**Volume (V)**	**I/V**	**PV**	**P/V**
75	20			
78.9	19			
83.3	18			
88.2	17			

9. Plot the chart for marks obtained by the students (out of 5) vs. frequency (total number of students in class is 50).

10. Create the following worksheets) containing an year wise sale figure of five salesmen in Rs.

Salesman	2002	2003	2004	2005
MOHAN	10000	12000	20000	50000
MITRA	15000	18000	50000	60000
SHIKHA	20000	22000	70000	70000
ROHIT	30000	30000	100000	80000
MANGLA	40000	45000	125000	90000

Apply the following Mathematical & Statistical functions:

xi) Calculate the commission for each salesman under the condition :-

- c) If total sales is greater than Rs. 3, 00,000/-, then commission is 10% of total sale made by the salesman.
- d) Otherwise, 4% of total sale.

xii) Calculate the maximum sale made by each salesman.

xiii) Calculate the maximum sale made in each year,

xiv) Calculate the minimum sale made by each salesman.

xv) Calculate the minimum sale made in each year.

xvi) Count the no. of sales persons.

xvii) Calcu1ate the cube of sales made by Mohan in the year 2002.

xviii) Find the difference in sales by salesman Mitra between the year 2002 and 2003. Find the absolute value of difference.

xix) Also calculate the Mode, Std dev, Variance, and Median for the sale made by each salesman.

xx) Calculate the year wise Correlation coefficient between the sales man Mohan and Mitra year wise

9. The following table gives a year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	[00000	80000
S5	40000	45000	125000	90000

Calculate total sale year wise.

vii) Calculate the net sales made by each salesman

viii) Calculate the commission for each salesman under the condition :-

a. If total sales is greater than Rs. 4,00,000/-, then commission is 5% of total sale made by the salesman.

b. Otherwise, 2% of total sale.

ix) Calculate the maximum sale made by each salesman.

x) Calculate the maximum sale made in each year.

xi) Draw a bar graph representing the sale made by each salesman,

xii) Draw a pie graph representing the sale made by salesmen in year 2001.

10. Consider the following worksheet for APS 1st year students:-

S. No.	**Name**	**PH**	**CH**	**BY**	**MT**	**CS**	**Total**	**%**	**Grade**
1									
2									

Grade is calculated as follows:-

If % >=90

Grade A

If % >=80&<90 Grade B

If % >=70&<80 Grade C

If % >=60 &<70 Grade D

viii) Calculate Grade using if function

ix) Sort the data according to total marks

x) Apply filter to display the marks of the students having more than 65% marks.

xi) Draw a pie chart showing % marks scored in each subject by the topper of the class.

xii) Draw the doughnut chart of the data as in (iv)

xiii) Enter the S. No. of a student and find out the Grade of the student using VLOOKUP.

xiv) Extract all records where name

d) Begins with "A"

e) Contains "A"

f) Ends with "A"

11. Create five Power point slides. Each slide should support different format. In these slides explain areas of applications of IT. Make slide transition time as 10 seconds.

14. Create five Power Point slides to give advantages/disadvantages of computer, application of computers and logical structure of computer.

15. Create five Power Point slides detailing the process of internal assessment. It should be a self-running demo.

Discipline Specific Core Courses (DSC):

Elementary Mathematics

Course Outcomes:

At the completion of the course, a student will be able to:

1. Use elementary algebra, geometry, number concepts, probability and problem solving.
2. Demonstrate familiarity with number theory and statistics.
3. Think mathematically and exhibit confidence in their mathematical ability.
4. Explain why mathematical thinking is valuable in daily life.
5. Represent and statistically analyze data both graphically and numerically.

Detailed Syllabus

UNIT I

Matrices, Types of Matrices, Operations of addition, Scalar Multiplication and Multiplication of Matrices, Determinant of a Square Matrix, Minors and Cofactors, Transpose adjoint and inverse of a matrix, solving system of linear equations in two or three variables using inverse of a matrix

UNIT II

Sets Relation & Functions: Introduction , Definition of Set, Type of Sets, Operations on Sets, Venn diagram, Cartesian Product, Relations, Functions, Types of function, Some elementary functions with their graphs (Exponential logarithmic modulus), Limit & continuity of a function (Simple Problems).

UNIT III

Differentiation: Introduction, Derivative and its meaning, Differentiation of algebraic trigonometric exponential & logarithmic functions, Rules of Differentiation, Differentiation by Substitution, Higher Order Differentiation, Maxima and Minima of Simple Functions

UNIT IV

Integration: Introduction, Integral as Anti-derivative process, Indefinite Integrals, Rules of Integration, Integration by substitution. Definite Integration properties of Definite Integral, Finding areas of Simple Closed Curves

UNIT V

Coordinate Geometry: Introduction, 2D Cartesian Co-ordinate system, Straight line: (Equation & Slope of a line) Circle: Equation of Circle Equation to Tangent, Conic Sections: Focus Eccentricity Directrix, Axis of a conic section, Parabola & Ellipse: (Definitions equations and shape of curve only).

Text Books:

1. Mathematics Vol-2, R. D. Sharma, Dhalpat Raj & Sons.
2. The Elements of Co-ordinate Geometry Part-I, S. L. Loney, Book Palace, New Delhi,

Reference Books:

1. Mathematics for BCA, G. C. Sharma & Madhu Jain, Oscar Publication.

Discipline Specific Electives (DSE):

Digital Electronics

At the completion of the course, a student will be able to:

1. Recall fundamentals and principles of analog circuits and electronic devices in electrical and electronic engineering. Acquire basic knowledge of physical and electrical conducting properties of semiconductors. Develop the ability to understand the design and working of BJT / FET amplifiers.
2. Employ the codes and number systems converting circuits and compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance, and efficiency.
3. Understand different types of digital electronic circuits using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.
4. Analyze, design and implement sequential logic circuits. Assess the nomenclature and technology in the area of memory devices and apply the memory devices in different types of digital circuits for real-world applications.
5. Design different types of with and without memory element digital electronic circuits for a particular operation, within the realm of economic, performance, efficiency, user-friendly and environmental constraints
6. Evaluate frequency response to understand the behavior of Digital electronic circuits. Create and analyze electronic circuits

Detailed Syllabus

Unit I

Introduction to Basic Electronics: Semiconductors, Intrinsic & Extrinsic semi conductors, P Type & N Type semiconductors, PN Junction & Biasing. Semiconductor Diode: Diode, PN junction diode, forward/reverse, current symbol ratings, forward & reverse bias characteristics, Transistor (Introductory concepts): PNP & NPN Transistor, CBCC CE configurations and Transistor as an Amplifier, Introduction to FET MOSFET & construction

Unit II

Data and number representation and Logic Gates: Binary, complement representation, BCD, ASCII, conversion of numbers from one system to the other, 2's complement, representation and binary arithmetic. Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive OR and Exclusive NOR. Implementations of Logic Functions using gates, NAND, NOR implementations, Multi level gate implementations, Multi output gate implementations, Tristate gates

Unit III

Minimization Techniques: Boolean postulates and laws, De Morgan's Theorem, Principle of Duality, Boolean expression, Minimization of Boolean expressions, Minterm, Maxterm, Sum of Products (SOP), Product of Sums (POS), Karnaugh map, Minimization, Don't care conditions, Quine McCluskey method of minimization.

Unit IV

Combinational Circuits: Design procedure, Half adder, Full Adder, Half subtractor, Full subtractor, Parallel binary adder, parallel binary Subtractor, Fast Adder, Carry Look Ahead, adder-Serial Adder/ Subtractor, BCD, adder, Binary Multiplier, Binary Divider Multiplexer/ Demultiplexer, decoder encoder.
Sequential Circuits: Latches, Flipflops, SR, JK, D, T and Master Slave, Characteristic table and equation Application table, Edge triggering - Level Triggering, Introduction to Asynchronous and Synchronous counters and shift registers

Unit V

Memory Devices: Classification of memories, ROM organization, PROM, EPROM, EEPROM, EAPROM, RAM organization, Write operation, Read operation, Memory cycle, Timing wave forms, Memory, decoding memory expansion, Static RAM Cell, Bipolar RAM cell, MOSFET RAM cell, Dynamic RAM cell

Text Books:

1. M. Morris Mano Digital Design 3rd Edition Prentice Hall of India Pvt. Ltd. 2003 Pearson Education (Singapore) Pvt. Ltd. New Delhi 2003.
3. S. Salivahanan and S. Arivazhagan Digital Circuits and Design 3rd Edition. Vikas Publishing House Pvt. Ltd New Delhi 2006.

Reference Books:

1. John F.Wakerly Digital Design Fourth Edition Pearson/PHl 2006.
2. John.M Yarbrough Digital Logic Applications and Design Thomson Learning 2002,
3. Charles H.Roth. Fundamentals of Logic Design Thomson Learning 2003.
4. Donald P.Leach and Albert Paul Malvino Digital Principles and Applications 6thEdition TMH 2003.
5. William H. Gothmann Digital Electronics 2nd Edition PHI 1982.
8. Thomas L. Floyd Digital Fundamentals 8th Edition Pearson Education Inc New Delhi 2003.
9. Donald D. Givone Digital Principles and Design TMH 2003.

Digital Electronics Lab

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

1. Recall and learn the basics of logic gates & code conversion.
2. Develop design capability in the binary arithmetic logic circuit
3. Apply knowledge in Combinational Logic Problem formulation and verify their functionalities.
4. Examine design capability in synchronous and asynchronous sequential circuits like flip flops, Shift registers, and counters
5. Evaluate the basic understanding of digital circuits and to verify their operation.

List of Exercises:

1. To study and verify the truth table of logic gates.
2. Design and implementation of 4-Bit Adder and Subtractor using logic gates.
3. Design and implementation of BCD to excess-3 code converter using logic gates,
4. Design and implementation of Binary to gray code converter using logic gates.
5. Design and implementation of 4 bit binary Adder/ Subtractor using IC 7483
16. Design and implementation of 4 bit binary BCD adder using IC 7483
17. Design and implementation of 2 bit Magnitude Comparator using logic gates.
18. Design and implementation of 16 bit odd/even parity checker generator.
19. Design and implementation of multiplexer using logic gates IC74150 and IC74154.
20. Design and implementation of De-multiplexer using logic gates IC74150 and IC74154
21. Design and implementation of encoder using logic gates IC7445 and IC74147
22. Design and implementation of decoder using logic gates 1C7445 and IC74147
23. Construction and verification of 4 bit ripple counter,
24. Design and implementation of 3-bit synchronous up/down counter.
25. Implementation of SISO SIPO PISO and PIPO shift registers using Flip- flops

Ability Enhancement Compulsory Courses (AECC)

English-I

Prerequisite: - Basic knowledge of English Grammar

Course Objective:

1. To provide good and hesitation free spoken English
3. Emphasis is given on Grammar vocabulary and, practice part of English and reading Comprehension

Course Outcomes

At the completion of the course, a student will be able to:

1. Recall various grammatical concepts like tenses, modals, active & passive etc.
2. Differentiate between tenses, modals, prepositions etc.
3. Apply the knowledge of grammar in their day to day conversation.
4. Develop language proficiency by practicing speaking, listening, reading and writing skills.
5. Build a capacity to learn new words to enhance their vocabulary.

Detailed Syllabus

UNIT-I

Grammar-I

1. Sentence Structure
2. Subject & Predicate
3. Tenses

UNIT-II

Grammar-II

1. Prepositions
2. Modals
3. Active & Passive Voice

UNIT-III

Grammar-II

1. Subject-Verb Agreement
2. Punctuations
3. Common Errors

UNIT-IV

1. Paragraph Writing
2. Job Applications (Solicited Unsolicited and Layout)

UNIT-V

3. Reading Comprehension (Reading at various speeds (slow fast very fast) reading different kinds of texts for different purposes (e.g. for relaxation for information for discussion at a later stage etc.); reading between the lines).
4. Effective Listening (Techniques)

Text Books:

1. Quirk & Greenbaum "Advanced English Usage" Pearson Education.
2. www.usingenglish.com- Writing/ Grammar

Reference Books:

1. Banerjee Meera & Mohan Krishna "Developing Communication Skills" Macmillan Publications 1990.
2. Chaturvedi P.D. "Business Communication" Pearson Publications.

Online Reading/Supporting Material:

1. www.englishcfub.com - Vocabulary Enrichment/ Speaking
2. www.ispeakyouspeak.blogspot.com - Vocabulary Enrichment/ Speaking
3. www.teachertube.com - Writing Technically www.Dictionary.com - Semantic / Grammar.

Discipline Specific Core Courses (DSC):

Database Management System

Course Outcomes

At the completion of the course, a student will be able to:

1. Identify and organize the information from a DBMS and maintain and retrieve efficiently, and effectively.
2. Illustrate the role of Database Management Systems in information technology applications within organizations and structured query languages to extract information from large datasets
3. Applying contemporary logical design methods and tools for databases and derive a physical design for a database from its logical design.
4. Analyze and design a real database application.
5. Evaluate a real database application using a database management system.

Detailed Syllabus

Unit I

Introduction to Database Management Systems: File-based system, drawbacks of file-Based System, Data and information, Database, Database management System, Characteristics of database approach, data models, DBMS architecture and data independence.

Unit II

Entity Relationship and Enhanced ER Modeling: Entity types, relationships, SQL: Schema Definition, constraints, and object modeling.

Unit III

Relational Data Model : Basic concepts, ACID property, CODD Rules, concept of key, relational integrity, primary key, foreign key, normalization, 1st normal form, 2nd normal form & 3rd normal form, 4th Normal Form and 5th Normal Form, relational algebra

Unit IV

Structured Query Language: Introduction, Commands in SQL, Data Types in SQL, Data Definition Language, Data Manipulation Language, Data Control Language, Table Modification Commands, primary & foreign keys.

Unit V

Database design: ER and EER to relational mapping, functional dependencies, normal forms up to fifth normal form, Introduction to OODBMS and ORDBMS

Books Recommended:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.

Reference Books:

1. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw- Hill, 2002.
2. R, Elmasri, S.B. Navathe Database Systems Models. Languages, Design and application

Programming, 6th Edition, Pearson Education, 2013.

Database Management System Lab
Course Outcomes:
At the completion of the course, a student will be able to:

1. Demonstrate an understanding of the elementary & advanced features of DBMS & RDBMS.
2. Develop a clear understanding of the conceptual frameworks and definitions of specific terms that are integral to the Relational Database Management.
3. Understand the basic concepts of Concurrency Control & database security
4. Understand the basic concept how storage techniques are used to backup data and maintain data access performance in peak hours
5. Attain a good practical understanding of the SQL.
6. Develop clear concepts about Relational Model.
7. Examine techniques pertaining to Database design practices and prepare various database tables and joins them using SQL commands
8. Evaluate options to make informed decisions that meet data storage, processing, and retrieval needs.

