

R.V.R. & J.C. COLLEGE OF ENGINEERING

(AUTONOMOUS) (Accredited by NAAC with 'A' Grade :: Affiliated to Acharya Nagarjuna University) Chandramoulipuram :: Chowdavaram :: GUNTUR - 522019

Three Year P.G. Degree Program

MASTER OF COMPUTER APPLICATIONS

Regulations (R-17) Scheme of Instruction, Examinations and Syllabus [w.e.f. 2017-2018]

DEPARTMENT OF COMPUTER APPLICATIONS

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DEPARTMENT OF COMPUTER APPLICATIONS

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THE INSTITUTION

Established in 1985, Rayapati Venkata Ranga Rao & Jagarlamudi Chandramouli College of Engineering, Guntur is the 'Jewel in the Crown' of Nagarjuna Education Society, which took upon itself the responsibility of enriching the society through promotion of education, literature and culture. As it always happens, the genuine intentions of the promoters of the society received the support of the almighty. Today eight educational institutions are functioning under the banner and patronage of Nagarjuna Education Society, with R.V.R. & J.C. College of Engineering, being the flag-ship of them.

The Vision

To enrich the society through education by generating globally competent man power that can make an honest living in the country or outside and capable of contributing to the socio economic development and welfare of the society. To inculcate in the students and general public, social skills, respect for ethics and law, tolerance and understanding needed to peacefully co-excist in a multi-racial and multi ethic society consisting of the very rich and very poor people.

The Mission

An integrated development of manpower possessing technological and managerial knowledge and skills, values and ethics needed to make an honorable living and contribute to the socio-economic development and welfare of the society.

Quality policy

Establishment of quality assurance system with continuous evaluation and monitoring to impart the best education to create ambience of excellence, recognizing the multi-cultural diversity and commitment to the transform and assimilate the excellence in education and value system

The Genesis and Growth

Like all great institutions, the College too had a humble beginning

with just 180 intake and a barely adequate infrastructure in1985, it is the determination and commitment of the Management that made the College one of the largest among Engineering Institutions in South India with excellent infrastructure, facilities and competent human resources. Today, it offers eight B.Tech., Degree Courses with an intake of 1080 plus 216 through lateral entry into the II Year for Diploma Holders. Further, the College offers MBA, MCA and M.Tech. in six specializations with an intake of 355. The total intake is 1435.

In 1998 it has become the youngest College to have been accredited and as on date all the seven eligible B.Tech. Degree Courses have been accredited in 2002, 2007 and again in 2012. It has become the first Engineering College in the state to have been accredited fourth time by N.B.A., New Delhi. In 2014, the Institution was accredited by NAAC with' A' Grade for FIVE Years by getting 3.19 CGPA on 4 point Scale. Further in the Academic Audit and Grading done by Andhra Pradesh State Council for Higher Education, Govt. of A.P., the institute is rated as the SECOND best among Private Engineering Colleges of A.P. and FOURTH best amongst all Engineering Colleges of A.P. including University Engineering Colleges. It has also figured among the "Top-100" Engg. Colleges in independent surveys conducted in 2006 & 2007 by the popular magazine the "OUTLOOK". The College received Best Laboratory Award, Eco Friendly Campus and First Prize for Best Performing Professional UG College in University Examination Results for the last FIVE consecutive years from Acharya Nagarjuna University. The College is a typical example of meticulous planning, resource scheduling, human endeavor and institutional management.

Courses Offered

1)

Une	Under-Graduate:B.Tech						
i)	Civil Engineering(1985)	180					
ii)	Mechanical Engineering(1985)	180					
iii)	Electronics & Communication Engg.(1985)	180					
iv)	Electrical & Electronics Engg.(1994)	180					

	V)	Computer Science & Engineering(1994)	180
	vi)	Chemical Engineering(1996)	60
	vii)	Information Technology(1998)	120
2)	Pos	t-Graduate:	
-,	i)	Management Sciences(MBA)(1995)	120
	ii)	Computer Applications (MCA) (1995)	120
	iii)	M.Tech in Computer Science & Engineering(2003)	25
	vi)	M.Tech in Power Systems Engineering(2004)	18
	V)	M.Tech. Structural Engineering(2004)	18
	vi)	M.Tech in Communication Engineering and	
		Signal Processing	18
	vii)	M.Tech in Machine Design	18
	viii)	M.Tech in Computer Science & Technology	18

The Campus

A built up area of 65,985 sq.m. on a 37.41 acres plot houses 61 Laboratories and 18 Computer Centres besides amenities like Canteen, Seminar Halls, Auditorium, Open Air Theatre, Gymnasium, e-classrooms and Conference Halls etc. to make life in the classroom and outside easy and comfortable. Continuous power supply is provided from 200 KVA, 250 KVA and 500 KVA modern Generator sets. Andhra Bank Branch is located in the campus. A fleet of 24 buses save the staff and students from the vagaries of public transport. The aesthetically designed structures, the hill slopes on the West, a well laid out campus dotted with roads, trees and gardens merge into a stunning landscape that inspires the minds to "Think Better, Work Better".

The Work Culture

The Management and Staff are a group of uncompromising people who stretch beyond reasonable limits to attain their objective - Excellence in everything they do. The people of RVR & JC have learnt that meeting of the minds and joining hands is the easier way to success. They do meet and interact frequently to set new starting lines than to celebrate the finishing lines reached.

The People

The College is possessive of its intellectual property; 257-strong faculties with diversity in specialization and heterogeneity in abilities have unity in their objective of enriching the students with up-to-date technical information, data and skills. The teachers adopt a very professional attitude and commitment in imparting instruction, counseling and personality development in which the student has the final say. The emphasis is more on learning of the students. The 165-odd administrative and supporting people provide the logistics to run academic and administrative operations, with silent efficiency.

Discipline

Insulating the students from the vulnerable influence due to the society's contemporary aberrations is our endeavor. The institution had become the choice of the parents for its track-record of campus discipline. The ambience and the exemplary orderliness of behavior of the staff induces a self-imposed discipline in the students. The temporary abnormalities if any are disciplined, of course.

Computer Centers

The computer facilities are vast. About 1500 terminals with latest configuration are located in fourteen Central and Department Computer Centers, all air conditioned. Software necessary for effective training and instruction as well as for consultancy are in place. All the computers in the campus have been interconnected through campus-wide intranet using Fiber Optic cables and switches. The City Computer Centre is an off-time facility for students & staff. Examination & administrative services are computerised. Currently, 16 MBPS Wireless Internet connectivity is provided by installing a Micro Tower.