The following concepts must be introduced to the students:

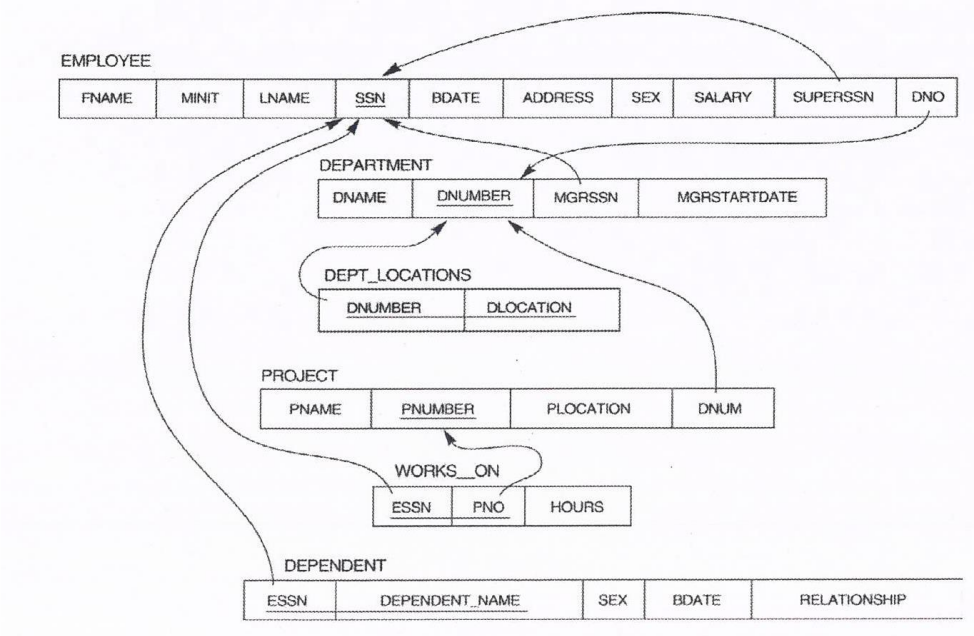
DDL Commands

- Create table, after table, drop table

DML Commands

- Select, update, delete, insert statements
- Condition specification using Boolean and comparison operators (and, or, not, =,<>, >, <, >=, <=,)
- Arithmetic operators and aggregate functions{Count, sum, avg, Min, Max)
- Multiple table queries (join on different and same tables)
- Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
- Categorization using group by……..having
- Arranging using order by

Relational Database Schema - COMPANY



Exercises to be performed on above schema

1. Create tables with relevant foreign key constraints
2. Populate the tables with data
3. Perform the following queries on the database :

xxxii. Display all the details of all employees working in the company.
xxxiii. Display ssn, lname, fname, address of employees who work in department no 7.
xxxiv. Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
xxxv. Retrieve the name and salary of every employee
xxxvi. Retrieve all distinct salary values
xxxvii. Retrieve all employee names whose address is in 'Bellaire'
xxxviii. Retrieve all employees who were born during the 1950s
xxxix. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
xl. Retrieve the names of all employees who do not have supervisors
xli. Retrieve SSN and department name for all employees
xlii. Retrieve the name and address of all employees who work for the 'Research' department
xliii. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.
xliv. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
xlv. Retrieve all combinations of Employee Name and Department Name
xlvi. Make a list of all project numbers for projects that involve an employee whose last name is ‘Narayan’ either as a worker or as a manager of the department that controls the project.
xlvii. Increase the salary of all employees working on the 'Product' project by 15%. Retrieve employee name and increased salary of these employees.
xlviii. Retrieve a list of employees and the project name each works in, ordered by the employee’s department, and within each department ordered alphabetically by employee first name.
xlix. Select the names of employees whose salary does not match with salary of any employee in department 10.
l. Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee.
li. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
lii. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper heading
liii. Find the sum of the salaries and number of employees of all employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department.
liv. Select the names of employees whose salary is greater than the average salary of all employees in department 10.
lv. For each department, retrieve the department number, the number of employees in the department, and their average salary.
lvi. For each project, retrieve the project number, the project name, and the number of employees who work on that project.
lvii. Change the location and controlling department number for all projects having more than 5 employees to 'Bellaire' and 6 respectively.
lviii. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.
lix. Insert a record in Project table which violates referential integrity constraint with respect to Department number. Now remove the violation by making necessary Insertion in the Department table.
lx. Delete all dependents of employee whose ssn is ‘123456789’.
lxi. Delete an employee from Employee table with ssn = '12345' (make sure that this employee has some dependents, is working on some project, is a manager of some department and is supervising some employees), Check and display the cascading effect on Dependent and Works on table. In Department table MGRSSN should be set to default value and in Employee table SUPERSSN should be set to

NULL

lxii. Perform a query using alter command to drop/add field and a constraint in Employee table.

Discipline Specific Core Courses (DSC)

Discrete Mathematics

Course Outcome:

After completion of this course Student will be able to:

1. Simplify and evaluate basic logic statements including compound statements, implications, inverses, converses, and contra positives using truth tables and the properties of logic.
2. Express a logic sentence in terms of predicates, quantifiers, and logical connectives
3. Apply the operations of sets and use Venn diagrams to solve applied problems; solve problems using the principle of inclusion-exclusion.
4. Determine the domain and range of a discrete or non-discrete function, graph functions, identify one-to-one functions, perform the composition of functions, find and/or graph the inverse of a function, and apply the properties of functions to application problems.
5. Verify that a simple program segment with given initial and final assertions is correct using the rule of inference for verification of partial correctness and loop invariants.

Detailed Syllabus

Unit I

Introduction: Introduction to Sets, Finite and Infinite Sets, Unaccountably Infinite Sets. Introduction to Functions and relations, Properties of Binary relations, Closure, Partial Ordering Relations

Unit II

Pigeonhole Principle, Permutation and Combinations, Mathematical Induction, Principle of Inclusion and Exclusion

Unit III

Asymptotic Notations, Recurrence Relations: Introduction, Generating Functions, Linear Recurrence Relations with constant coefficients and their solution

Unit IV

Graphs Theory: Basic Terminology of Graphs, Models and Types, Multigraphs, Weighted Graphs, Graph Representation, Graph Isomorphism, Graph Connectivity, Euler and Hamiltonian Paths and Circuits, Planar Graphs, Graph Coloring, Basic Terminology of Trees, Properties of Trees, Spanning Trees

Unit -V

Inference Theory: Introduction, Logical Connectives, Well Formed Formulas, Tautologies, Equivalence

Text Books:

1. C, L Liu and D.P. Mohapatra, Elements of Discrete Mathematics, Third Edition, Tata McGraw Hill, 2008.
2. K. Rosen, Discrete Mathematics and Its Applications, Sixth Edition, Tata McGraw Hi 11, 2007.

Reference Books:

1. T.H. Gormen, C.E. Leiserson, R.L. Rivest, Introduction to Algorithms, Third Edition,Prentice Hall of India,2010.

2. J.P. Trembley, R. Manohar, Discrete Mathematical Structures with Application to Computer Science, First Edition, Tata McGraw Hilt, 2001.
3. David Gries, Fred B. Schneider, A Logical Approach to Discrete Math, Springer; 2010.

Online Reading/Supporting Material:

2. http://ocw.mit.edu/course5/electrical-engineering-and--computer-science/6-042j-mathematics-fpr-computer- science-fal 1-2005/

Discipline Specific Core Courses(DSC)

Analysis of Algorithms and Data Structures

Course Outcome:

After completion of this course Student will be able to:

1. Understand basic data structures (such as an array based list, linked list, stack, queue, binary search tree) and algorithms.
2. Acquire the knowledge to analyze, design, apply and use data structures and algorithms to solve engineering problems
3. Evaluate the solutions of problems by implementing them using the advance data structures .
4. Apply modern tool to solve engineering problems using C.
5. Describe an understanding of analysis of algorithms.
6. Synthesize an algorithm or program code or segment that contains iterative constructs and analyze the code segment.

Detailed Syllabus

Unit I

Introduction: Basic Design and Analysis techniques of Algorithms, Correctness of Algorithm

Algorithm Design Techniques: Iterative techniques, Divide and Conquer, Dynamic Programming, Greedy Algorithms, Asymptotic Notations

Unit II

Sorting Techniques: Elementary sorting techniques-Bubble Sort, Insertion Sort, Merge Sort, Advanced **Sorting techniques:** Heap Sort, Quick Sort, Sorting in Linear Time-Bucket Sort, Radix Sort and Count Sort.

Searching Techniques: Linear and Binary search

Complexity Analysis: Medians & Order Statistics.

Unit III

Data Structures: Arrays Single and Multi-dimensional Arrays, Sparse Matrices, Stacks Implementing stack using array and linked list, Prefix, Infix and Postfix expressions, Utility and conversion of these expressions from one to another

Unit IV

Queues: Array and Linked representation of Queue, De-queue, Priority Queues. Linked Lists: Singly, Doubly and Circular Lists, representation of Stack and Queue as Linked Lists.

Unit V

Recursion Developing Recursive Definition of Simple Problems and their implementation; Advantages and Limitations of Recursion. Trees Introduction to Tree as a data structure; Binary Trees, Binary Search Tree, (Creation, and Traversals of Binary Search Trees), Heaps, Red-black trees

Text Books:

1. T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein-Introduction to Algorithms, PHI, 3rd Edition 2009.
2. Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
3. Seymour Lipschutz, Data Structures with C, Mcgraw Hill

Reference Books:

1. Sarabasse & A.V. Gelder Computer Algorithm-Introduction to Design and Analysis, Publisher - Pearson 3rd Edition 1999.
2. Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning, 2012.
3. SartajSahni, Data Structures, “Algorithms and applications in C++", Second Edition, Universities Press, 2011.
4. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, "Data Structures Using C and C++:, Second edition, PHI, 2009.
5. D.S Malik, Data Structure using C++,Second edition, Cengage Learning, 2010

Data Structures Using 'C Lab:

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

1. Recall how to analyze algorithms and estimate their worst-case and average-case behavior (in easy cases).
2. Illustrate a given problem and develop an algorithm to solve the problem
3. Determine the fundamental data structures and with the manner in which data structures can be best be implemented
4. Design the description of algorithms in both functional and procedural styles.
5. Implement theoretical knowledge in practice (via the practical component of the course).

Exercises:

1. Write a program to implement Simple array.
26. Write a program to input N element into a 1-d array and insert an item at particular position.
27. Write a program to input N element into 1-d array and delete an item from particular position.
28. Write a program to input N element into an array, find the location of an item using linear search.
29. Write a program to input N element into an array, find the location of an item using Binary search.
2. Write a program to perform addition of two matrices.
3. Write a program to perform multiplication of two matrices.
4. Write a program to perform transpose of a matrix.
5. Implementation of Recursive function.
6. Write a program to implement bubble sort on an array.
7. Write a program to implement selection sort on an array.
8. Implement Insertion Sort (The program should report the number of comparisons)
9. Implement Merge Sort(The program should report the number of comparisons)
10. Implement Heap Sort (The program should report the number of comparisons)
11. Implement Randomized Quick sort (The program should report the number of comparisons).
12. Implement Radix Sort.
13. Write a program to implement of stack operations using array.
14. Write a program to implement of queue operations using array.
15. Write a program to create a linked list, display its element and search an element in it.
16. Write a program to implement stack operations using linked list.
17. Write a program to implement queue operations using linked list.
18. Implementation of Single, Double and circular Linked List
19. Creation and traversal of Binary Search Tree.
20. Write a program to perform the following operations: Insert an element into a binary search tree. Delete an element from a binary search tree. Search for a key element in a binary search tree.
21. Write a program that use recursive functions to traverse the given binary tree in Preorder b) Inorder and c) Postorder.

Skill Enhancement Courses(SEC)

HTML Programming

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

1. Remember about the concept of web application.
2. Illustrate d concepts of interactive web page(s) using HTML, CSS and JavaScript.
3. Build a responsive web site using HTML5 and CSS3.
4. Assess role of HTML and CSS in effective web development.
5. Develop an effective web application using HTML and CSS as per the plan.

Detailed Syllabus

Unit I

HTML Introduction: Introduction to the Internet, History of HTML, The Head, the Body, Colors, Attributes, Lists, ordered and unordered. HTML Basic Tags, HTML Formatting Tags, HTML Color Coding, Unicode Transformation Format (UTF), Metadata.

Unit II

Page Formatting: Adding a New Paragraph, Adding a Line Break, Inserting Blank Space, Preformatted Text, Changing a Page's Background Color, Div Element.
Links: Introduction, Relative Links, Absolute Links, Link Attributes, Using the ID Attribute to Link Within a Document.

Unit III

Images: Putting an Image on a Page Using Images as Links, Putting an Image in the Background.
Tables: Creating a Table, Table Headers, Table Borders, Table Headers, Captions, Spanning Multiple Column, Styling Table.

Unit IV

Forms: Basic Input and Attributes Other Kinds of Inputs, Styling forms with CSS. IFrames: Inserting IFrames, Setting Height and Width, Using an IFrame for a link target. Video and Audio: About Video and Audio Files, Linking to Video and Audio Files, Adding Video, Adding Audio, Using YouTube to Display Video.

Unit V

Overview of Meta tags and SEO (Search Engine Optimization), Using a search engine to find information, Create and publish a multi-page web site using these technologies.

Book Recommended:

1. Introduction to HTML and CSS-O'Reilly, 2010
2. Jon Duckett, HTML and CSS, John Wiely, 2012
3. Steven Holzner, HTML Black Book, 2000

HTML Programming Lab

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

1. Students learn about the concept of web application creation using HTML.
2. Different formatting options used while creating the web pages.
3. Build a responsive web site using HTML5 and CSS3.
4. Understand the role of HTML and CSS in effective web development along with its uses.
5. Develop an effective web application using HTML and CSS as per the projects.

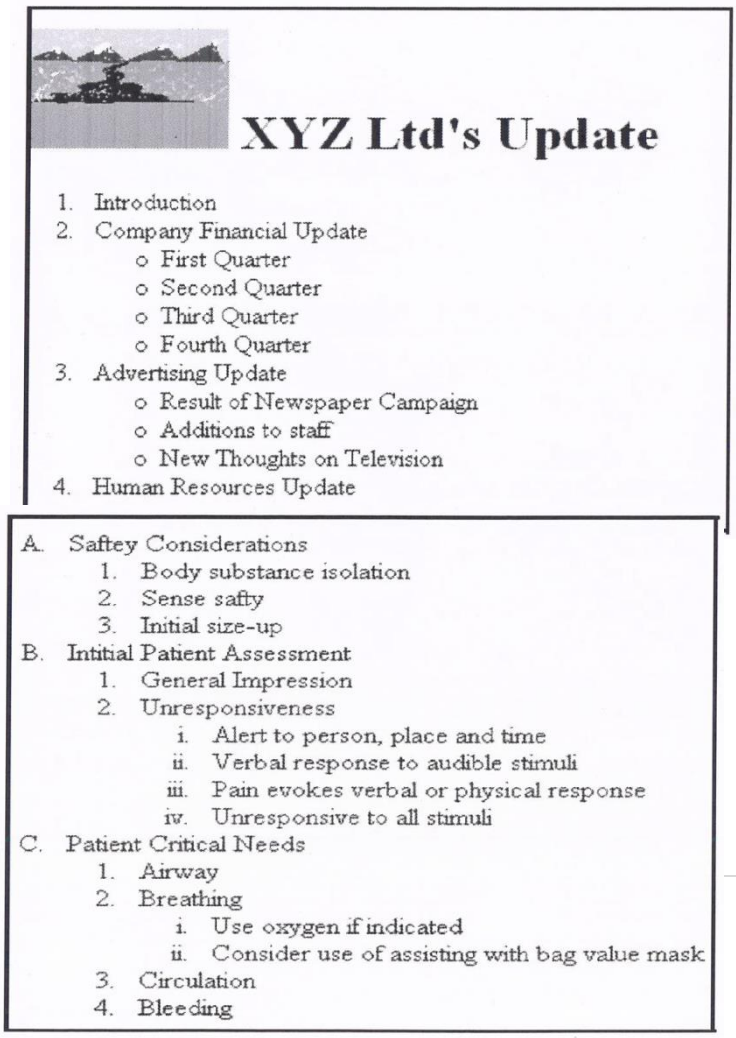
Exercises:

Q.1 Create an HTML document with the following formatting options:

6. Bold
7. Italics
8. Underline
9. Font (Type, Size and Color)
10. Pre tag

Q.2 Create an HTML document which consists of:

1. Ordered List
2. Unordered List
3. Nested List
4. Image



Q.3 Create an HTML document which implements Internal linking as well as External linking.
Q.4 Create a table using HTML which consists of columns for Roll No., Student's name and grade.

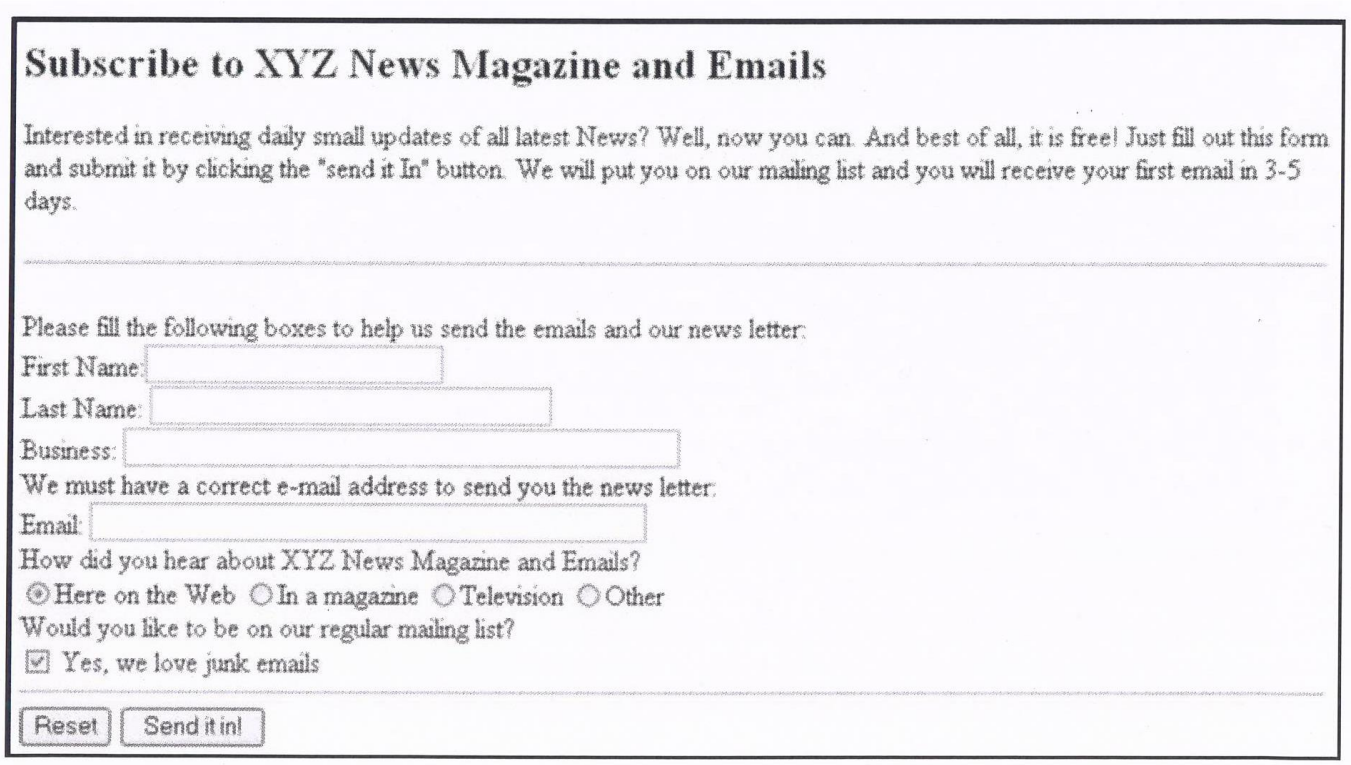
Result		
Roll No.	Name	Grade

Q.5 Create a Table with the following view:

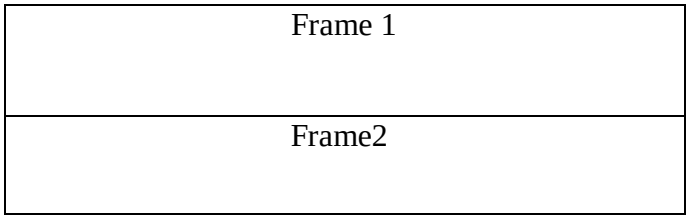
				Place an image here

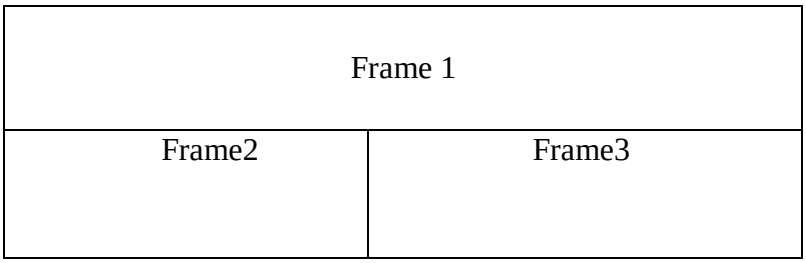
Q.6 Create a form using HTML which has the following types of controls:

I. Text Box
II. Option/radio buttons
III. Check boxes
IV Reset and Submit buttons



Q.7 Create HTML documents (having multiple frames) in the following three formats:





List of projects using HTML and CSS(Only for web page and UI design):

1) Interactive response system like any CRM of MNC
2) Railway project administration system
3) Worker loan management system
4) A catalog management system
5) School management system
6) Hospital management system
7) Cyber Café ID system daily Report
8) Internet and Data report login system
9) Mobile dealership management system
10) Garment shop barcode with billing system
11) Coffee shop management system
12) School library system
13) College organization system
14) Travel Reservation system
15) Radio record system

Ability Enhancement Compulsory Courses (AECC)

Environmental Science

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

1. Identify and justify key stakeholders in humanities and social sciences that need to be a part of sustainable solutions.
2. Articulate the interdisciplinary context of environmental issues.
3. Formulate an action plan for sustainable alternatives that integrate science, humanist, and social perspectives.
4. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
5. Access the qualitative and quantitative research methods to gain empirical evidence bearing on evaluation of environmentally sustainable alternatives

Detailed Syllabus

Unit I
Introduction To Environmental Sciences: Natural Resources: Environmental Sciences, Relevance, Significance of Public awareness, Forest resources, Water resources, Mineral resources, Food resources, conflicts over resource sharing, Exploitation, Land use pattern, Environmental impact, fertilizer, Pesticide Problems, case studies.

Unit II
Ecosystem, Biodiversity and Its Conservation: Ecosystem, concept, structure and function producers, consumers and decomposers, Food chain, Food web, Ecological pyramids, Energy flow, Forest, Grassland, desert and aquatic ecosystem
Biodiversity, Definition genetic, species and ecosystem diversity, Values and uses of biodiversity, biodiversity at global, national (India) and local levels Hotspots, threats to biodiversity conservation of biodiversity Insitu & Exsitu

Unit III
Environmental Pollution And Management: Environmental Pollution, Causes, Effects and control measures of Air, Water, Marine, soil, solid waste, Thermal, Nuclear pollution and Disaster Management, Floods, Earth quake, Cyclone and Landslides. Role of individuals in prevention of pollution, pollution case studies

Unit IV
Social Issues, Human Population: Urban issues, Energy water conservation, Environmental Ethics, Global warming, Resettlement and Rehabilitation issues, Environmental legislations, Environmental production Act. 1986 Air, Water, Wildlife and forest conservation Act, Population growth and Explosion, Human rights and Value Education Environmental Health HIV/AIDS - Role of IT in Environment and Human Health, Women and child welfare, Public awareness, Case studies.

Unit V
Visit to a local area / local polluted site / local simple ecosystem Report submission.

Books Recommended:

3. Kumarasamy, k., A Alagappa Moses and M.Vasanthy, 2004, Environmental studies, Bharathisadan University Publication, Trichy.
4. Kalavathy, s. (ed.) 2004, Environmental studies, Bishop Heber College Publication, Trichy.

Reference Books:

2. Rajamannar, 2004, environmental studies, Ever College Publication, Trichy.

Ability Enhancement Compulsory Courses (AECC)

Human Values & Professional Ethics

Course Outcomes:

After successful completion of the course, students will be able to:

1. Understand the significance of value inputs in a classroom and start applying them in their life and profession

2. Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.

3. Understand the role of a human being in ensuring harmony in society and nature.

4. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

Unit I

Human Values: Morals, Values, and Ethics, Integrity, Trustworthiness, Work Ethics, Service-Learning, Living Peacefully, Honesty, Courage, Caring, Sharing, Value Time, Co-operation, Commitment, Civic Virtue, Respect for others, Self-confidence, Empathy, Spirituality, Character.

Unit II

Principles for Harmony: Truthfulness, Customs and Traditions, Human Dignity, Value Education, Human Rights, Fundamental Duties, Aspirations, and Harmony (I, We & Nature), Emotional Intelligence, Gender Bias, Mayer Model, Emotional Competencies, Conscientiousness

Unit III

Engineering Ethics and Social Experimentation: History of Ethics, Need of Engineering Ethics, Senses of Engineering Ethics, Profession, and Professionalism, Self Interest, Moral Autonomy, Utilitarianism, Uses of Ethical Theories, Virtue Theory, Types of Inquiry, Deontology, Kohlberg's Theory, Heinz's Dilemma, Gilligan's Argument, Learning from the Past, Comparison with Standard Experiments, Consultants and Leaders, Engineers as Managers, Role of Codes, Balanced Outlook on Law, Codes and Experimental Nature of Engineering.

Unit IV

Engineers' Responsibilities towards Safety and Risk : The concept of Safety, Safety and Risk, Types of Risks, Voluntary v/s Involuntary Risk, Consequences, Risk Assessment, Liability, Accountability, Reversible Effects, Delayed v/s Immediate Risk, Threshold Levels of Risk

Engineers' Duties and Rights: Professional Duties, Collegiality, Techniques for Achieving Collegiality, Senses of Loyalty, Consensus and Controversy, Confidential and Proprietary Information, Professional and Individual Rights, Conflict of Interest, Ethical egoism, Collective Bargaining,

Confidentiality, Gifts and Bribes, Occupational Crimes, Problem-solving, Industrial Espionage, Price Fixing, Whistle Blowing

Unit V

Global Issues: Globalization and MNCs, Business Ethics, Cross Culture Issues, Media Ethics, Endangering Lives, Environmental Ethics, Bio-Ethics, Computer Ethics, War Ethics, Research Ethics, Intellectual Property Rights

Text Books:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Engineering Ethics by Harris, Pritchard, and Rabins, Cengage Learning, New Delhi.
3. Human Values And Professional Ethics by Jayshree Suresh and B. S. Raghavan, S.Chand Publications
4. Ethics in Engineering by Mike W. Martin and Roland Schinzinger – Tata McGraw-Hill – 2003.

Reference Books:

1. Professional Ethics and Morals by Prof.A.R.Aryasri, DharanikotaSuyodhana – Maruthi Publications.
2. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.
3. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman, and M. Jayakumaran – University Science Press.
4. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan, and V.S.SenthilKumar-PHI Learning Pvt. Ltd – 2009.
5. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill – 2013

Semester-III

Discipline Specific Core Courses (DSC):

Operating System

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

1. Recall the main components of an OS & describe the important computer system resources functions and the types of Operating Systems.
2. Explain the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS and understand the factors in OS design.
3. Evaluate the requirement for process synchronization and coordination handled by operating system
4. Categorize memory organization and explain the function of each element of a memory hierarchy and analyze its allocation policies.
5. Conceptualize the components involved in designing a contemporary OS.

Detailed Syllabus

Unit I

Introduction: System Software, Resource Abstraction, OS strategies.

Types of operating systems - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems.

Unit II

Operating System Organization: Factors in operating system design, basic OS functions, implementation consideration; process modes, methods of requesting system services - system Calls and system programs.

Unit III

Process Management: System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model, Deadlocks

Scheduling: Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies.

Unit IV

Memory Management: Mapping address space to memory space, memory allocation strategies, fixed partition, variable partition, paging, virtual memory, Introduction to File Management, IO Management

Unit V

Shell introduction and Shell Scripting: What is shell and various type of shell, Various editors present in Linux, Different modes of operation in vi editor, shell script, Writing and executing the shell script, Shell variable (user defined and system variables), System calls, Using system calls, Pipes and Filters, Decision making in Shell Scripts (If else, switch), Loops in shell, Function, Utility programs (cut, paste, join, tr, uniq utilities), Pattern matching utility (grep)

Text Books:

1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
2. A.S. Tanenbaurn, Modern Operating Systems, 3rd Edition, Pearson Education 2007.

Reference Books:

1. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
2. W, Stallings, Operating Systems, Internals & Design Principles, 5th Edition, Prentice Hall of India. 2008.
3. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

Operating Systems Lab

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

1. Remember the functions, structures and history of operating systems.
2. Understand of design issues associated with operating systems
3. Apply concepts including scheduling, synchronization and deadlocks.
4. Distinguish multithreading , Multitasking & Multiprogramming and also able to explain the concept of memory management including virtual Evaluate the requirement for process synchronization and coordination handled by operating system
5. Categorize memory organization and explain the function of each element of a memory hierarchy and analyze its allocation policies.
6. Conceptualize the components involved in designing a contemporary OS.

Experiment List

1. Simulate the following CPU scheduling algorithms.
a) FCFS b) SJF c) Round Robin d) Priority.
2. Write a C program to simulate producer-consumer problem using Semaphores
3. Write a C program to simulate the concept of Dining-philosophers problem.
4. Write a C program to simulate the following contiguous memory allocation Techniques
a) Worst fit b) Best fit c) First fit.
5. Simulate all page replacement algorithms
a)FIFO b) LRU c) OPTIMAL
6. Simulate all File Organization Techniques
a) Single level directory b) Two level directory
7. Simulate all file allocation strategies
a) Sequential b) Indexed c) Linked.
8. Simulate Bankers Algorithm for Dead Lock Avoidance.
9. Simulate Bankers Algorithm for Dead Lock Prevention.
10. Write a C program to simulate disk scheduling algorithms.
a) FCFS b) SCAN c) C-SCAN

Discipline Specific Core Courses (DSC):

OOPs Using C++

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

1. Have profound knowledge of object oriented programming.
2. Demonstrate the difference between the solutions offered by traditional imperative
3. Illustrate problem solving methods and object-oriented methods.
4. Explain the class inheritance, data encapsulation, polymorphism as fundamental building blocks to generate reusable code.
5. Understand and implement error handling and file handling routines.

Detailed Syllabus

Unit I

Different paradigms for problem solving, differences between OOP and Procedure oriented programming, Abstraction, Overview of OOP principles, Encapsulation, Inheritance and Polymorphism.

C++ Basics: Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Pointers and Arrays, Strings.

Unit II

Flow control statement- if, switch, while, for, do, break, continue, got statements. Functions-Scope of variables, Parameter passing, Default arguments, inline functions, Recursive functions, Pointers to functions, Dynamic memory allocation and de-allocation operators-new and delete, Preprocessor directives

C++ Classes And Data Abstraction: Class definition, Class structure, Class objects, Class scope, this pointer, Friends to a class, Static class members, Constant member functions, Constructors and Destructors

Unit III

Polymorphism: Function overloading, Operator overloading, Generic programming, necessity of templates, Function templates and class templates.

Inheritance: Defining a class hierarchy, Different forms of inheritance. Defining the Base and Derived classes, Access to the base class members, Base and Derived class construction. Destructors, Virtual base class.

Unit IV

Virtual Functions and Polymorphism: Static and Dynamic bindings, Base and Derived class virtual functions, Dynamic binding through virtual functions, Virtual function call mechanism, Pure virtual functions.

Unit V

C++ I/O: I/O using C functions, Stream classes' hierarchy, Stream I/O, File streams and String streams, Overloading « and » operators, Error handling during file operations, Formatted I/O.

Exception Handling: Benefits of exception handling, throwing an exception, the try block, catching an exception

Text Books:

1. Problem solving with C++, The OOP, 4th Edition, Walter Savitch, Pearson Education.

2. C++, The Complete Reference, 4th Edition, Herbert Schildt, TMH.

Reference Books:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.
3. OOP in C++, 3rd Edition, T.Gaddis, J.Walters and G.Muganda, Wiley DreamTech Press.
4. Mastering C++, K.R. Venugopal, Rajkumar Buyya, McGraw Hill Education, 2017.