Library

The four-storied library of 87,468 volumes of 25,910 titles, 3,267 CDs and educational films is the biggest learning resource in the campus. 257 National and International Journals provide up-to-date information on any topic the students and staff look for. Orderly stacking, computerized information and the seven qualified library staff facilitate easy location of any information needed. The Digital Library is providing internet facility to all the students with 17 systems. Comfortable seating arrangement and large reading spaces provide a serene atmosphere for spending long hours in the library. The City Centre too has a reference library that is open upto 10.00 p.m.

Hostels

Four storied Girls hostel with a 6,040 sq.m. accommodating 650 girl students with modern facilities available. Four storied boys hostels with a 11,152 sq.m. accommodating 1400 students with modern facilities in the College campus.

The Students

From the day of induction, the staff do everything to naturalize the students to the culture of R.V.R. & J.C. College of Engineering i.e. single minded pursuit of the objective. The part played by the students in making the College, into an ideal seat of learning is significant. The students of this College consistently produce the best of the results in the University.

Extra-curricular Activities

NCC, NSS Units are established in the College. Opportunities area plenty for those with extracurricular talent. Numerous competitions are held for various levels of students, who have proved their superiority in various inter-collegiate competitions conducted by public organizations and other institutions. The students prove their leadership qualities and co-operative skills by organizing colorful functions at regular intervals.

Campus Recruitment

About 60 renowned Industries / IT Organizations regularly visit the College to recruit the final years for employment. A training and placement Department monitors recruitment, short term training and personality development programmes.

The Alumni

The alumni of college are well settled in prestigious positions across the globe. The college regularly arranges meets between students and alumni to share each other's' experiences. Keeping in close with, and continuing to recognize alumni for their academic or professional excellence if one of the best practices of the college.

The college practices the modesty of looking for new starting lines than be content with the finishing lines reached.

"We admit, we have miles and miles to go before we complete our MISSION"

DEPARTMENT OF COMPUTER APPLICATIONS

Department Vision

To groom students achieve excellence in offering innovative solutions in tune with the needs of the society.

Department Mission

To help students excel in building globally competent sociotechnical systems.

About Department

The Department of Computer Applications started functioning from 1995 and is offering Masters Degree in Computer Applications.

In the culturally and intellectually rich environment of R.V.R. & J.C. College of Engineering, the department educates thinkers who do and doers, who think broadly and strategically about problem solving methods and process that manipulate, transform information through computers. By providing a rigorous formal education while allowing a maximum intellectual flexibility and diversity, the department equips its students with know – how for technical innovation and vision for leadership. The students of M.C.A are nurtured to become world-class software professionals as Project Managers, System Analysts or Team leaders in Industry or become Entrepreneurs in their own innovative way.

The department has modern laboratories to serve the teaching and research needs of the students and faculty of the department. Substantial computing resources that include high end servers with 135 MNC branded systems and all the necessary licensed software, giving students a diversity of experience in Operating Systems are exclusively provided for the department. All systems are fully networked within the department and to the institute's campus using High End CISCO Switches and Fiber Optic Cables. Dedicated leased line internet connectivity is provided by B.S.N.L. The department provides mail accounts to all students and staff of the college in Google Apps mail service. The laboratories have been upgraded and modernized from time to time. These facilities are maintained by the department's staff of programmers and technicians.

With a right blend of young and experienced staff, the department demonstrates high level of entrepreneurial spirit and student centered approach. The faculty is dedicated to providing students with a challenging and rewarding course of study in a caring & sharing environment.

The skills associated within teams are learnt and assessed in individual projects. Post graduate research is strongly encouraged through seminars, projects, theses and through the different guest lectures given by the experienced people from industry and academic.

The department encourages and nurtures the innate talents of students through the Computer and Information Sciences Association(CISA) by organizing several activities like student meets, seminars, guest lectures by the industry and academic experts. CISA organizes a National Level Technical Student Meet CIS'SOIREE every year

Programme Educational Objectives (PEOs)

PEOs for MCA programme are designed, based on the department mission.

MCA graduates will be able to:

- PEO 1 : Professionally excel in technical skills to meet the industry or academic needs.
- PEO 2 : Flourish with multidisciplinary approach towards entrepreneurship in a broader social context.
- PEO 3 : Exercise problem solving capacity with effective use of analysis, design, development that addresses idea realization.
- PEO 4 : Imbibe leadership qualities with professional ethics and communication skills.
- PEO 5 : Provide a congenial academic environment for all round development.

Programme Outcomes (POs)

After completion of the course, MCA graduates will have the ability to:

PO1 : Knowledge

Apply knowledge in computer applications to become successful professionals.

PO 2 : Problem Analysis

Develop logic and understand the essential mathematics related to Information Technology.

PO 3 : Design/development of solutions

Design, implement, and evaluate a software product.

PO 4 : Investigations

Transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies.

PO 5 : Modern tools usage

Familiarize with emerging and advanced software tools.

PO6 : Society

Experience the industrial environment for understanding the impact of computational solutions in a global and societal context.

PO 7 : Environment & Sustainability

Demonstrate the knowledge in sustainable development keeping in view of environmental effects and real life problems.

PO 8 : Ethics

Apply professional ethics.

PO9 : Team Work

Get readiness to collaborate in a multidisciplinary team.

PO 10 : Communication skills

Communicate effectively in both verbal and written form.

PO 11 : Project management

Handle the projects through appropriate project management techniques.

PO 12 : Life long learning

Engage in life-long learning, keeping abreast of latest/ever changing technologies.

R.V.R. & J.C. COLLEGE OF ENGINEERING :: GUNTUR (Autonomous)

REGULATIONS (R-17)

For 3-YEAR

MASTER OF COMPUTER APPLICATIONS (M.C.A.) Degree Program

(w.e.f. the batch of students admitted into First Year M.C.A from the academic year 2017-18)

1. ADMISSION

The eligibility criteria for admission into Master of Computer Applications (M.C.A.) programme is as per the guidelines of Andhra Pradesh State Council of Higher Education (APSCHE), Amaravathi.

1.1 Category – A Seats:

The seats under this category shall be filled by the Convener, ICET Admissions.