OOPs Using C++ Lab

Course Outcomes:

At the completion of the course, a student will be able to:

After successful completion of the course, students will be able to:

1. Acquire profound knowledge of object oriented programming.
2. Demonstrate the difference between the solutions offered by traditional imperative problem solving method and object-oriented method
3. Explain the class inheritance, data encapsulation, polymorphism as fundamental building blocks to generate reusable code.
4. Understand and implement error handling and file handling routines.

Exercises:

1. Write a C++ program for function with default arguments
2. Write a C++ program to illustrate the concept of call by value.
3. Write a C++ program to illustrate the concept of call by reference
4. Write a C++ program to illustrate the concept of call by address.
5. Write a C++ program to illustrate the concept of Classes and objects.
6. Write a C++ program to create a mark list using arrays in C++ programming language.
10. Write a C++ program to perform operation on string class.
11. Write a C++ program to implement static member function.
12. Write a C++ program to display the details of a person using constant member function.
21. Write a C++ program to illustrate the concept of unary operator overloading.
22. Write a C++ program to illustrate the concept of Binary operator overloading.
23. Write a C++ program to illustrate the concept of function overloading.
24. Write a C++ program to multiply the positive numbers using single inheritance.
25. Write a C++ program using multiple inheritances for collecting employee details.
26. Write a C++ program for calculation of area of shapes using virtual functions.
27. Write a C++ program for a student mark list processing using virtual base class.
28. Write a C++ program using function template to find the maximum of two data.
29. Write a C++ program using class template to find the greater of the given two data's.
30. Write a C++ program for creating student data using sequential file access.
31. Write a C++ program for creating student data using random file access.

Discipline Specific Core Courses (DSC)

Software Engineering

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

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. Communicate effectively with a range of audiences
4. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
5. Acquire and apply new knowledge as needed, using appropriate learning strategies
6. Develop an efficient software using latest tools and techniques. Use of computer aided designing and automated testing tools.

Detailed Syllabus

Unit I
Software Process: Introduction, Software Engineering Paradigm, life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented), System engineering, computer based system, verification, validation, life cycle process, development process, system engineering hierarchy.

Unit II
Software requirements: Functional and non-functional requirements, requirement engineering process, feasibility studies, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, Software document analysis and modeling, data, functional and behavioral models, structured analysis and data dictionary

Unit III
Design Concepts and Principles: Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles, Real time systems, Real time software design, system design, real time execution, data acquisition system, monitoring and control system.

Unit IV
Software Configuration Management: The SCM process, Version control, Change control, Configuration audit, SCM standards.
Software Project Management: Measures and measurements, S/W complexity and science measure, size measure, data and logic structure measure, information flow measure.
Estimations for Software Projects, Empirical Estimation Models, Project Scheduling,

Unit V

Testing: Taxonomy of software testing, levels, test activities, types of software test, black box testing boundary conditions, structural testing, test coverage criteria based on data flow, mechanisms, and regression testing in the large. Software testing strategies, strategic approach and issues, Unit testing, integration testing, validation testing, system testing and debugging **Trends in Software Engineering:** Reverse Engineering and Re-engineering: wrappers, Case Study of CASE tools.

Text Books:

1. Roger S. Pressman, Software engineering- A practitioner's Approach, McGraw-Hill
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition. 2000.
3. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.

Reference Books:

1. James F Peters and Witold Pedryez, "Software Engineering-An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
2. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.

Software Engineering Lab

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

1. Compare between traditional ad-hoc method and SDLC based approach of software development.
2. Understand different theories, models, and techniques related to SDLC.
3. Apply the software engineering lifecycle for different projects by demonstrating competence in communication, planning, analysis, design, construction, and deployment
4. An ability to work in one or more significant application domains. Work as an individual and as part of a multidisciplinary team to develop and deliver quality software.
5. Develop of efficient software using latest tools and techniques. Use of computer aided designing and automated testing tools.

Exercises:

2. Practical Title

- Problem Statement,
- Process Model

2. Requirement Analysis

- Creating a Data Flow
- Data Dictionary,
- Use Cases

3. Project Management

- Computing FP
- Effort
- Schedule, Risk Table, Timeline chart

4. Design Engineering

- Architectural Design
- Data Design, Component Level Design

5. Testing

- Basis Path Testing

Sample Projects

- DTC Route Information: Online information about the bus routes and their frequency and fares
- Car Pooling: To maintain a web based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively.
- Patient Appointment and Prescription Management System
- Organized Retail Shopping Management Software
- Parking Allocation System
- Wholesale Management System

Discipline Specific Electives (DSE)
Computer Networks

Prerequisite: Basic Knowledge of Computers

Objectives:

1 Given an environment, after analyzing the channel characteristic

2 Appropriate channel access mechanism and data link protocols are chosen to design a network.

3 Given an environment, analyzing the network structure and limitations, appropriate routing protocol is chosen to obtain better throughput.

4 Given various load characteristics and network traffic conditions, decide the transport protocols and timers to be used.

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

1. Independently understand basic computer network technology.
2. Identify the different types of network topologies and protocols.
3. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
4. Identify the different types of network devices and their functions within a network
5. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Detailed Syllabus

Unit I
Basic Concepts: Components of data communication, standards and organizations, Network Classification, Network Topologies; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.

Unit II
Physical Layer: Cabling, Network Interface Card, Transmission Media Devices- Repeater, Hub, Bridge, Switch, Router, Gateway.
Data Link Layer: Framing techniques; Error Control; Flow Control Protocols; shared media protocols - CSMA/CD and CSMA/CA.

Unit III
Network Layer: Virtual Circuits and Datagram approach, IP addressing methods - Subnetting; Routing Algorithms (adaptive and non-adaptive)
Transport Layer: Transport services, Transport Layer protocol of TCP and UDP

Unit IV
Application Layer: Application layer protocols and services - Domain name system, HTTP,

WWW, telnet, FTP, SMTP

Unit V

Network Security: Common Terms, Firewalls, Virtual Private Networks.

Text Books:

1. B.A. Forouzan: Data Communication and Networking, 4th Edition, Tata McGraw Hill, 2007.

2. D.E. Comer, Internetworking with TCP/IP, Vol. I, Prentice Hall of India, 1998.

Reference Books:

1. W. Stalling, Data & Computer Communication, 8th edition, Prentice Hall of India, 2006.

2. D. Bertsekas, R. Gallager, Data Networks, 2nd edition, Prentice Hall of India, 1992.

Skill Enhancement Courses (SEC)

MySQL (SQL/PL-SQL)

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

1. Remember key concepts related to SQL including DDL, DML,DCL,DTL commands.
2. Understanding of PL/SQL elements like Cursors, Procedures, functions, triggers.
3. Applying cursors, procedures, functions and triggers on student database to perform different updating and manipulations in existing tables in database. Use of stored procedures, functions, cursors to ensure max reusability.
4. Analyze the limitations of SQL and supports provided by procedural language to develop a effective application.
5. Built a strong adherence in procedural language while creating application.

Detailed Syllabus

Unit I

SQL Vs. SQL * Plus: SQL Commands and Data types, Operators and Expressions, Introduction to SQL* Plus.

Unit II

Managing Tables and Data: Creating and Altering Tables (Including constraints),Data Manipulation Command like Insert, update, delete, SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT, Special operator like IN, ANY, ALL BETWEEN, EXISTS, LIKE.

Unit III

Join, Built in functions, Other Database Objects: View, Synonyms, Index. Transaction Control Statements: Commit, Rollback, Savepoint

Unit IV

PL/SQL: SQL v/s PL/SQL, PL/SQL Block Structure, Language construct of PL/SQL (Variables, Basic and Composite Data type, Conditions looping etc.), % TYPE and % ROWTYPE. Using Cursor (Implicit, Explicit).

Unit V

PL/SQL Procedure, Triggers, Exporting and importing data between MYSQL and Microsoft excel.

Text Books:

1. Baron Schwartz, High Performance MySQL, O'Reilly, 2012.
2. Vikram Vaswani, The Complete Reference MySQL, McGraw Hill Educations, 2004.

Reference Books:

1. Dyer, R. MySQL in a Nutshell 2e, OReilly; Rev Ed edition, (2008)
2. Reese, G. MySQL Pocket Reference 2e, O'Reilly, (2007)

Online Reading/Supporting Material:

1. MySQL http://www.mysql.com/ MySQL 5.0 Reference Manual.
2. http://dev,mysql.com/doc/refman/5.0/en/index.html

MySQL (SQL/PL-SQL) Lab:

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

1. Learn to use key concepts related to SQL including DDL, DML, DCL and DTL commands.
2. Developing of PL/SQL elements like Cursors, Procedures, functions, triggers.
3. Applying cursors, procedures, functions and triggers on various databases to perform different updating and manipulations in existing tables in database.
4. Building of databases for different project applications.

Exercises:

SQL COMMANDS

1) SQL* formatting commands

2) To create a table, alter and drop table.

3) To perform select, update, insert and delete operation in a table.

4) To make use of different clauses viz where, group by, having, order by, union and intersection,

10)To study different constraints.

[SQL FUNCTION]

11)To use oracle function viz aggregate, numeric, conversion, string function.

12)To understand use and working with joins.

13)To make use of transaction control statement viz rollback, commit and save point.

14)To make views of a table.

14) To make indexes of a table.

[PL/SQL]

15) To understand working with PL/SQL

16) To implement Cursor on a table.

17) To implement trigger on a table

List of projects using DBMS (PL/SQL for database design and connectivity):

1) Interactive response system like any CRM of MNC
2) Railway project administration system
3) Worker loan management system
4) A catalog management system
5) School management system
6) Hospital management system
7) Cyber Café ID system daily Report
8) Internet and Data report login system
9) Mobile dealership management system
10) Garment shop barcode with billing system
11) Coffee shop management system
12) School library system
13) College organization system
14) Travel Reservation system
15) Radio record system

Semester- IV

Discipline Specific Core Courses (DSC)

Computer Architecture

Course Outcomes:

At the completion of the course, a student will be able to:

1. Understand the theory and architecture of central processing unit.
2. Analyze some of the design issues in terms of speed, technology, cost, performance.
3. Design a simple CPU with applying the theory concepts.
4. Use appropriate tools to design verify and test the CPU architecture.
5. Learn the concepts of parallel processing, pipelining and interprocessor communication.
6. Understand the architecture and functionality of central processing unit.
7. Exemplify in a better way the I/O and memory organization.
8. Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.

Detailed Syllabus

Unit-I

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Common bus system, Computer Instructions, Instruction formats, Instruction Cycle, Fetch and Decode, Flowchart for Instruction cycle, Register reference instructions.

Unit-II

Register Transfer and Micro-operation: Register Transfer Language, Register Transfer, Bus and Memory Transfer, Three state bus buffers, Memory Transfer; Arithmetic Micro operations, Logic Micro operations.

Unit-Ill

Micro programmed Control Unit: Design of Control Unit, and Central Processing Unit: Introduction, General Register Organization, and Stack Organization: Register stack. Memory stack; Instruction Formats, Addressing Modes

Unit-IV

Input Output Organization: Peripheral devices, Input Output interface, Modes of Data Transfer, Priority Interrupt and Direct Memory Access.

Unit-V

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Text Books:

1. M. Mano, Computer System Architecture, Pearson Education 1992.
2. Digital Design, M.M. Mano, Pearson Education Asia, 1979.

Reference Books:

1. A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004.

2. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India, 2009.

Discipline Specific Core Courses (DSC)

Programming in Java

Course outcomes:
At the completion of the course, a student will be able to:

1. Recall the basic knowledge on Object Oriented concepts specially in java.
2. Create & design applications using Object Oriented Programming Concepts using java
3. Describe for compile, test and run Java programs comprising more than one class
4. Create simple data structures like arrays in a Java program
5. Explain members of classes found in the Java API

Detailed Syllabus

Unit I

Introduction to Java: Features of Java, JDK Environment, Object Oriented Programming Concept Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA

Unit II

Java Programming Fundamental: Structure of Java program, Data types, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch),Looping(for, while) ,Type Casting Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor

Unit III

Arrays and Strings: Arrays, Creating an array, Types of Arrays, String class Methods, String Buffer methods.

Implementation of Inheritance, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes

Unit IV

Abstract Class, Interface and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages

Exception Handling: Exception types, using try catch and multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions.

Unit V

File Handling: Byte Stream, Character Stream, File 10 Basics, File Operations, Creating file, Reading file, Writing File

Applet Programming: Introduction. Types Applet, Applet Life cycle, Creating Applet, Applet tag

Text Books:

1. Herbert Schildt, Java 7, The Complete Reference, 8th Edition, 2009.
2. E Balagurusamy, Programming with JAVA, TMH, 2007.

ReferneceBooks:

1. Ivan Bayross, Web Enabled Commercial Application Development Using Html, Dhtmljavascript, Perl Cgi, BPB Publications, 2009.
2. Cay Horstmann, BIG Java, Wiley Publication , 3rd Edition., 2009.

Java Programming Lab

Course outcomes:
At the completion of the course, a student will be able to:

1. Recall traditional imperative design and object-oriented Design using java
2. Understand class structures as fundamental, modular building blocks
3. Describe for compile, test and run Java programs comprising more than one class
4. Create simple data structures like arrays in a Java program
5. Create and Specify classes found in the Java API

Exercises:

1. Write a program to find the largest of n natural numbers.
2. Write a program to find whether a given number is prime or not.
3. Write a menu driven program for following:
    a. Display a Fibonacci series
    b. Compute Factorial of a number
    c. Write a program to check whether a given number is odd or even.
    d. Write a program to check whether a given string is palindrome or not.
4. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
5. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
6. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
7. Write a program in Java to input N numbers in an array and print out the Armstrong numbers from the set.
8. Write Java program for the following matrix operations:
    a. Addition of two matrices
    b. Summation of two matrices
    c. Transpose of a matrix
    d. Input the elements of matrices from user.
9. Write a Java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
10. Write a Java for the implementation of multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
11. Write a Java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
12. Write a Java program to draw a line between two coordinates in a window.
13. Write a java program to display the following graphics in an applet window.
    a. Rectangles
    b. Circles
    c. Ellipses
    d. Arcs
    e. Polygons
14. Write a program that reads two integer numbers for the variables a and b. If any other Character except number (0-9) is entered then the error is caught by Number Format Exeeption object.

After that ex.getMessage() prints the information about the error occurring causes.

15. Write a program for the following string operations:

a. Compare two strings

b. Concatenate two strings

c. Compute length of a string

16. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

Discipline Specific Electives (DSE)

Internet and Web Design

Course outcomes:
At the completion of the course, a student will be able to:

6. Apply the basic concepts for network implementation. Review the current topics in Web & Internet technologies.
7. Interpret and Learn the basic working scheme of the Internet and World Wide Web.
8. Describe fundamental tools and technologies for web design.
9. Identify and comprehend the technologies for Hypertext Mark-up Language (HTML).
10. Create and specify design rules in constructing web pages and sites.

Detailed Syllabus

Unit I

Introduction to Web Design: Introduction to hypertext markup language (html) document Type definition, creating web pages, graphical elements, lists, hyperlinks, tables, web forms, inserting images, frames.

Unit II

Customized Features: Cascading style sheets, (ess) for text formatting and other manipulations, **JavaScript:** Data types, operators, functions, control structures, events and event handling.

Unit III

Java: Use of Objects, Array and Array List class, Designing classes, Inheritance, Input/output, Exception Handling.

JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, working with statements, Creating and Executing SQL Statements, Working with Result Set Objects.

Unit IV

JSP: Introduction to JavaServer Pages, HTTP and Servlet Basics, The Problem with Servlets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment, Implicit JSP Objects, Conditional Processing, Displaying Values

Unit V

Using an expression to set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data between JSP Pages, Requests, and Users, Database Access.

Text Books:

2. Web Enabled Commercial Application Development Using Html, Dhtml, javascript. Perl Cgi by Ivan Bayross, BPB Publications, 2009.
5. The Complete Reference J2EE, TMH, Jim Keogh, 2002, Java Server Pages, Hans Bergsten, Third Edition, O'Reilly Media December 2003.

Reference Books:

6. BIG Java Cay Horstmann, Wiley Publication , 3rd Edition., 2009
7. Java 7, the Complete Reference, Herbert Schildt, 8th Edition, 2009.

Internet and Web Design Lab

Course outcomes:
At the completion of the course, a student will be able to:

6. Recall traditional imperative design and object-oriented Design using java
7. Understand class structures as fundamental, modular building blocks
8. Describe for compile, test and run Java programs comprising more than one class
9. Create simple data structures like arrays in a Java program
10. Create and Specify classes found in the Java API

Exercises:

JAVA Script

1. Create a student registration form. Create functions to perform the following checks:
   a. Roll number is a 7-digit numeric value
   b. Name should be an alphabetical value(String)
   c. Non-empty fields like DOB
2. Implement a static password protection.
3. Write a Java script
   a. To change the colour of text using SetTimeOut()
   b. To move an image across screen using SetInterval()

JAVA Programs

6. Write a program to find the largest of n natural numbers.
7. Write a program to find whether a given number is prime or not
8. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
9. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
10. Write Java program for the following matrix operations;
    a. Addition of two matrices
    b. Summation of two matrices
    c. Transpose of a matrix

    Input the elements of matrices from user
6. Write a Java program that computes the area of a circle, rectangle and a Cylinder using function overloading.

JDBC

1. Create a table 'Student' and 'Teacher' in 'College' database and insert two rows in this newly created table using JDBC API and do the following:
   a. Update an already created table Teacher' in 'College' database by updating a teacher's name, with "Dr." appended before the name, whose name is "Rita".
   b. Repeat the same thing for all the teachers using PreparedStatement.
   c. Delete the student with ID=3 from 'Student' database.
   d. Insert two students to the ResultSet returned by the query which selects all students with FirstName="Ayush". The database must also get updated along with ResultSet.
2. Create a procedure in MySQL to count the number of Rows in table 'Student'. Use Callable Statement to call this method from Java code.

JSP Practical list

2. Display the pattern:

1
1 2
1 2 3

Take 'n' in a textbox from user. Display this pattern using

- Scriptlets
- <c:forEach> loop

2. Make two files as follows:
   a. main.html: shows 2 text boxes and 3 radio buttons with values "addition", "subtraction" and "multiplication"
   b. operate.jsp: depending on what the user selects perform the corresponding function

(Give two implementations: using request, get Pararneter() and using expression language)

6. Validate User input entered in a form. The input must include Name, DOB, Email ID, Lucky Number, Favorite food etc. (Refer Chapter 8)
7. Display Good Morning <uname>, Good Afternoon <uname> or Good Evening <uname> based on the current time of the day.
8. Create your custom library which contains two tags: <hello>, <choco>.

Usage of the tags:

- <hello name="Ajay">: Output should be Hello Ajay. It contains a mandatory attribute 'name'

which can accept Dynamic value.

- <choco texture="Chewy">: Output should be FiveStar, BarOne. <choco texture="Crunchy">:

Output should be Munch. KitKat.

That means the mandatory attribute must accept a value, and based on the attributes value, it should give output. You must use a bean ChocoBean for this purpose.

List of projects using JSP, JDBC and JAVA Script (UI Design Validation and Verification):

16) Interactive response system like any CRM of MNC
17) Railway project administration system
18) Worker loan management system
19) A catalog management system
20) School management system
21) Hospital management system
22) Cyber Café ID system daily Report
23) Internet and Data report login system
24) Mobile dealership management system
25) Garment shop barcode with billing system
26) Coffee shop management system
27) School library system
28) College organization system
29) Travel Reservation system

30) Radio record system

Discipline Specific Electives (DSE)

E-Commerce Technologies

Course outcomes:
At the completion of the course, a student will be able to:

6. Identify and explain fundamental web site tools including design tools, programming tools, and data processing tools.
7. Apply the solutions on finding major electronic payment issues and options.
8. Acquire the knowledge of security issues and explain procedures used to protect against security threats.
9. Communicate effectively in ways appropriate to the discipline, audience and purpose.
10. Implement the corrective measures to management issues underlying e-Commerce issues including organizational structure, strategic planning, goal setting, corporate social responsibility, international arena, changing market intermediaries, resource allocation and customer service.

Detailed Syllabus

Unit I

An introduction to Electronic commerce: What is E-Commerce (Introduction and Definition), Main activities E-Commerce. Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, 9 Electronic Commerce and Electronic Business(C2C)(C2G;G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C)

Unit II

The Internet and WWW: Evolution of Internet, Domain Names and Internet Organization (.edu, .com, .mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website, Cost, Time, Reach, Registering a Domain Name, Web promotion, Target email, Barter, Exchange, Shopping Bots

Unit III

Internet Security: Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime(Laws , Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus(How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Authorization and Authentication, Firewall, Digital Signature(How it Works)

Unit IV

Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash

Unit V

Planning for Electronic Commerce: Planning Electronic Commerce initiates, Linking objectives

to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites.

Internet Marketing; The PROS and CONS of online shopping, The cons of online shopping. Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

Text Books:

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies- :- Himalaya Publishing House, 2011.

2. Kamlesh K Bajaj and Debjani Nag, E- Commerce, 2005.

Reference Books:

3. Gray P. Schneider, Electronic commerce, International Student Edition, 2011.

4. E-Commerce, Fundamentals and Applications, Wiely Student Edition,

Skill Enhancement Courses(SEC)

Shell Programming and System Administration

Course outcomes:

At the completion of the course, a student will be able to:

6. Understand the installation and configuration of mainstream operating systems, important network services.
7. Explain about disaster recovery procedures, and techniques for ensuring the security of the system.
8. Manage system resources, including methods for tracking system metrics.
9. Apply these skills in the administration of an actual computer system with actual users.
10. Configure desktop environment that users would normally require for day to day operations.

UNIT – I

Overview of Linux:what is Linux, root in Unix,Common Linux Features ,advantage of Linux Overview of Unix and Linux architectures,Linux files system, hardware requirements for Linux Linux standard directories,Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat file comparisons .

UNIT – II

Essential Linux commands, Processes in Linux, Process fundamentals,Connecting processes with pipes, Redirecting input, Redirecting output, Backgroundprocessing, Managing multiple processes, Process scheduling – (at, batch), nohupcommand, kill, ps, who,find, sort, touch, filefile processing commands – wc, cut, paste etc, Mathematical commands – expr, factor etc, Creating files with vi editor, Editing files with vi editor.

UNIT – III

Shell programming: Basics of shell programming, various types of shell available in Linux Comparisons between various shells, Shell programming in bash ,Conditional statements Looping statements, Case statements, Parameter passing and arguments, Shell variables, System shell variables, shell keywords, Creating Shell programs for automating system tasks.

UNIT – IV

System administration: Common administrative tasks, identifying administrative files, Configuration and log files, Role of system administrator , managing user accounts -adding users, Managing user accounts -deleting users , Changing permissions and ownerships, Creating and managing groups, Modifying group attributes, Temporary disabling of users accounts, Creating and mounting file system, Checking and monitoring system performance, file security & Permissions, becoming super user using su, Getting system information with uname, host name, Disk partitions & sizes, users, kernel, installing and removing packages, rpm command.

UNIT – V

Simple filter commands & Understanding various Servers: Filter Commands-pr, head, tail, Filter Commands -cut, sort, Filter Commands- uniq, tr, Filter using regular expression grep, Filter using regular expression egrep, sed, DHCP, DNS, Squid, Apache, Telnet, FTP, Graham Glass, King Ables, Pearson Education

TEXT BOOKS:

1. W. Richard. Stevens (2005), Advanced Programming in the UNIX Environment, 3rd edition, Pearson Education, New Delhi, India.
2. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg.Thomson
REFERENCES:
1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. UNIX Network Programming, W.R. Stevens, PHI.
UNIX for Programmers and Users, 3rd Edition, Graham Glass, King Ables, Pearson Education

Shell Programming and System Administration Lab

Course outcomes:
At the completion of the course, a student will be able to:

5. Students learn the installation and configuration of mainstream operating systems, important network services.
6. Students learn to manage system resources, including methods for tracking system metrics.
7. Can apply these skills in the administration of an actual computer system with actual users.
8. Configuration of desktop environment that users would normally require for day to day operations.

Exercises:

35. Study of Linux Terminal
36. Linux commands- PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir,rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip,
37. file handling utilities, security by file permissions,process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask,ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text Processing utilities and backup utilities , tail, head ,sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg,comm, cmp, diff, tr, awk, cpio.
38. Write a shell script which ask your name, age, department, and course and lastly give the syntax to display all your information.
39. Write a shell script which asks your Enrolment no., name, name of 3 subjects and marks obtained.
40. Display these fields by using echo and equal operator.
41. Write a shell script, declare 5 variables and assign values to them. Display the values in the given order: - 1, 5,2,3,4.
42. Write a shell script that creates a file containing the message that this file is created today i.e. on the current date followed are the users of UNIX at this moment and show the list of users.
43. Write a shell script that accepts two file names from the command line, copies the first to second file and display the second file.
44. Write a shell script that accepts two parameters i.e. two files, append file1 to file2 and display file2.
45. Write a shell script that assigns execute permission to a file.
46. Write a shell script that accepts one file and directory name and move that file tothe directory and show recursive listing and long listing.
47. Write a shell script where we create a directory, move to the directory, create a file. Show the present path and display the file.
48. Write a shell script that asks your name and invite you on current date for a party and append this message to a file name party.
49. Write a shell script that reads a file name from command line and changes name to filename.logname.
50. Display the number of links and size of the file given as the command line argument.
51. Write a shell script which displays the date in desired format i.e. Monday 25 September 2006. Write a shell script by which you create a branch \usr directory till depth of d5 and using concept of assigning the path to the variables do the movements within this directory path and create two files in each directory from d1.
52. Write a shell script and declare two variables A and B. Take static valueof A=5 and B=3. Perform all operations on it.
53. Write a shell script which accepts a number and checks whether the number is an odd or even

number.

54. Write a shell script to give the result of student. Take marks of the five subjects, student name, roll no and percentage and show a message whether a student gets division as per the following rules:
    70% <-> distinction 60 %-> 1st divisions 50 %-> 2nd divisions
    <40 %-> Fail
55. Write a shell script which checks the age of the student for swimming. The condition are as follows:
    <10- not allowed 10- 18- junior pool only
    >18- swimming is allowed in depth also.
56. Write a shell script to find out the gross salary of an employee when the given information is as under:-
    a) If basic salary is less than Rs.1500/-HRA = 10% of basicDA = 90% of basic
    b) If basic is greater than or equal to Rs.1500/-HRA = 500/- , DA = 98% of basic
57. Write a shell script to enter a year and show a message whether the year is a leap year or not.
58. Write a shell script using concept of position parameters which copies one file and display destination file and it should also contain an error message if the source file
59. Write a shell script to calculate the gross salary of an employee whose basic salary is entered through keyboard. His DA=40% of basic and HRA=20% of basic.
60. Write a shell script where distance between two cities is input through the keyboard in km.
61. Convert and print this distance in meters, feet, inches and cm.
62. Write a shell script to find area and perimeter of rectangle.
63. Write shell scrip to find area and circumference of the circle.
64. Write a shell script to find sum of digits of a number and check whether the number is palindrome or not.
65. Pass a filename as command line argument to script which finds
    (i) Whether file exists or not.
    (ii) Display the message what type of file it is.
    (iii)(a) If the file is ordinary files check its read permission. If available display the file else display message read permission denied. (b) Check its write permission and if available append that file by your name and course, else display error message. (c) Check executes permission & if available shows the output of that file.
    (iv)(a) if it's a directory checks its read permission, if available list the directory.
66. (b) Check its write permission; if available make a sub-directory in that directory. Create two file in that sub-directory that you created just now.
67. Write a menu driven program:-
    a) Place the pwd of user.
    b) List the directory of user.
    c) Long listing the directory of the user and at the same time this long listing is to be stored in a file.
    d) Create a file in your directory and copy this file in your directory.
    e) Move the specified file to your parent directory.
    f) Rename the specified file in the current directory.
    g) Make a sub directory in the current directory and change its permission by taking away all the permission of group and others.
68. Write a Menu driven program
    a) Check the contents of /etc/passwd file.
    b) List of users who have currently logged in.
    c) Pwd
    d) Exit

Ability Enhancement Compulsory Courses (AECC)

ENGLISH-II

Course outcomes:
At the completion of the course, a student will be able to:

5. Learn the grammatical concepts and communication process for effective communication skills.
6. Develop the habit of reading and understanding the text for better comprehensive skills.
7. Identify the importance of Time Management, Goals and Business etiquette.
8. Apply their effective communication and writing skills at their work place.

Detailed Syllabus

Unit I
Grammar: Articles, Parts of Speech, Subject – Verb Agreement, Moral Verbs, Direct & Indirect & Speech

Unit II
Communication: Definition, Process and Importance, Communication Barriers, Types of Communication- Formal, Informal: Verbal, Non Verbal

Unit III
Smart Goals, Time Management, Business Etiquette, Long Term & Short Term Goals

Unit IV
Comprehension: 'Of Studies' by Francis Bacon, 'where the mind is without fear' by Rabindra Nath Tagore, 'Last Leaf' by O' Henry, 'Mending Wall' by Robert Frost

Unit V
Composition: Dialogue Writing, Group Discussion, Report Writing, Letter- Formal & Informal, C V / Resume Writing

Text Books:

3. A Practical English Grammar (4th Edition) by A. J. Thomson (Author), A. V. Martinet.
4. Wrien, P.C & Martin. H. "English Grammar & Composition". S. Chand.

Reference Books:

2. Close, R. A. Reference Grammar for Students of English. Orient Longman.

Semester-V

Discipline Specific Core Courses (DSC):

Computer Graphics and Multimedia

Course outcomes:

At the completion of the course, a student will be able to:

7. Remember the technical aspect of Multimedia Systems.
8. Understand various file formats for audio, video and text media.
9. Develop various Multimedia Systems applicable in real time.
10. Design interactive multimedia software.
11. Apply various networking protocols for multimedia applications.
12. Evaluate multimedia application for its optimum performance.

UNIT-I

Introduction: The Advantages of Interactive Graphics, Representative Uses of Computer Graphics, Classification of Application Development of Hardware and software for Computer Graphics, Conceptual Framework for Interactive Graphics, Overview,
Scan: Converting Lines, Scan Converting Circles, Scan Converting Ellipses.

UNIT-II

Hardcopy Technologies, Display Technologies, Raster-Scan Display System, Video Controller, Random-Scan Display processor, Input Devices for Operator Interaction, Image Scanners.
Clipping Southland- Cohen Algorithm, Cyrus-Beck Algorithm, Midpoint Subdivision Algorithm.

UNIT-III

Geometrical Transformation: 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Composition of 2D Transformations, The Window-to-Viewport Transformation, Efficiency, Matrix Representation of 3D Transformations, Transformations as a Change in Coordinate System.

UNIT-IV

Multimedia Elements, Multimedia Applications, Multimedia System Architecture, Evolving Technologies for Multimedia Systems, Multimedia Data Interface Standards, the Need for Data Compressions, Multimedia Database.

UNIT-V

Media and Data Streams: Medium, Main Properties of a Multimedia Stream, Multimedia System Definition, Combination of Media. Data & File Format Standards: Rich –Text Format, TIFF File Format, RIFF, MIDI File Format, JPEG DIB File Format, MPEG Standards.

Text Books:

1. Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles& practice,2000.
2. Ralf Skinmeiz and KlanaNaharstedt, Multimedia: computing, Communication and Applications, pearson, 2001
3. D.Harn& Baker. Computer Graphics Prentice Hall of India,1986.