1.2 Category – B Seats:

The seats under this category shall be filled by the College as per the guidelines of APSCHE

2. DURATION OF THE COURSE AND MEDIUM OF INSTRUCTION

- 2.1 The duration of the course is three academic years consisting of two semesters in each academic year.
- 2.2 The medium of instruction and examination is English.

3. MINIMUM INSTRUCTION DAYS

Each semester shall consist of a minimum number of 90 days of instruction excluding the days allotted for tests, examinations and preparation holidays.

4. REGISTERING THE SUBJECTS OFFERED

- 4.1 A student has to register and secure 142 credits out of which 40 credits from laboratory subjects including project work.
- 4.2 The structure of the M.C.A Programme comprises of six semesters of course work consisting of 21 Core subjects + 4 Elective

subjects + 14 Labs + One Mini Project Work + One MOOCs followed by one semester of Major Project work. At the end of III Year II Semester the student should submit Project report.

- 4.3 MOOCs (Massive Open Online Courses) Requirements.
 - Enrolment of MOOCs Course will be initiated from the date of commencement of class work for II Year I Semester.
 - MOOCs course completion certificate must be submitted on or before the last instruction day of III Year I Semester, otherwise his/her Semester End Examination results will not be declared.
 - Two credits will be secured from MOOCs.
 - List of MOOCs courses will be announced by the Board of Studies at the time of commencement of class work for II Year I Semester.
- 4.4 Project work shall be carried out under the Supervision of a Faculty Member in the department. A candidate may, however, in certain cases,be permitted to work on his Project/Dissertation at the place of employment, any recognized Institution/R&D Organization/Industry with the approval of the Head of The Department and Head of the Organization. In such cases, the Project Work shall be jointly supervised by a member of the faculty and a person from the Organization in the concerned area of specialization.

5. ATTENDANCE

- 5.1 Students shall put in attendance of not less than 75% in aggregate in the prescribed subjects in each semester.
- 5.2 Condonation of shortage in attendance may be recommended on genuine medical grounds, up to a maximum of 10% provided the student puts in at least 65% attendance, provided the Principal is satisfied with the genuineness of the reasons and the conduct of the candidate.
- 5.3 Students who have put in less than 65% of attendance are not eligible for grant of condonation on shortage of attendance and also they are not eligible to appear in Semester End Examination of that semester. Such students shall have to repeat the regular

course of study of the corresponding semester in subsequent academic year in order to become eligible to appear for the examination. The seats of candidates admitted for repetition of the semester be treated as extra seats over and above the sanctioned strength.

6. LABORATORY

In any semester, a minimum 80% of total experiments / exercises specified in the syllabus for laboratory subject shall be completed by the candidate and get the record certified by the concerned Head of the Department, to be eligible to appear for the Semester End Examination in that laboratory subject.

7. SCHEME OF INSTRUCTION AND EVALUATION

- 7.1 Instruction in various subjects shall be provided by the college as per the Scheme of instruction and syllabus prescribed.
- 7.2 At the end of each semester, Semester End Examinations shall be held as prescribed in the scheme of examination.
- 7.3 The distribution of marks between sessional work (based on internal assessment) and Semester End Examination is as follows:

Nature of the subject	Sessional Marks	Semester End Exam. Marks
Theory subjects	40	60
Laboratory subjects	40	60
Mini Project Work	100	—
Major Project Work	40	60

7.4 The performance of the student in each semester is evaluated subject wise. The Internal Examination consists of a midterm examination for 30 Marks (18 Marks for Sessional Test and 12 Marks for Assignment Test) and an Assignment for 10 Marks. The Semester End examination will be conducted for 60 marks. The Internal Evaluation for Theory subjects is based on performances in the two midterm examinations one held in the middle of the semester and another held immediately after the

completion of the instruction. The Sessional marks for the midterm examinations shall be awarded giving a weightage of 15 marks out of 18 marks (80% approx.) to that midterm examination in which the candidate scores more marks and the remaining 3 marks (20% approx.) for other midterm examination in which the candidate scores less marks. Similarly a weightage of 10 marks (80% approx.) out of 12 marks earmarked for assignment tests shall be given for the assignment in which the candidate scores more marks and remaining 2 marks (20% approx.) shall be given for the assignment test in which the candidate scores less marks. The internal evaluation for laboratory subjects is based on the day-to-day performance and Semester End Internal Laboratory Examination.

- 7.5 The marks for Mini project work will be awarded by internal evaluation by a panel of two faculty members.
- 7.6 A student who could not secure a minimum of 50% aggregate sessional marks is not eligible to appear for the Semester End Examination and shall have to repeat that Semester.
- 7.7 If any student fails to get marks in internal assessments or abstains for the internal assessment tests, he/she has to get required marks in the Semester End Examination for a pass.
- 7.8 For each theory subjects, there is a comprehensive Semester End Examination at the end of each Semester.
- 7.9 For each laboratory subject the Semester End Examination is conducted by one internal and one external examiner appointed by the Principal of the College. The duration of the examination is specified in the detailed Schemes of Instruction & Examination.
- 7.10 Viva-voce Examination in Major Project Work is conducted by one internal examiner and one external examiner appointed by the Principal.
- 7.11 If any student failed in any subject, then he/she has to appear the Semester End Examination in that subject in the corresponding semester in subsequent academic year for a pass.

8. CONDITION(S) FOR PROMOTION

A student shall be eligible for promotion to next semester, if he/she satisfies the minimum requirements of attendance and internal marks as stipulated in *Clauses 5 and 7*.

9. CONDITIONS FOR PASS

A student is declared to have passed in individual subject if he / she secures a minimum of 40% marks in theory and 50% marks in laboratory subjects / Mini Project Work / Major Project Work in Semester End Examination and a minimum of 50% marks in both Sessional & Semester End Examinations put together.

10. AWARD OF CREDITS

Credits are awarded for all subjects. Each theory subject is awarded 4 credits and each laboratory subject / Mini Project Work / MOOCs is awarded 2 credits. Major Project Work at the end of III Year II Semester is awarded 10 credits.

S. No.	Range of Marks	Grade	Grade Points
1.	≥90%	0	10.0
2.	80%-89%	A+	9.0
3.	70%-79%	А	8.0
4.	60%-69%	B+	7.0
5.	55%-59%	В	6.0
6.	50%-54%	С	5.0
7.	≤49%	F	0.0
8.	The grade 'W' represents withdrawal/absent		
	(subsequently changed into pass or C to O or F grade in the same semester)	W	0.0

10.1 AWARD OF GRADES

10.2 A student securing 'F' grade in any subject there by securing zero grade points has to reappear and secure at least 'C' grade in the subsequent examinations for that subject.