4. J. F. Koegel Buferd -Multimedia Systems, Pearson Education, New Delhi, 2006

Text Books:

3. Villamil and Molina, "An Introduction to Multimedia", MacMillan, 1997
4. Lozano, "Multimedia: Sound & Video", Prentice Hall of India (Que), 1997.
9. Ranjan Parekh, "Principle of Multimedia", Tata McGraw Hilf.
10. Villamil and Molina, "Multimedia: Production, Planning and Delivery", Que, 1997.

Reference Books:

11. Sinclair, "Multimedia on the PC". BPB Publications
12. Tay Vaughan. "Multimedia: Making It Work", Fifth edition, Tata McGraw Hill, 1994.
13. James E Shuman, "Multimedia in Action", Wadsworth Publications, 1997.
14. Jeff Coate Judith, "Multimedia in Practice", Prentice Hall of India, 1995 John F. Koegel, "Multimedia Systems", Addison Wesley Ltd.

Computer Graphics and Multimedia Lab

Course outcomes:
At the completion of the course, a student will be able to:

1. Identify the basic tools and components of a multimedia project.
2. Apply basic elements and principles of photo editing software to achieve a great photo
3. Apply effects like color, shadows, alteration of backgrounds, cropping and Collage making.
4. Create simple shapes using animation editing software and design.
5. Prepare and present a multimedia portfolio containing electronic media that demonstrates multimedia and problem-solving skills.

Practical exercises

1. Write a program to draw a chain of diamonds.
2. Write a program to draw village of houses.
3. Write a program to create checker board effect.
4. Write a C program to implement line drawing algorithm.
5. Write a C program to implement circle drawing algorithm.
6. Write a C program to implement the Line, Circle and ellipse attributes by drawing "House".
7. Write a C program to implement ellipse drawing algorithm.
8. Write a C program to implement two Dimensional transformations - Translation, Reflection, and Shear.
9. Write a C program to implement two Dimensional transformations - Rotation (With and without pivot point), Scaling (With and without pivot point).
10. Write a C program to implement composite 2D Transformations – Translation, Scaling, Rotation.
11. Write a C program to implement composite 2D Transformations –fixed point scaling, fixed point rotation.
12. Write a C program to implement Cohen Sutherland 2D line clipping algorithm.
13. Write a C program to implement Sutherland – Hodgeman Polygon clipping Algorithm.
14. Write a C program to implement three dimensional transformations - Translation, Rotation, Scaling.
15. Write a C program to implement composite 3D transformations - Translation, Rotation, and Scaling.
16. Draw an animation to show a bouncing ball.Design a moving ball in V-shape
17. Draw an animation to show a moving stick man.
18. Draw an animation to show a fainting banana.
19. Draw an animation to show sunrise and sunset.
20. Draw an animation to show a disappearing house.
21. Draw an animation to show two boats sailing in river
22. Draw an animation to show a scene of cricket match.
23. Draw an animation to help teach a poem or a song
24. Draw an animation to show cartoon with a message.
25. Create Spot Light using Macromedia Flash.
26. Make a movie showing Shape Tweening.
27. Make a movie showing Motion Tweening.
28. Add sound and button to the movie
29. Create Animated Pool Table.
30. Create Bow & Arrow hitting a Ball.

Discipline Specific Core Courses (DSC):

Programming in .NET

Course outcomes:

At the completion of the course, a student will be able to:

1. Remember the programming skills and be familiar with programming environment.
2. Apply the concept so the students will be able to use ASP.NET controls in web applications.
3. Interpret the to debug and deploy ASP.NET web applications
4. Describe to create database driven ASP.NET web applications and web services
5. To develop, implement, and demonstrate Component Services, Threading, remoting, Windows services.
6. Create and develop Assemblies and Deployment in .NET, Application Development.

Detailed Syllabus

Unit I

The Framework of .Net: Building blocks of .Net Platform (the CLR, CTS and CLS), Features of .Net, deploying the .Net Runtime, Architecture of .Net platform, Introduction to namespaces & type distinction. Types & Object in .Net, the evolution of Web development.

Unit II

Class Libraries in .Net, Introduction to Assemblies & Manifest in .Net, Metadata & attributes. Introduction to C#: Characteristics of C#, Data types: Value types, reference types, default value, constants, variables, scope of variables, boxing and unboxing.

Unit III

Operators and expressions: Arithmetic, relational, logical, bitwise, special operators, evolution of expressions, operator precedence & associativity. Control constructs in C#: Decision making, loops. Classes & methods: Class, methods, constructors, destructors, overloading of operators & functions.

UNIT-IV

Inheritance & polymorphism: visibility control, overriding, abstract class & methods, sealed classes & methods, interfaces.

UNIT-V

Advanced features of C#: Exception handling & error handling, automatic memory management, Input and output (Directories, Files, and streams).

Text Books:

3. Introduction to C# using .NET By Robert J. Oberg, PHI, 2002,
4. Programming in C# by E. Balaguruswamy, Tata McGraw Hill,

Reference Books:

2. The Complete Guide to C# Programming by V. P. Jain.

.NET Programming Lab

Course outcomes:
At the completion of the course, a student will be able to:

1. Apply the concept so the students will be able to use ASP.NET controls in web applications.
2. Interpret the debug and deploy ASP.NET web applications.
3. Develop, implement, and demonstrate Component Services, Threading, remoting, Windows services.
4. Identify Security in the .NET framework and Deployment in the .NET.
5. Develop Assemblies and Deployment in .NET, Application Development

Exercises:

1. Write a simple program in C# to write a string on the screen
2. Write a program in C# to prompt the user for some input and then take some action.
3. Write a program in C# to demonstrate different kinds of arrays including jagged arrays.
4. Write a program to demonstrate boxing.
5. Write a program to demonstrate how unary operators are used.
6. Write a program in C# to demonstrate how binary operators work.
12. Write a program in C# to find out trie range of number from 1-10 or 11-20 or 21-30 or less than 1.
7. Write a program in C# to find out the number entered between 1 -3.
13. Write a program in C# to override a method which calculates pay of an employees to take bonus into account.
14. Write a program in C# to ask a user to enter a choice to add, delete, modify or view address using methods for each functionality.
15. Write a program in C# to demonstrate and verify that the static constructor runs only one time, even though two instances of Class are created, and that it runs before the instance constructor runs.

Discipline Specific Core Courses (DSC):
Data Warehousing and Data Mining

Course outcomes:
At the completion of the course, a student will be able to:

1. Identify the basic concepts and need of the data warehousing and data mining with its various application.
2. Summarize the Data Warehousing Architecture and Data Mining Architecture along with the physical design and deployment process.
3. Experiment with single dimensional and multi dimensional association rules for data mining.
4. Assess the various classification techniques such as Bayesian classification, Classifier accuracy, Clustering Methods and Outlier analysis etc.
5. Determine the various applications and algorithms for data mining, text mining and web mining.

Detailed Syllabus

Unit I

Data Warehousing: Introduction- Definition and description, need for data ware housing, need for strategic information, failures of past decision support systems, OLTP vs DWH, Requirements-trends in DWH Application of DWH.

Unit II

Data Warehousing Architecture: Reference architecture, Components of reference architecture, Data warehouse building blocks, implementation, physical design process and DWH deployment process, Multidimensional Data Model and Data Warehouse Architecture.

Unit III

Data Mining: Data mining tasks, Data mining vs. KDD , Issues in data mining, Data Mining metrics, Data mining architecture, Data cleaning, Data transformation , Data reduction and Data Mining primitives.

Unit IV

Association Rule Mining: Introduction to Mining, single dimensional Boolean association rules from transactional databases, multi-dimensional association rules.

Classification and Prediction: Classification Techniques, Issues regarding classification and prediction. Decision tree, Bayesian classification, Classifier accuracy, Clustering Methods and Outlier analysis.

UNIT V

Applications and Other Data Mining Methods: Distributed and parallel Data Mining Algorithms, Text mining and Web mining

Text Books:

1. Jiawei Han and Micheline Kamber," Data Mining Concepts and Techniques", Morgan Kaufmann Publishers, USA, 2006.
2. BersoiV'DataWarehousing, Data Mining and OLAP", Tata McGraw Hill Ltd, New Delhi, 2004.
3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining,, Pearson Education.

Reference Books:

1. Arun K Pujari,"Data mining techniques", Oxford University Press, London, 2003.
2. Dunham M H,"Data mining: Introductory and Advanced Topics". Pearson Education, New Delhi, 2003.
3. Mehmed Kantardzic," Data Mining Concepts, Methods and Algorithms", John Wiley and Sons, USA, 2003.
4. Soman K. P., DiwakarShyam, Ajay V., Insight into Data mining: Theory and Practice, PHI 2006.

Discipline Specific Electives (DSE)

Management Information System

Course outcomes:
At the completion of the course, a student will be able to:

1.Relate the basic concepts and technologies used in the field of management information systems.
2. Compare the processes of developing and implementing information systems.
3. Outline the role of the ethical, social, and security issues of information systems.
4. Translate the role of information systems in organizations, the strategic management processes, with the implications for the management.
5. Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization.

UNIT – I

Meaning and role of MIS: Introduction to MIS, definition & characteristics of MIS, Components of MIS, Nature & Scope of MIS, MIS organization within the company. Management, organizational theory & systems Approach: Development of organization theory, management & organizational behavior, management, information, and the systems approach. Introduction to system and Basic System Concepts, Types of Systems Information System: Definition & Characteristics, Types of information, Role of Information in Decision-Making, Sub-Systems of an Information system: EDP and MIS Levels of Management TPS/MIS/DSS.

UNIT – II

Information Systems for Decision making: Evolution of an Information System, Basic information systems, Decision making & MIS, Types of decisions--Structured Vs Unstructured decisions, Strategic , tactical & operational information for taking decisions, Simon's model of decision-making. MIS as a technique for making programmed decisions, decision assisting information systems.

UNIT – III

Strategic and project planning for MIS: General business planning, appropriate MIS response, MIS planning – general, MIS planning – details. Conceptual Design – Definition of the problem, system objective and system constraints, analysis of information source, alternative system design and selection of optimal system, conceptual system designs document.

UNIT – IV

Detailed System Design: Inform & Involvement of end user, aim of detailed design, project management, identification & trade-off criteria, defining subsystems, degree of automation of each operation, inputs, outputs & processing, early system testing, software, hardware & tools, documentation, Role of Top management during design.

UNIT – V

Implementation, evaluation and maintenance of the MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train and operating personnel, computer-related acquisitions, develop forms for data collection and information, dissemination, develop the files, test the system, cut over, document the system, evaluate the MIS, control and maintain the system. System maintenance: Corrective, Adaptive & perfective maintenance. Pitfalls in MIS: Fundamental weaknesses. Functional MIS: A Study of Marketing, Personnel, Accounting MIS.

BOOKS RECOMMENDED:

1. R. G. Murdick, J. E. Ross and J. R. Clagget, "Information SystemsforModern Management", 3rd

Edition by, PHI – 1994
2. D. P. Goyal, "Management Information Systems", Macmillan Business Books
3. Laudon&Laudon, "Information Systems", PHI

Skill Enhancement Courses (SEC)

Android Programming

Course outcomes:
At the completion of the course, a student will be able to:

1. Remember Android platform, Architecture and features.
2. Understand the User Interface and develop activity for Android App.
3. Design and implement Database Application and Content providers.
4. Use multimedia, camera and Location based services in Android App.
5. Discuss various security issues in Android platform

Detailed Syllabus

UNIT I

Introduction: History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.

UNIT II

Overview of object oriented programming using Java: OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine

UNIT III

Development Tools: Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project, Hello World, run on emulator, Deploy it on USB-connected Android device.

UNIT IV

User Interface Architecture: Application context, intents. Activity life cycle, multiple screen sizes.

User Interface Design: Form widgets, Text Fields, Layouts. Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, and Dialog.

UNIT V

Database: Understanding of SQLite database, connecting with, the database.

Text Books:

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.
2. Android Wireless Application Development By Lauren Darcey and Shane Conder, Pearson Education, 2nd ed. (2011)
3. Using SQLite By Jay A. Kreibich, Publisher: O'Reilly Media.

Reference Books:

1. Mobile Computing using Android and iPhone [ISBN: 978-93-81786-93-2] by Bharat & Company.
4. Professional Android 2 Application Development Reto Meier, Wiley India Pvt Ltd (2011).
5. Beginning Android Mark L Murphy, Wiley India Pvt Ltd.

Online Reading / Supporting Material:

5. http://www.developer.android.com
6. http://developer.android.com/aboLJt/versions/indexJitml
7. http://developer.android.com/training/basics/flrstapp/indexJ^tml
8. http://docs.oracle.com/javase/tutorial/index.htm (Available in the form of free downloadable ebooks also).

Android Programming Lab and Minor Project

Course outcomes:
At the completion of the course, a student will be able to:

1. Students learn to develop android based applications.
2. Understand the User Interface and develop UI for Android App.
3. Design and program Database Application and Content providers using android.
4. Students learn to develop small projects using the various technologies.

Android Experiment List :

1. Create "Hello World" application that will display "Hello World" in the middle or the screen in the emulator. Also display "Hello World" in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res » value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and selected option should appear in text box.
5. Create a list of all courses in your college and on selecting a particular course teacher-in charge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message,
8. Create an application to Create, Insert, Update, Delete and retrieve operation on the database.

List of some minor projects during the V Semester:

- Assignment Management System
- Project ATM Banking System
- Project Cab Management System
- Project Cargo Management System
- Project City Bus Management System
- Project Civil Registration System
- Project Content Management System
- Project Customer Relationship Management System
- Project Drug Management System
- Project Employee Leave Management System
- Project Factory Information Management System
- Project Hospital Management System
- Project Infrastructure Management System
- Project Life Insurance Management System
- Project Mobile Shop
- Project Newspaper Ad Management System
- Project Online IT Service Help Desk
- Project Online Job Portal System

- Project Online Student Management System
- Project Online Tax Information System
- Project Online Voting System
- Project Patient Management System
- Project Payroll Management System
- Project School Management System
- Project Task Management System
- Project Vehicle Insurance Management System

Skill Enhancement Courses (SEC)
Management Process and Organizational behavior

Course Outcomes:

1. Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.
2. Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.
3. Analyze the complexities associated with management of the group behavior in the organization.
4. Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.
5. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
6. Articulate the basic structure, functions, and processes of key social systems affecting the environment

Course Contents

Unit- I

Principles of Management: Management: Introduction, Definition of management, Nature, Purpose and Functions, Levels and types of managers, managerial roles, skills for managers, evolution of management thought, Fayol's fourteen principles of management.

Unit – II

Planning: Meaning, Nature of Planning, Planning Process, Objectives, MBO, Strategies, level of strategies, policies, methods and programs, Planning Premises, Decision-making, Process of decision-making, Types of decisions

Organizing: Organization structure, Formal and informal organizations, Functional, divisional, geographical, customer based and matrix organizations, tram based structures, virtual organizations, boundary less organizations. Principles of organizations
Controlling: Meaning, importance of controlling, controlling process, types of control, factors influencing control effectiveness.

Unit-III

Organizational Behaviour: Organizational Introduction, definition, fundamental principles of OB, contributing disciplines, challenges and opportunities. Evolution and Organizational Behavior in India.

Individual Behaviour: Foundations of individual behaviour. Ability: Intellectual abilities, Physical ability, the role of disabilities

Unit - IV

Personality: Meaning, formation, determinants, traits of personality, big five and MBTI, personality attributes influencing OB.

Attitude: Meaning, Formation, components of attitudes, relation between attitude and behavior

Unit – V

Motivation: Meaning, theories of motivation-needs theory, two factor theory, Theory X and Y

Leadership: Meaning, styles of leadership, leadership theories, trait theory, Managerial grid

Text Books:

1. Organizational Behavior, Stephen P. Robbins, Pearson Education.
2. Organizational Behaviour, S.S.Khanka, S.Chand

Reference Books:

3. Organizational Behavior , Mishra .M.N ,Vikas
4. Principles of Management, Koonz, Weihrich and Aryasri, Tata Mcgraw Hill.

Semester-VI

Discipline Specific Core Courses (DSC):

PHP Programming

Course outcomes:
At the completion of the course, a student will be able to:

1. Remember basic concept of PHP code to produce outcomes and solve problems.
2. Design and insert data using PHP and MySQL.
3. Apply basic knowledge for test, debug, and deploy web pages containing PHP and MySQL.
4. Creating Infrastructure and maintain complex Data flow with security.
5. Develop an application using PHP and MySQL

Detailed Syllabus

Unit I

Introduction to PHP: PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, and Editors etc.). PHP with other technologies, scope of PHP, Basic Syntax, PHP variables and constants, Types of data in PHP, Expressions, scopes of a variable (local, global), PHP Operators: Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator.PHP operator Precedence and associatively.

Unit II

Handling HTML form with PHP: Capturing Form Data, GET and POST form methods Dealing with multi value fields, Redirecting a form after submission.

PHP conditional events and Loops: PHP IF Else conditional statements (Nested IF and Else) Switch case, while, For and Do While Loop, Goto , Break ,Continue and exit.

Unit III

PHP Functions: Function, Need of Function, declaration and calling of a function. PHP Function with arguments, Default Arguments in Function. Function argument with call by value, call by reference. Scope of Function Global and Local

Unit IV

String Manipulation and Regular Expression: Creating and accessing String , Searching & Replacing String, Formatting, joining and splitting String, String Related Library functions Use and advantage of regular expression over inbuilt function. Use of preg_match (), preg_replace (), preg_split() functions in regular expression.

Unit V

Array: Anatomy of an Array, Creating index based and Associative array, Accessing array Looping with Index based array, with associative array using eachQ and foreachQ.Some useful Library function

Text Books:

1. Core PHP Programming. Leon Atkinson {Prentice Hall, ISBN 0130463469).
2. Beginning PHP5 and MySQL: From Novice to Professional, W. Jason Gilmore, 2004, Apress, ISBN: 1-893115-51-8

Reference Books:

1. Vikram Vaswani (2008), PHP: A BEGINNER'S GUIDE, McGraw-Hill

PHP Lab:

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

1. Understand the major areas and challenges of web programming.
2. Distinguish web-related technologies.
3. Use advanced topics in HTML5, CSS3, JavaScript
4. Use a server-side scripting language, PHP
5. Design and implement typical static web pages and interactive web applications, dynamic web applications.

Exercises:

1. Create a PHP page using functions for comparing three integers and print the largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. WAP to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user, After submission that page displays the reverse of provided string.
5. Write a PHP function that checks if a string is all lower case.
6. Write a PHP script that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
7. WAP to sort an array.
8. Write a PHP script that removes the whitespaces from a string. Sample string : The quick " " brown fox' Expected Output: Thequick""brownfox
14. Write a PHP script that finds out the sum of first n odd numbers.
15. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.
16. Write a PHP script that checks if a string contains another string.
17. Create a simple 'birthday countdown' script, the script will count the number of days between current day and birth day.
18. Create a script to construct the following pattern, using nested for loop.

```
*
**
***
****
*****
```

17. Write a simple PHP program to check that emails are valid-
18. WAP to print first n even numbers.
19. $color = array('white[1], 'green', 'red")

    Write a PHP script which will display the colors in the following way: Output: white, green, red,

- green
- red

• white

20. Using switch case and dropdown list display a "Hello" message depending on the language selected in drop down list.
21. Write a PHP program to print Fibonacci series using recursion.
22. Write a PHP script to replace the first 'the' of the following string with 'That'.

Sample : 'the quick brown fox jumps over the lazy dog.'

Expected Result: That quick brown fox jumps over the lazy dog.

Discipline Specific Core Courses (DSC):

Project Work/Dissertation

Course outcomes:

At the completion of the course, a student will be able to:

1. Identify the real world problems and challenges that need IT based solutions and create very precise specifications of the IT solution to be designed.
2. Understand project characteristics and various stages of a project.
3. Identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders.
4. Implement project management knowledge, processes, lifecycle and the embodied concepts, tools and techniques in order to achieve project success.
5. Demonstrate an ability to work in teams and manage the conduct of the research study.

As such, during the development of the project students shall involve themselves in all the stages of the System Development Life Cycle (SDLC) like requirements analysis, systems design, software development/coding;, testing and documentation, with an overall emphasis on the development of reliable software systems. Since, the project work spans over the entire final semester, the students shall be advised to take up projects for solving problems of software industry or any research organization or the real life problems suggested by the faculty in-charge of BCA project work in the institutions.

This option is to be offered only in 6^{th} Semester. The students will be allowed to work on any project based on the concepts studied in core/elective or skill based elective courses. The group size should be maximum of three (03) students. Each group will be assigned a teacher as a supervisor who will handle both their theory as well lab classes. Theory classes will cover project management techniques.

During the project work, its progress will be monitored, on monthly basis, by the internal guide. 1 Copies of Project Report to be submitted to SC (I copy to be retained by SC and 1 copy to be forwarded to Department). End Examination shall be based on Project Report, Presentation, Viva, and Demonstration of the software.

1 Duration (for 1 group),

* Presentation 20 minutes
* Viva 15 minutes
* Demonstration 15 minutes
* Report checking 10 minutes Students shall be given 30 minutes time to make preparations of their presentation and demonstration in the Lab (students are advised to carry out preparation on the previous day).

2 Project Work carries Total 300 Marks

* Project Report 100 marks
* Presentation (PowerPoint based) 80 marks
* Viva 60 marks
* Demonstration 60 marks 8.

3 Format of Project Report The manuscript of the report should be organised in the following sequence;

* Preliminary pages
* The body of the project(chapters)
* The bibliography
* Preliminary pages
* Approval Page
* The approval page is also known as signature page or completion certificate
* Internal as well as External guides should sign this page in order to assure that they have seen and approved the final version of the report.

4 Synopsis

* It should preferably be a single page (150 words max)
* The synopsis should be a summary or condensation of the project.

5 Acknowledgement

* The acknowledgment should not be more than one page.
* The student may acknowledge financial support, permission to use copy righted materials, trademarks, service marks, personal assistance etc.

6 Table of Contents

* It should be left justified, Times Roman 14 (student may use Table of content feature available in MS-WORD)

7 Introduction and Background

* It should have about 10% of total length
* Statement of Problem Area (brief, non-technical)
* Existing system, Methods and Procedures
* Background * Purpose/Objectives/justification of Project

8 Body of the Project Report

The body of the project report may include relevant features listed below:

* Company Profile
* Requirements Analysis
* Systems Design
* Database design (normalization, tables)
* File System and Data Structures
* User Interface design
* Prototyping
* Software and Hardware Platform (Selection of Operating System, Software packages, Computer Languages, Computer Systems and Peripherals)
* Verification and Software Testing
* DFD, Structure Charts, E-R diagram, Flowcharts, UML diagrams, Pseudocode, Decision Table, Decision Tree, Workflow, data dictionary
* Input and Output Forms/formats/reports
* Screen Dumps
* System Functional Specification
* Off-line or On-line Help feature

* Quality parameters/procedures
* Encryption/Security features
* Future Directions
* Results / conclusion
* References

Any points made in the text must be supported by evidence, either your results or the published findings of others. The sources are identified by citation.

9 To insure durability, permanency, and opacity, project report should be printed on A4 size white bond paper.

10 Typeface and Printing Chapter/Section Titles

* Should be printed in Times New Roman font in black colour
* Font size should be 16/14 points bold.
* Chapter should start on new page

11 Running text in the Report should be printed in Times New Roman font in black colour

* Font size should be 12 points.
* The print should be best quality
* Single line spacing for running text
* Double line spacing between paragraphs
* Printing on both sides

12 Margins

* Every page of the report, including all appendices, all notes, and the bibliography must have a LEFT and RIGHT margins of $1^{1/2}$ inches (to allow room for binding) and TOP and BOTTOM margins of 1 inch.
* Nothing should appear in LEFT and RIGHT margins. This means that all page numbers, text, tables, parts of illustrations, etc., must not appear in the margin area.

13 Page Numbers

* The page numbers must be bottom-cantered to the text (font Times New Roman; 10 points)
* All preliminary pages should NOT be numbered.
* The numbering should start from chapter-one (Introduction)
* Chapter titles (Headings) start on a new page.
* Leave an extra space after title
* Since you will have several levels of subheadings, distinguish one level from another in a consistent way, such as (1, 1.1, 1.2,2, 2.1,2.1.1,2.1.2, 2.2),
* Avoid having more than three levels of subheadings.

14 Length of Project Report

* In any case, the length of the graduate project report should not be more than 100 pages (excluding program listing)

15 Binding

* The project report must be clothbound (hardcover binding) and must be in light gray or black colour. Spiral binding is NOT allowed.
* The outside cover of the project report must follow the format described earlier and the lettering must be printed in gold letters.

Certificate for Evaluation

This is to certify that the undersigned have assessed and evaluated the Project Work titled "....." submitted by the student. The project Report has been (accepted / rejected) for the partial fulfilment of BCA programme.

Signature of the Examiner

Name of the Examiner

Discipline Specific Electives (DSE)

Cloud Computing

Course outcomes:
At the completion of the course, a student will be able to:

1. Remember concept of Cloud Computing, benefit and challenges associated with it.
2. Understand various cloud services, cloud service providers and frameworks being used.
3. Describe importance of virtualization along with their technologies.
4. Identify the need for the virtualization and advantage and limitations of using virtualization concept.
5. Analyze the open stack & Google Cloud platform components and understand Mobile Cloud Computing
6. Investigate the security aspect in cloud, standards for security framework, challenges.

Detailed Syllabus:

UNIT I

Cloud Introduction; Cloud Computing Fundamentals: Cloud Computing definition, Types of Cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing usage scenarios and Applications, Business models around Cloud Major Players in Cloud Computing.

UNIT II

Cloud Services and File System: Types of Cloud services, Service providers, Google App Engine, Amazon EC2, Microsoft Azure, Sales force. Introduction to Map Reduce, GFS, HDFS, Hadoop Framework,

UNIT III

Collaborating With Cloud: Collaborating on Calendars, Schedules and Task Management **Collaborating** on Event Management, Contact Management, Collaborating via Web-Based Communication Tools, Evaluating Web Mail Services and Collaborating via Social Networks

UNIT IV

Virtualization for Cloud: Need for Virtualization - Pros and cons of Virtualization, Types of Virtualization, System VM, Process VM, Virtual Machine monitor.

UNIT V

Security, Standards, and Applications

Security in Clouds: Cloud security challenges, Common Standards: The Open Cloud Consortium - The Distributed management Task Force - Standards for application Developers Standards for Messaging - Standards for Security. End user access to cloud computing, Mobile Internet devices and the cloud.

Text Books:

1. Bloor R., Kanfman M., Halper F. **Judith** Hurwitz "Cloud Computing " Wiley India Edition, 2010
2. John Rittinghouse & James Ransome, "Cloud Computing Implementation Management and Strategy", CRC Press, 2010
3. Antony T Velte, Cloud Computing : "A Practical Approach", McGraw HiIl,2009

Reference Books:

1. Michael Miller, Cloud Computing: "Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008.
2. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kauftnann Publishers, 2006.

Online Reading/Supporting Material

1. Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing", Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

4. webpages.iust.ac.ir/hsalimi/.../89.../Cloud%20Common%20standards.pptop ennebula.org,
5. www.cloudbus.org/cloudsim/, http://wvvw.eucalyptus.com/
4. hadoop.apache.org
5. http://hadoop.apaehe.org/docs/stable/hdfs_design,html

Cloud Computing Lab:

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

1. Define & implement Virtualization using different types of Hypervisors
2. Experience storage, calendar and document editing services offered by Google cloud.
3. Describe the functioning of Platform as a Service
4. Explore the Microsoft cloud platform.
5. Analyze and understand the functioning of different components involved in Amazon web services cloud platform.
6. Design & Synthesize Storage as a service using own Cloud

Exercises:

1 Create virtual machines that access different programs on same platform,

2 Create virtual machines that access different programs on different platforms.

3 Exploring Google cloud for the following

a) Storage

b) Sharing of data

e) manage your calendar, to-do lists,

f) a document editing tool

4 Exploring Microsoft cloud

5 Exploring Amazon cloud

Discipline Specific Electives (DSE)

Software Testing Concepts

Course Outcomes:

At the completion of the course, a student will be able to:

1. Learn systematic approach to the development, operation, maintenance, and retirement of software.
2. Learn how to use available resources to develop software, reduce cost of software and how to maintain quality of software.

3. Illustrate Methods and tools of testing and maintainace of software's.
4. Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.
5. Develop methods and procedures for software development that can scale up for large systems and that can be used to consistently produce high-quality software at low cost and with a small cycle time.

Detailed Syllabus

UNIT I

Introduction

Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System Testing, Basic Terminologies, V Shaped Software Lifecycle Model.

UNIT II

Functional Testing\ Black-box Testing

Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing

UNIT III

Structural Testing: White-box Testing

Basis Path Testing: Program Graph, DD Path graph, Cyclomatic Complexity, Graph Matrices, Control Flow Testing: Statement Coverage, Branch Coverage, Condition Coverage, Path Coverage.

UNIT IV

Software Quality Assurance, test optimization, Eleven Step Testing Process and Testing Security.

UNIT V

Software Reusability, Software Metrics, Software Testing Tools, Defect Tracking Tools, Defect Management Tools and Challenges

Books Recommended;

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Seventh Edition, Mc Graw Hill Education.2009.
2. Yogesh Singh, Software Testing, Cambridge University Press, 2011.

Skill Enhancement Courses (SEC)

'R'-Programming and Python Programming

Course Outcomes:

At the completion of the course, a student will be able to:

1. Identify programming logics and develop efficient programs using R (and similar high-level languages).
2. Explain & describe routine a specialized data manipulation/management and analysis tasks.
3. Apply and build document, share, and collaborate on code development using a suite of Open Source.
4. Develop methods and procedures

Detailed Syllabus

Unit I

Introduction: Overview and History of R, Basic Features of R, Design of the R System, Limitations of R, R Resources.

Unit II

Install and configuration of R programming environment, Getting started with the R interface, Getting Help, Entering Input, Evaluation, R Objects, Numbers, Attributes, Creating Vectors, Mixing Objects, Matrices, Lists, Factors, Missing Values, Data Frames

Unit III

Getting Data In and Out of R, Using the reader Package, Using Textual and Binary Formats for Storing Data, Interfaces to the Outside World, Sub-setting R Objects.

Unit IV

Dates and Times, Managing Data Frames , Control Structures , Functions , Scoping Rules of R , Loop Functions, Debugging, Debugging Tools in R, Simulating Random Numbers, Profiling R Code, Data Analysis Case Study

Unit V

Python programming Basic: Python interpreter, IPython Basics, Tab completion, Introspection, $run command, magic commands, matplotlib integration, python programming, language semantics, scalar types. Control flow

Data Structure, functions, files: tuple, list, built-in sequence function, dict, set, functions, namescape, scope, local function, returning multiple values, functions are objects, lambda functions, error and exception handling, file and operation systems

Text Books:

1. Roger D. Peng, R Programming for Data Science, 2015-07-20.
2. R programming Using R for introductory Statistics, by John Verzani, Chapman & Hall/CRC, 2004

Reference Books:

1. W. N.Venables, D. M. Smith, An Introduction to R, R-core team, 2015

'R'-Programming and Python Programming Lab

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

1. Identify and implement programming logics and develop efficient programs using R and Python
2. Students learn to develop various programs using R and Python.
3. Apply and build document, share, and collaborate on code development using a suite of Open Source.
4. Develop methods and procedures for various tasks used for different analysis of data.