- 10.3 After each semester, Grade sheet will be issued which will contain the following details:
 - o The list of subjects for each semester and corresponding credits and grades obtained,
 - o The Semester Grade Point Average (SGPA) for each semester
 - o The Cumulative Grade Point Average (CGPA) of all subjects put together up to that semester.

SGPA is calculated based on the following formula:

 $\frac{\sum[\text{No.of credits} \times \text{Grade points}]}{\sum \text{No.of Credits}}$

CGPA will be calculated in a similar manner, considering all the subjects up to that semester.

- 10.4 A consolidated Grade Sheet shall be issued to the student, after completing all, indicating the CGPA of all the Three years put together.
- 10.5 Conversion of CGPA into equivalent Percentage of marks:

Equivalent Percentage of Marks = 9.25 x CGPA.

11. ELIGIBILITY FOR AWARD OF M.C.A DEGREE

The M.C.A. Degree shall be conferred on a student who satisfies the following requirements:

- 11.1 The student who satisfies the conditions for pass in all the subjects including labs of all the years as stipulated in *Clause 9*.
- 11.2 Maximum Time Limit for completion of M.C.A. Degree

A student, who fails to fulfill all the academic requirements for the award of the degree within six academic years from the year of admission, shall forfeit his/her seat in M.C.A Degree.

12. AWARD OF CLASS

A student who becomes eligible for the award of M.C.A Degree as stipulated in *Clause 10* shall be placed in one of the following Classes.

S.No.	Class	CGPA
1	First ClassWith Distinction	8.0 or more
2	First Class	6.5 or more but less than 8.0
3	Second Class	5.0 or more but less than 6.5

13. AWARD OF RANK

The rank shall be awarded based on the following:

- 13.1 Ranks shall be awarded for the top five percent of the candidates appearing for the Regular Semester End Examinations or the top ten candidates whichever is minimum.
- 13.2 The Rank shall be awarded only to those students who complete their degree within three academic years.
- 13.3 For the purpose of awarding rank, those students who have passed all subjects in the first attempt only shall be considered.

14. TRANSITORY REGULATIONS

- 14.1 A student, who is detained or discontinued in any semester, on readmission shall be required to do all the courses in the curriculum prescribed for such batch of candidates in which the candidates joins subsequently.
- 14.2 A student, studied under Acharya Nagarjuna University regulations, detained due to lack of academics/attendance at the end of the I Year I Semester, shall join in I Year I Semester of R-17 regulations.
- 14.3 A student, studied under Acharya Nagarjuna University regulations, detained due to lack of academics/attendance at the end of the I Year II Semester and onwards, shall continue Acharya Nagarjuna University regulations.

15. CONDUCT AND DISCIPLINE

15.1 Students shall conduct themselves within and outside the premises of the institute in a manner befitting the candidates of our institution.

- 15.2 As per the order of Hon'ble Supreme Court of India, ragging in any form is considered as a criminal offence and is banned. Any form of ragging will be severely dealt with.
- 15.3 The following acts of omission and / or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures with regard to ragging.
- a) Lack of courtesy and decorum, indecent behavior anywhere within or outside the campus.
- b) Willful damage of college / individual property.
- c) Possession, consumption or distribution of alcoholic drinks or any kind of narcotics or hallucinogenic drugs.
- d) Mutilation or unauthorized possession of library books.
- e) Noisy and unseemly behavior, disturbing studies of fellow candidates.
- f) Hacking of computer systems (such as entering into other person's areas without prior permission, manipulation and / or damage of computer hardware and software or any other cybercrime etc.).
- g) Usage of camera / cell phone in the campus.
- h) Plagiarism of any nature.
- i) Any other acts of gross indiscipline as decided by the academic council from time to time.
- 15.4 Commensurate with the gravity of offense, the punishment may be reprimand, fine, expulsion from the institute / hostel, debar from examination, disallowing the use of certain facilities of the institute, rustication for a specified period or even outright expulsion from the institute or even handing over the case to appropriate law enforcement or the judiciary, as required by the circumstances.
- 15.5 For an offence committed in (i) a hostel (ii) a department or in a class room (iii) elsewhere, the chief warden, the head of the department and the principal respectively, shall have the authority to reprimand or impose fine.

- 15.6 Cases of adoption of unfair means and / or any malpractice in an examination shall be reported to the principal for taking appropriate action.
- 15.7 All cases of serious offence, possibly requiring punishment other than reprimand, shall be reported to the academic council.
- 15.8 The institute level standing disciplinary action committee constituted by the academic council shall be the authority to investigate the details of the offence, and recommend disciplinary action based on the nature and extent of the offence committed.
- 15.9 The principal shall deal with any academic problem, which is not covered under these rules and regulations, in consultation with the programmes committee in an appropriate manner, and subsequently such actions shall be placed before the academic council for ratification. Any emergency modification of regulation, approved by the appropriate authority, shall be reported to the academic council for ratification.
- 15.10 "Grievance and Redressal Committee" (General) constituted by the Principal shall deal with all grievances pertaining to the academic / administrative / disciplinary matters.

16. MALPRACTICES

- 16.1 The Principal shall refer the cases of malpractices in internal assessment tests and Semester End Examinations to a malpractice enquiry committee constituted by him / her for the purpose. Such committee shall follow the approved scales of punishment. The principal shall take necessary action, against the erring candidates basing on the recommendations of the committee.
- 16.2 Any action on the part of a candidate during an examination trying to get undue advantage or trying to help another, or drive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the staff, who are in-charge of conducting examinations, valuing examination papers and preparing / keeping records of

documents relating to the examinations in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned in the examination shall be viewed seriously and recommended for award of appropriate punishment after thorough enquiry.

17. AMENDMENTS

The College may, from time to time, revise, amend, or change the Regulations, Schemes of Examinations, and / or Syllabus.

R.V.R. & J.C. COLLEGE OF ENGINEERING (Autonomous) MASTER OF COMPUTER APPLICATIONS

Course Structure, Scheme of Instruction and Examination w.e.f 2017-2018

Sub.		Scheme of Instruction periods per week		Scheme of Examination			
Code	Subject Title	Theory	Lab.	Duration of Sem. End Exam. (Hrs.)	Sessional Marks	Semester End Exam. Marks	Credits
CA111	Problem Solving with C	4	-	3	40	60	4
CA112	Computer Organization	4	-	3	40	60	4
CA113	Operating systems Principles	4	-	3	40	60	4
CA114	Discrete Mathematical Structures	4	-	3	40	60	4
CA115	Accountancy and Financial Management	4	-	3	40	60	4
CA151	PC Software Lab	-	6	3	40	60	2
CA152	C Programming Lab	-	6	3	40	60	2
CA153	Communication Skills Lab	-	4	3	40	60	2
	TOTAL:	20	16	24	320	480	26

I YEAR - I SEMESTER

I YEAR - II SEMESTER

Sub.	Subject Title	Scheme of Instruction periods per week		Scheme of Examination			
Code		Theory	Lab.	Duration of Sem. End Exam. (Hrs.)	Sessional Marks	Semester End Exam. Marks	Credits
CA121	Data Structures in Python	4	-	3	40	60	4
CA122	Database Management Systems	4	-	3	40	60	4
CA123	Computer Networks	4	-	3	40	60	4
CA124	Probability & Statistics	4	-	3	40	60	4
CA125	Management Information Systems	4	-	3	40	60	4
CA161	Data Structures in Python Lab	-	6	3	40	60	2
CA162	DBMS Lab	-	6	3	40	60	2
CA163	UNIX Shell Programming Lab	-	4	3	40	60	2
	TOTAL:	20	16	24	320	480	26

Sub.		Scheme of Instruction periods per week		Scheme of Examination			
Code	Subject Title	Theory	Lab.	Duration of Sem. EndExam. (Hrs.)	Sessional Marks	Semester End Exam. Marks	Credits
CA211	Object Oriented Programming through JAVA	4	-	3	40	60	4
CA212	Web Technologies	4	-	3	40	60	4
CA213	Cryptography and Network Security	4	-	3	40	60	4
CA214	Operations Research	4	-	3	40	60	4
CA215	Software Engineering	4	-	3	40	60	4
CA251	Java Programming Lab	-	6	3	40	60	2
CA252	Web Technologies Lab	-	6	3	40	60	2
CA253	Technical Seminar & Report Writing Lab	-	4	3	40	60	2
	TOTAL:	20	16	24	320	480	26

II YEAR – I SEMESTER

Note: Each student should learn any one course by registering for courses through online instruction from standard e-learning portals like SWAYAM, NPTEL, COURSERA, EdX, etc. Enrolment of MOOCs course will be initiated from the date of commencement of class work for II Year I Semester and submit the course completion certificate on or before the last instruction day of III Year I Semester.

		Scheme Instructio periods pe	of on er week	Scheme of Examination		xamination	
Sub. Code	Subject Title	Theory	Lab.	Duration of Sem. End Exam. (Hrs.)	Sessional Marks	Semester End Exam. Marks	Credits
CA221	.Net Programming	4	-	3	40	60	4
CA222	Web Services	4	-	3	40	60	4
CA223	Design and Analysis of Algorithms	4	-	3	40	60	4
CA224	Elective-I	4	-	3	40	60	4
CA225	Elective-II	4	-	3	40	60	4
CA261	Net Programming Lab	-	6	3	40	60	2
CA262	Web Services Lab	-	6	3	40	60	2
CA263	Soft Skills Lab	-	4	3	40	60	2
	TOTAL:	20	16	24	320	480	26

II YEAR - II SEMESTER

Elective-I

Elective-II

- (A) Artificial Intelligence
- (B) Computer Graphics & Multimedia*
- (C) Software Project Management(D) Logistics & Supply Chain Management
- (D) Logistics & Supply Chain Manager
- (E) Open Source Systems*

(A) Embedded Systems

- (B) Image Processing using MATLAB*
- (C) Object Oriented Modeling and Design using UML*
- (D) Advanced DBMS
- (E) Cyber Security

* Learning-By-Doing(LBD)

		Scheme of Instruction periods per week		Scheme of Examination			
Sub. Code	Subject Title	Theory	Lab.	Duration of Sem. EndExam. (Hrs.)	Sessional Marks	Semester End Exam. Marks	Credits
CA311	Data Mining and Big Data	4	-	3	40	60	4
CA312	Mobile Application Development using Android	4	-	3	40	60	4
CA313	Cloud Computing	4	-	3	40	60	4
CA314	Elective-III	4	-	3	40	60	4
CA315	Elective-IV	4	-	3	40	60	4
CA316	MOOCs *	-	-	-	100	-	2
CA351	Data Mining and Hadoop Lab	-	6	3	40	60	2
CA352	Mobile Application Development using Android Lab	-	6	3	40	60	2
CA353	Mini Project Work	-	4	-	100	-	2
	TOTAL:	20	16	21	480	420	28

III YEAR - I SEMESTER

* MOOCs Course Completion Certificate must be submitted on or before the last instruction day of III Year I Semester, otherwise his/her Semester End Examination result will not be declared. Mini Project Work: A problem chosen by each student to be carried out and a report is to be submitted at the semester end.

Elective-III

- (A) Machine Learning using R**
- (B) Soft Computing
- (C) Software Testing and Quality Assurance**
- (D) Enterprise Resource Planning
- (E) Information Retrieval Systems

Elective-IV

- (A) Internet of Things**
- (B) Bioinformatics
- (C) DevOps**
- (D) E-Commerce
- (E) Social Network Analysis

** Learning-By-Doing (LBD)

III YEAR - II SEMESTER

		Scheme of Instruction		Scheme of Examination			
Sub. Code	Subject Title	Theory	Lab.	Duration of Sem. End Exam. (Hrs.)	Sessional Marks	Semester End Exam. Marks	Credits
		-	-				
CA361	Major Project Work	Six Months Duration		-	40	60	10
1. Three	Stages in Project adjudication:						

a) Presentation of Problem Statement and Problem Approval by Guide.

b) Progress Approval by System Demonstration with results (Internal) - 40Marks

c) Final Presentation with Documentation (External Project Viva-Voce) - 60Marks

 Candidates can do their thesis work within the department or in any industry. In case of thesis done in industry/research organization, one advisor (Guide) should be from the department and one advisor (Co-Guide) should be from the industry/research organization.

TOTAL MARKS FOR THE MCA COURSE4100TOTAL CREDITS FOR THE MCA COURSE142

I Year MCA – I Semester

CA111: PROBLEM SOLVING WITH C

Lectures	: 4Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: Mathematics background.