R Experiment List:

1. Write a program that prints 'Hello World' to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list.
6. Write a function that tests whether a string is a palindrome.
7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort
8. Implement linear search.
9. Implement binary search.
10. Implement matrices addition, subtraction and Multiplication.
17. Create a vector of coefficients for a quadratic equation, using the sample function.
18. Read the file, assigning the result to the object hills,
19. Construct a scatter plot matrix.
20. Compute a linear regression of time against distance. ,
21. List objects in current working space.
22. Compute the real roots of the quadratic equation $x^2 + x + 1 = 0$ with the formula for the roots of a quadratic $x = -b \pm \sqrt{(b^2 - 4ac)}/2a$ and use sqrt function to compute a (positive) square root.
21. Write an R expression to determine if two sets, A and B, represented as integer vectors are disjoint. If they are disjoint, display elements of set A otherwise display elements of set B.
(Examine the help for functions print and cat).
22. Compound interest can be computed using the formula $A = P \times (1 + R/100)^n$ where P is the original money lent, A is what it amounts to in n years at R percent per year interest. Write R code to calculate the amount of money owed after n years, where n changes from 1 to 15 in yearly increments, if the money lent originally is 5000 pounds and the interest rate remains constant throughout the period at 11.5%.
23. Write a loop structure to scan through an integer vector to determine the index of the maximum value. The loop should terminate as soon as the index is obtained. Examine the help for the rank, sort and order functions.
24. Let vector y be the logarithm of a random sample from a standard normal distribution, N(0, 1). Use the if-else function to replace missing values with the value 9999.
21. Construct a 2×2 data frame, X say. Experiment with $X^{\wedge}$ (1: K), where K takes values 1:4. How does the recycling rule behave? What happens if you remove the brackets from the command

22. Assume that we have registered the height and weight for four people: Heights in cm are 180, 165, 160, 193; weights in kg are 87, 58, 65, J00. Make two vectors, height and weight, with the data. The bodymass index (BMI) is defined as Weight in kg/ (height in m)^2
24. Make a vector with the BMI values for the four people, and a vector with the natural logarithm to the BMI values. Finally make a vector with the weights for those people who have a BMI larger than 25

Python Experiment List:

1. Write a python program to print the multiplication table for the given number
2. Write a python program to check whether the given number is prime or not
3. Write a python program to find factorial of the given number
4. Write a python program to implement simple Chatbot
5. Write a python program to implement List operations (Nested List, Length,Concatenation, Membership, Iteration, Indexing and Slicing)
6. Write a python program to implement List methods (Add, Append, Extend & Delete).
7. Write a python program to Illustrate Different Set Operations
8. Write a python program to generate Calendar for the given month and year
9. Write a python program to implement Simple Calculator program
10. Write a python program to Add Two Matrices
11. Write a python program to Transpose a Matrix
12. Write a python program to implement Breadth First Search Traversal
13. Write a python program to implement Water Jug Problem
14. Write a python program to remove punctuations from the given string
15. Write a python program to sort the sentence in alphabetical order.

Annexure II- Mandatory Documents for Admission

To be uploaded on the Online Admission Portal by the Prospective students

Admission Documents	Format (Jpeg/PNG/PDF)	Documents Size
Duly filled online application form with student signature	Digital signature/Student signature JPEG/PNG	20 KB
Colour scan copy of all year/semester mark sheet/grade cards (for PG programs only) or consolidated mark sheet/grade cards also accepted.	PDF/JPEG	500 KB
Colour scan copy of 10th std. Mark sheet/grade card	PDF/JPEG	
Colour scan copy of 12th std./ Three-Year Polytechnic Diploma Mark sheet/grade card	PDF/JPEG	
Colour scan copy of passport size photograph	JPEG or PNG Format	50 KB
Colour scan copy of Govt. Photo id proof, Aadhar card is mandatory. (Other options: Voter's id, Driving License, Passport etc.)	PDF/JPEG	100 KB
In case of name change, Gazette notification documents for name changes For married women – marriage certificate would be accepted – provided previous maiden name is clearly mentioned in the same. In case of deferred Father name or mother name in such cases without a Gazette notification document.	PDF	500 KB
If foreign student: colour scan copy of passport	PDF/JPEG	500 KB
Fees submission transaction details or receipt as per University policy for respective online programs	PDF/JPEG	500 KB
Digitally Signed undertaking as per the process; where applicable	PDF	500 KB

Students can also visit the University website for the said information.

Annexure III- Content uploading protocol: Internal Process

The step-by-step breakdown of the process is as follows:

1) **Organizing Academic Content:**
   - Create a separate sub-folder for each module of a subject within the Course Folder named after the Course Code.
   - Each module sub-folder should contain PDFs (e-books, practical assignments, plagiarism reports, etc.), 1 PowerPoint presentation (ppt), and 1 recorded lecture video.
   - Compile all module study material PDFs into one combined PDF for each subject for plagiarism check.
2) **Google Drive Link Creation and Sharing:**
   - Create a Google Drive link for content sharing.
   - Upload the folders onto the drive.
   - Share the drive link with the Deputy Director and Program Coordinator for review.

3) **Review Process:**Program Coordinator will provide suggestions and reviews.

4) **Revised Content Sharing:**After revisions, follow Step 1 and Step 2 again, but rename the files to indicate corrections (e.g., MBM101_corrected).

5) **Final Approval:** Deputy Director communicates final approval to upload the contents on LMS to the Technical Manager.

6) **Content Upload on LMS:**Once approved, Program Coordinator ensures the contents are uploaded under the correct subject name and program on the LMS.

7) **Student Notification:**Notify students of the availability of approved content on the LMS.

This process ensures organized content creation, thorough review, and proper dissemination to students via the Learning Management System.

Annexure IV- Academic Bank of Credit Id Creation Process

All enrolled students, particularly those of Indian nationality, are required to register with ABC (Academic Bank of Credits), a central scheme established by the Ministry of Education, Government of India, for depositing credit. ABC ID creation is mandatory for all students, ensuring their participation in this scheme.

Process	• Students can register by logging in at www.abc.digilocker.gov.in • Click on My Account → Login as Student • Click on "Sign up with DigiLocker" → Enter valid mobile number → An OTP is sent at the phone number via SMS → Enter the OTP and click on "Continue" button → Enter Security PIN set created during Sign Up and click "Submit" Button • You will be prompted with ABC student account creation window
Documents and proofs required	• Aadhaar Card is mandatory for ABC Id creation • Learners Name • Date of Birth • Gender • Enrolment Number • Requirements by Academic Institution: • Mobile Number

The ABC Id can be created by students themselves using Digi-locker, UMANG application, ABC portal or Academic Institution Portal. The process for which is provided below.

The University will extend support to the students to create ABC ID. The documents required will remain the same as stated above.

Annexure V - Guidelines and Pre-requisites for Proctored Examination

the minimum hardware, software, and connectivity requirements for taking exams through the Online Proctored Examination Platform are mentioned below:

TYPE	MINIMUM	RECOMMENDED
Internet Connection	Wifi Connection	Wired Connection
PC Users	Windows 8 (Windows 10 S mode is not supported)	Windows 10 (10 S mode is not supported)
Mac Users	MacOS 10.13 (Oldest Still Maintained Version)	MacOS 10.15
CPU	more than 2 core CPU less than 85% CPU Usage	more than 4 core CPU less than 50% CPU Usage
Webcam	640x480 resolution	1280x720 resolution
Internet Download Speed	1 Mbps	12 Mbps
Internet Upload Speed	1 Mbps	3 Mbps
RAM	4 GB less than 90% Ram Usage	16 GB less than 70% Usage
Connectivity Ports	1935, 843, 80, 443, 61613, UDP/TCP	1935, 843, 80, 443, 61613, UDP/TCP
Screen Resolution	1366 x 768	1920 x 1080 and above
Chromebook Users (Only for Automated Proctoring. Is not Supported for Live Proctoring)	Chrome device is running the latest version of Chrome OS.	Chrome device is running the latest version of Chrome OS.

1) Additional Requirements:

- A functioning microphone (some web cameras have them built-in); the microphone should not be part of headphones.
- Headphones are generally not permitted; check with your testing organization to determine if headphones are allowed.
- A compatible browser: Google Chrome (preferred) or Mozilla Firefox.
- Webcam and microphone (built-in or external) – test your webcam at https://webcamtests.com/.

- Connection to a network with sufficient internet speed: at least 1 Mbps download speed and 1 Mbps upload – test internet speed at www.speedtest.net.

2) **Not Supported:**

- Microsoft Edge browser.
- Google Chromebooks (for Live Proctoring only).
- Tablets (Nexus, iPad, Tab, Note, etc.).
- Smartphones.
- Linux operating systems.
- Windows 10 in S mode or Surface RT.
- Connecting from within a virtual machine. You will be asked to reconnect using your host operating system to take your exam.
- Apple Boot Camp.
- Remote Access Software.
- Inactive Version of Windows and Test Builds/Test Mode.

3) **Pop-up Blocker:**
Pop-up blockers must be either off or disabled. Disable your pop-up blocker as follows:

    - Open Chrome on your computer.
    - Click on the icon with three vertical dots.
    - Click More, then Settings on the top right.
    - Go to Privacy and security and click Site settings.
    - Click Pop-ups and redirects.
    - Turn the setting to Allowed at the top.

Important: The Institute regularly takes actions to optimize its examination system, and hence please note that the above-mentioned hardware, software, equipment, and connectivity requirements might change at the Institute's discretion. All students will need to 100% comply with any such changed specifications announced by the Institute.

General Instructions

For Proctored Online Examinations, the timing will strictly adhere to the communicated timetable schedule in Indian Standard Time (IST), including for candidates taking the exam outside India.

Candidates can take exams on devices such as laptops or desktops. Ensure that the device is fully charged well in advance to last for at least 2 hours. It should also have continuous internet connectivity. Avoid sharing the phone's hotspot with any other device during the examination.

To ensure a smooth examination attempt, students are advised to:

a) Sit in a closed room with adequate lighting for the camera to detect them. Face the light during the examination and avoid sitting near or against a window.

b) Ensure a noise-free environment during the examination to avoid detection and capture as deviation.

c) Position the device so that the front camera captures the student's face properly, and they can sit comfortably for one hour without moving the device.

d) If using a Wi-Fi router, sit near the router/modem to prevent any signal-related issues.

Students must log in to the portal 30 minutes before the start of the examination compulsorily. This ensures sufficient time for any technical checks or troubleshooting before the exam begins.

- During the online examination, the following activities are strictly prohibited:
  a) Having any other person present in the room where the student is taking the examination.
  b) Moving from one place to another during the examination.
- You are not allowed to refer to any textbooks or any other material during the notified examination time.

- You are permitted to use rough paper and pen/pencil for solving analytical questions only and can use permitted scientific calculators. Before using rough papers and calculators, kindly show them in your PC/Mobile camera and then proceed.

- Once logged into the system with your Username and Password, please allow camera, location access, and audio device access when prompted. Failure to grant access to any of these may prevent you from appearing for the examination, or the remote proctor may disable your examination.

- In case of network disconnection or power failure during the examination, wait for internet connectivity to restore (do so as quickly as possible) and resume the test within 2 minutes by clicking on the "Resume" button. If unable to reconnect after 2 minutes, contact the administration for appropriate solutions to continue the test.

- It is advised to use the same laptop/desktop for both the mock examination and the final online examination.

- A helpdesk number will be provided to troubleshoot technical issues during the examination process. Students can contact this number for assistance in such cases.

2. Examination Rules

• Every student will need to log in through a secure ID and password on the online examination platform on the day of the examination. The time schedule, URL, User ID, and password will be provided in the LMS portal and will also be sent to the registered email ID or via SMS to the registered mobile phone.

- At the beginning of each session, the student undergoes identity verification at 2 levels:
  - Level 1: Capture of facial photo. During the examination, the student is required to click and upload their photograph in the system. The system constantly monitors the picture of the student taking the examination with the facial photo captured initially for any mismatch. In case of any

mismatch, the system will capture the anomaly, and a notification to the student/live proctor will be instantly displayed.

- Level 2: Student must display College ID/Government-authorized ID proof at the beginning of the examination.

- Only 2 attempts will be allowed for every student for every session of the day for a test. After two attempts, the student will not be able to take the test again for the respective session of the day.
- The student should ensure that they click on the "Submit" button available on the right top position of the screen before logging out of the exam.
- The Online Examination system will issue regular warnings for any deviations from the specified norms on the screen of your device. The maximum number of warnings will be 10, after which the test will be terminated.
- If a student violates any rules during the examination or tries to adopt any unfair means, the system will automatically collect data based on the following deviations and alert the student, immediately alerting the online live proctor:

  - Focus changed to a different window: student tabs out of the examination-taking window.
  - Browser not supported: Student is using an older browser version or a non-compatible browser.
  - Webcam is disabled: Student's webcam is disabled.
  - Face is not visible in the camera: Student is not looking into the camera.
  - Several faces in front of the camera: There are other people along with the examination taker.
  - Face does not match the profile: Student taking the examination is not the same person whose photo was captured before starting the examination and the photo of the student as available in the University database.
  - Microphone muted or its volume is low: Student has muted the microphone.
  - Conversation or noise in the background: System has captured background noise.
  - Screen activities are not shared: student has stopped screen share activity. Sharing of the screen is not necessary for the users of smartphones.
  - Second display is used: Additional display like an extended monitor has been connected.
  - Full-screen mode is disabled: student has disabled full-screen mode.

3. Examination code of conduct and Malpractices

• Students are not permitted to leave their seat during the examination.
• Consultation with others for information during the examination is strictly prohibited.
• The system utilizes Artificial Intelligence to monitor and record facial expressions, eye movements, and other activities.

• Engagement in suspicious or objectionable activities detected by the system will result in disciplinary action as per University regulations.
• Regular warnings will be issued on the device screen, recorded in the examination system, affecting the overall credibility score, potentially leading to examination cancellation.
• Taking photos, recording videos, or engaging in suspicious activities during the examination will be recorded and treated as malpractice.
• Use of headphones, noise cancellation devices, or Bluetooth devices during the examination is prohibited.
• Manual proctors (invigilators) will monitor students throughout the examination duration. • Referring to textbooks or consulting others for information during the examination is not allowed.
• Taking photos, screenshots, audio recording, or video recording of the examination and sharing it with others is considered malpractice.
• Use of headphones, noise cancellation devices, or Bluetooth devices during the examination is prohibited.
• Attempting to navigate away from the main screen will automatically terminate the examination.
• While using a laptop or desktop, refrain from using the keyboard except for communicating with the proctor; only use the mouse to answer questions.
• Starting the examination from multiple devices simultaneously is not allowed; however, changing devices due to technical faults is permitted.
• Students must remain in their place for the duration of the examination.
• Ensure no light source is behind your face.
• Avoid covering your face with hair, clothing (mask), hands, or any other object.
• Do not use headphones, earbuds, or any listening equipment.
• Eliminate background noise, voices, music, or television.
• Do not wear sunglasses during the examination.
• Do not allow any other individuals into the room.
• Avoid communication with any person during the examination.
• Do not have any programs or applications running that utilize the webcam, microphone, or screen-share features.
• Refrain from taking photos, screenshots, audio recording, or video recording of the examination and sharing it with others, as it will be considered malpractice.

Annexure VI – Continuous Internal Assessment Pattern

Particular	A1 (Objective Type)	A2 (Objective Type)
Marks	15	15

Question Pattern for the CIA Components
A-1 1.There will be 15 Objective type Multiple Choice Questions (MCQs), each carrying mark1 mark 2. The time for the A-1 assignment will be 30 mins 3. All questions are compulsory 4. There will be NO NEGATIVE MARKING for the wrong answers. **A-2** 1. There will be 15 Objective type Multiple Choice Questions (MCQs), each carrying mark1 mark 2. The time for the A-1 assignment will be 30 mins 3. All questions are compulsory 4. There will be NO NEGATIVE MARKING for the wrong answers.

Annexure VII – End-term Examination Pattern

JNU

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End Term Examination

[PROGRAM NAME]

[COURSE NAME][COURSE CODE]

Time : 2 Hours	Max. Marks : 70
Note for students: The paper will comprises of 70 compulsory objective questions of 1 mark each.	
Answer all the questions. Each question carries one mark.	
Q. No. 1 to Q. No. 70 - Objective questions with four multiple choices.	