Course Objectives

- To understand the basic problem-solving process using algorithm, Flow Charts and pseudo-code development.
- To well-versed with various control structures
- To learn the concepts of arrays and pointers.
- To learn structures and unions to create custom data types in C
- To process Files

Course Outcomes

At the end of the course the students will be able to

- Develop algorithms & flowcharts for real problems.
- Apply basics of C for problem solving.
- Identify and use suitable control structures & arrays for problem solving in C.
- Design modular programs using the concepts of functions.
- Design well-structured programs using structures, pointers and file handling features in C

UNIT – I

12 Periods

Problem Solving using Algorithms, Flowcharts and pseudo-code.

Introductory Concepts: Types of Programming Languages, Introduction to C, Desirable Program Characteristics.

Introduction to C Programming: The C Character Set, Writing First Program of C, Identifiers and Keywords, Data types, Constants, Variables and Arrays, Declarations, Expressions Statements, Symbolic Constants.

Operators and Expressions: Arithmetic Operators, Unary Operators, Relational and Logical Operators, Assignment Operators, The Conditional Operator, Library Functions.

Data Input and Output: Preliminaries, Single Character Input-The Getchar Function, Single Character Output – The Putchar Function, Enter Input Data – The Scanf Function, More About the Scanf Function, Writing Output Data – The Printf Function, More About the Printf Function, The Gets and Puts Functions.

Preparing and Running A Complete C Program: Planning a C Program, Writing a C Program, Error Diagnostics, Debugging Techniques.

UNIT – II

Control Statements: Preliminaries, Branching: The IF-ELSE Statement, Looping: The while Statement, More Looping: The do-while Statement, Still More Looping: The for Statement, Nested Control Structures, The Switch Statement, The break Statement, The continue Statement, The comma Statement, The goto Statement.

Functions: A Brief Overview, Defining a Function, Accessing a Function, Function Prototypes, Passing Arguments to a Function, Recursion.

Program Structure: Storage Classes, Automatic Variables, External (Global) Variables, Static Variables.

UNIT – III

Arrays: Introduction to arrays, one Dimension Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, two Dimension Arrays: Definition, Declaration, Initialization, Accessing & storing the elements.

Pointers: Fundamentals, Pointer Declarations, Passing Pointers to a Function, Pointers and One-dimensional Arrays, Dynamic Memory Allocation, Operations on Pointers, Pointers and Multidimensional Arrays, Arrays of Pointers, Passing Functions to Other Functions.

UNIT – IV

26

Strings: String- Declaration, Initialization, pointers and strings, standard library string functions, array of pointers to strings.

15 Periods

15 Periods

10 Periods

Structures and Unions: Defining a Structure, Processing a Structure, User-defined Data Types (Typedef), Structure and Pointers, Passing Structures to Functions, Self-referential Structures, Unions.

UNIT – V

8 Periods

DataFiles: Why Files, Opening and Closing a Data File, Reading and Writing a Data File, Processing a Data File, Unformatted Data Files, Concept of Binary Files.

Prescribed Book

Byron S Gottfried, "Programming with C", Third Edition, Schaum Out Lines, TATA McGraw Hill.

Reference Books

- 1. Herbert Schildt, "The Complete Reference C", Fifth Edition, TMH
- 2. K R Venugopal&Sudeep R. Prasad, "Programming with C",2nd edition, TMH.

Web References

- 1. http://www.w3schools.in/c-tutorial/
- 2. http://www.coronadoenterprises.com/tutorials/c/c_intro.htm
- 3. http://www.cprogramming.com/tutorial/c/lesson1.html
- 4. http://cprogramminglanguage.net/
- 5. https://www.tutorialspoint.com/cprogramming/
- 6. http://www.cprogramming.com/tutorial/c-tutorial.html
- 7. http://fresh2refresh.com/c-programming/

CA112 : COMPUTER ORGANIZATION

Lectures	: 4Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: Basic knowledge of Computer Programming

Course Objectives

- To describe basic organization of computer system.
- To restate the design of control unit and ALU.
- To be summarize of the concepts of CPU
- To acquire the knowledge of memory organization.
- To interpret the design of I/O organization

Course Outcomes

At the end of the course the students will be able to

- Describe basic structure of computer and draw logic circuits.
- Work with different types of data representations, computer arithmetic operations.
- Generate different types of micro operations.
- Summarize the control unit operations.
- Create memory organization and classify the concept of cache and its mapping techniques.
- Restate the concept of I/O organization.

UNIT – I

12 Periods

Digital Logic Circuits: Digital Computers, Logic Gates, Boolean Algebra, Map simplification, Combinational Circuits, Flip-Flops, Sequential Circuits.

Digital Components: Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit.

UNIT – II

Data Representation: Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Other Binary Codes, Error Detection Codes.

Register Transfer and Micro operations: Register Transfer Languages, Register Transfer, Bus and Memory Transfer, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit.

UNIT – III

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions.

Micro programmed Control: Control Memory, Address Sequencing, Micro-program Example, and Design of Control Unit.

UNIT – IV

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes.

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms.

UNIT – V

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt.

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

Prescribed Book

 M.Morris Mano, "Computer System Architecture", 3/e, Pearson Education (2008). Chapters: 1,2,3, 4, 5.1 to 5.7, 7, 8.1 to 8.7, 10.2 to 10.5, 11.1 to 11.5, 12.1 to 12.5

12 Periods

12 Periods

12 Periods

12 Periods

Reference Books

- 1. V. Rajaraman, T. Radha Krishnan, "Computer Organization and Architecture", PHI,(2011).
- 2. BehroozParhami, "Computer Architecture", Oxford (2014).
- 3. ISRD group, "Computer Organization", ace series, TMH (2007).
- 4. William Stallings, "Computer Organization and Architecture Designing for Performance", Pearson Education,8th edition (2010).
- 5. P.Chakraborty, "Computer Architecture and Organization", Jaico Books (2008).

Web References

http://nptel.ac.in/courses/106106092

https://www.tutorialspoint.com/computer_logical_organization/

CA113: OPERATING SYSTEMS PRINCIPLES

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: Basic knowledge in computers.

Course Objectives

- To examine basic computer system organization, operating system structures and process concept.
- To recognize the concept of multithreaded programming, process scheduling and synchronization.
- To discuss various deadlock handling methods, memory-management techniques and describe the benefits of a virtual memory system.
- To describe file system implementation and mass-storage structure.
- To identify the structure of I/O subsystem, design principles underlying Linux and windows 7 operating systems.

Course Outcomes

On successful completion of the course, students should be able to:

- Summarize the objectives, functions, operating system structures, types of operating systems and process concept.
- Analyse various threading issues, process scheduling algorithms and synchronization.
- Explain various deadlock handling mechanisms and memory management techniques including virtual memory
- Use disk management and disk scheduling algorithms for better utilization of external memory.
- Determine various interfaces to I/O devices and compare features of different operating systems.

UNIT-I

Introduction: What Operating Systems Do, Computer-System Organization, Computer-System Architecture, Operating-System Structure, Operating-System Operations, Process Management, Memory

12 Periods

Management, Storage Management, Protection and Security, Kernel Data Structures, Computing Environments, Open-Source Operating Systems.

System Structures: Operating-System Services, User and Operating-System, Interface, System Calls, Types of System Calls, System Programs, Operating-System Structure, System Boot.

Process Concept: Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication, Examples of IPC Systems, Communication in Client–Server Systems.

UNIT-II

14 Periods

Multithreaded Programming: Overview, Multi-core Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.

Process Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling.

Synchronization: Background, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples.

UNIT-III

14 Periods

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Memory-Management Strategies: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table.

Virtual-Memory Management: Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing.

UNIT-IV

File System: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, File Sharing, Protection.

12 Periods

Implementing File-Systems: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, and Free-Space Management.

Mass-Storage Structure: Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap-Space Management, RAID Structure.

UNIT-V

8 Periods

I/O Systems: Overview, I/O Hardware, Application I/O Interface, Kernel I/ O Subsystem, Transforming I/O Requests to Hardware Operations.

The Linux System: Linux History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, Input and Output, Inter-process Communication, Network Structure, Security.

Windows 7: History, Design Principles, System Components, Terminal Services and Fast User Switching, File System, Networking.

Prescribed Book

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Concepts", Ninth Edition, John Wiley and Sons Inc, 2014.

Reference Books

- 1. William Stallings, "Operating Systems Internals and Design Principles", Eighth Edition, Pearson Education (2015)
- 2. Achyut S Godbole, "Operating Systems", Third Edition, TMH (2011).
- 3. Ann McIverMcHoes, Ida M.Flynn, "Understanding Operating Systems", Sixth Edition, Cengage Learning (2011).
- 4. Deitel&Deitel, "Operating Systems", Third Edition, Pearson Education (2008).

Web Resources:

- 1. http://nptel.iitg.ernet.in/Comp_Sci_Engg/IISc%20Bangalore/ Operating%20Systems.htm
- 2. http://www.whoishostingthis.com/resources/os-development/

CA114: DISCRETE MATHEMATICAL STRUCTURES

Lectures	: 4Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: Mathematics background upto XII class.

Course Objectives

At the end of the course the students will

- Understand and construct mathematical arguments.
- Prove simple arguments.
- Develop recursive algorithms based on mathematical induction.
- Know basic properties of relations.
- Know essential concepts in graph theory and related algorithms.
- Know essential concepts in trees and finite state machine.

Course Outcomes

At the end of the course the students will be able to familiar with

- Constructing proofs.
- Elementary formal logic.
- Set algebra.
- Recurrence relations.
- Graphs and trees, relations and functions, and finite automata.

UNIT – I

12 Periods

The Foundations: Logic and Proofs: Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Normal Forms, Proof Methods and Strategy.

UNIT – II

12 Periods

Basic Structures: Sets, Functions, Sequences and Sums: Sets, Set Operations, Functions, Sequences and Summations.

Induction and Recursion: Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms.

UNIT – III

Counting: The Basics of Counting, The Pigeon Hole Principle, Permutations and Combinations, Binomial Coefficients, Generalized Permutations and Combinations.

Advanced Counting Techniques: Recurrence Relations, Solving Linear Recurrence Relations, Generating Functions, Inclusion–Exclusion.

UNIT – IV

Relations: Relations and Their Properties,n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

ModelingComputation:Languages and Grammars, Finite-State Machines with Output, Finite-State Machines with No Output.

UNIT – V

Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism's, Connectivity, Euler and Hamilton Paths, Shortest Path Problems, Planar Graphs, Graph Coloring.

Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees.

Prescribed Book

1. Kenneth Rosen, "Discrete Mathematics and Its Applications", 7/e, McGraw Hill Publishing Co.

Reference Books

 Joe L. Mott, Abraham Kandel& T. P. Baker, "Discrete Mathematics for computer scientists&mathematicians", 2ndedition, Prentice Hall of India Ltd, New Delhi(2009).

12 Periods

12 Periods

12 Periods
- 2. Swapan Kumar Sarkar, "A Text Book of Discrete Mathematics",5th edition S.Chand (2013).
- 3. D.S.Malik and M.K.Sen, "Discrete Mathematical Structures", 1stedition,Cengage (2012).

Web References

- 1. http://nptel.ac.in/courses/106106094/
- 2. http://csvls.blogspot.in/2010/04/video-lectures-of-discretemathematics.html

CA115: ACCOUNTANCY AND FINANCIAL MANAGEMENT

Lectures	: 4Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: Basic Mathematics.

Course Objectives

- To develop an insight of postulates, principles and techniques of accounting
- To develop utilization of Financial and Accounting Information for decision Making.
- To ensure broad understanding of the concept theories, techniques of Financial Management.

Course Outcomes

On successful completion of the course, students should

- Gain accounting knowledge to maintain various books of accounts.
- Be able to examine financial wealth of a company.
- Have guideline to the company about how to procure finance from various sources of finance.
- Develop idea to the investor to invest on particular project which gives benefits in future.

UNIT-I

12 Periods

Financial Accounting - I

Introduction : Emerging role of Accounting

Accounting and Booking Keeping

Functions of Accountant – Advantages and Limitations of Accounting

Basic Accounting Concepts, GAAP

Accounting standards In India

Double Entry System – Principles of Double Entry System, Advantages of Double Entry System, Accounting Equation – Classification of Accounts – Accounting Process

UNIT-II

Financial Accounting - II

Journal-ledger – Difference between Journal and Ledger, Trial balance, (problems) Subsidiary Books, Importance – Types and Advantages of Subsidiary Books, Preparation of Subsidiary Books Steps in Preparation of Final Accounts, Capital and Revenue Expenditures – Trading Account – Profit & Loss A/C – Balance Sheet preparation of final accounts with adjustments (problems)

UNIT-III

12 Periods

Cost Accounting

Cost Sheet: Components of Cost, Elements of Cost, cost Unit and Cost Method in Various Industries

Marginal costing: CVP Analysis, Break Even Point (problems)

Budget and Budgetary Control: Meaning, Types of Budgets, Current Developments in Budgeting

Standard Costing: Variance Analysis (Problems)

UNIT-IV

12 Periods

Financial Management

Definition - Nature and scope of finance function-goals of financial management- Functions of Financial Manager – Time Value of Money.

Financial decisions: Nature and Scope of Financial decision – major areas of financial decision -investment decision (Problems)-financing decision and dividend decision.

Financial Statement analysis: Importance of financial statement analysistypes of Financial analysis –Parties Interested in Financial Analysis – Limitations of Financial Analysis - ratio analysis(Problems), Changes in Working Capital(Problems), Funds Flow and Cash Flow Analysis (Theory)

UNIT-V

12 Periods

Working Capital Management

Concepts of working capital-importance of working capital-components of working capital-determinants of working capital-Financing of working capital

– Estimation of working Capital Requirements Inventory managementaccounts of receivable management - cash and Liquidity management.

Computerized Accounting– Role of Computerized Accounting – Advantages and Limitations of Computerized Accounting – Accounting Software – Accounting Packages.

Prescribed Book

1. K.RajeswaraRao&G.Prasad, "Accounting and finance", Jaibharath publishers, 2014 (Chapters 1 to 19)

Reference Books

- 1. Vanhorne& James C, John M.Wachewiez J.R., "Fundamentals of Financial management", PHI, 2002.
- 2. Horngren, SundemBlliott, "Introduction to financial accounting", Pearson education, 2002.
- 3. Ambrish Gupta, "Financial Accounting for Management", 3/e, Pearson Education (2009).
- 4. Paresh Shah, "Basic Financial Accounting for Management", Oxford Higher Education (2008).

Web References

- 1. https://www.tutorialspoint.com/accounting_basics/
- 2. https://www.tutorialspoint.com/itil/financial_management.htm
- 3. http://nptel.ac.in/courses/110101003

CA151 : PC SOFTWARE LAB

Lectures	: —	Sessional Marks	: 40
Practicals	: 6 Periods/week	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisite: Basics of Computers.

Course Objectives

- To learn functions of hardware parts and to install operating system.
- Be able to Write and Edit of text documents.
- To create a slide; add content (text, graphics, objects and pictures) to present a show.
- To design and build a database, manage data in tables, use queries, design forms and generate reports within the Access environment.
- To create basic worksheets which can include calculations, modify and format worksheets
- To gain a working knowledge of Photoshop and develop skills in editing and altering photographs for through a basic understanding of the tool bar, layers, and the adjustments panel

Course Outcomes

Upon completion of the lab, student should be able to:

- Identify the different kinds of I/P,O/P and memory devices.
- Identify how to change system settings, install and remove software.
- Create documents in Microsoft Word.
- Create workbooks in Microsoft Excel.
- Create presentations in Microsoft PowerPoint.
- Create data database in Microsoft MS-Access.
- Design layouts for web pages, Paper Adverts, Broachers, CD Covers, Package Designing, Event and Exhibition stall Designs, Pop Up, Touch Ups, Colour corrections, Paintings, Drawings, Converting B/W photo to colour

LAB CYCLE

Computer Hardware and Software

- 1. Demonstrate the peripherals of a computer, components in a CPU and its functions.
- 2. Assembling and disassembling the computer system hardware components.
- 3. Installation of operating system.

MS-Word

- 1. Create text manipulation with scientific notations.
- 2. Create a cover page of a project report.
- 3. Design an Invitation to invite Staff, students to a seminar.
- 4. Draw a flowchart to find sum of two numbers using drawing toolbars.
- 5. Create a class time table using table option.
- 6. Assignment using Mail merge.
- 7. Creation of Bio-Data: consisting Name, email-id, Contact Address, Carrier Objective, Educational qualifications, social activities, achievements.
- 8. Create a macro for inserting a picture and formatting the text.

MS-Power Point

- 1. Make a simple presentation to list computer hardware, computer software.
- 2. Make a Power point presentation on your carrier planning.
- 3. Make a Power point presentation on any Current affair.
- 4. Make a Power point presentation to represent a Software Company Profile.
- 5. Make a Power point presentation about things you learned during student life.

MS-Excel

- 1. Create an worksheet to convert
 - a) Decimal Numbers to Hexa decimal, Octal, Binary
 - b) Binary to Decimal, Octal, Hexadecimal
 - c) Hexadecimal to Decimal, Octal, Binary

- 2. Create a report containing a student result sheet.
- 3. Create a report containing the pay details of the employee.
- 4. The Cement Company shows the sales of different products for 5 years. Create column chart, Pie Chart and Bar chart for the following data

PRODUCT-1	PRODUCT-2	PRODUCT-3	PRODUCT-4
1000	800	900	1000
800	80	500	900
1200	190	800	400
400	200	300	1000
1800	400	400	1200
	PRODUCT-1 1000 800 1200 400 1800	PRODUCT-1PRODUCT-210008008008012001904002001800400	PRODUCT-1 PRODUCT-2 PRODUCT-3 1000 800 900 800 80 500 1200 190 800 400 200 300 1800 400 400

MS-Access

1. Create employee table using MS-ACCESS with following fields: employee number, employee name, employee salary.

Also create query with the following criteria.

Retrieve employee details who get salary above 20,000.

2. create Employee and Department tables with following fields:

Employee table: employee number, employee name, employee salary, department number

<u>Department table:</u> department number, department name, department location

Also maintain the relationship (one-to-many) between above two tables.

3. Create a table and form with following fields Book Number, Book Name, Author, Publisher, Price .Generate the report with following fields All Books with price between Rs.500 and Rs.1000

Adobe Photoshop

- 1. Design a visiting card containing at least one graphic and text information
- 2. Take a photographic image, gives a title for the image, put the border, Write your names and also write the name of institution and place.
- 3. Prepare a cover page for the book in your subject area.

- 4. Extract the flower only from given photographic image and organise it on a background.
- 5. Adjust the brightness and contrast of the picture so that it gives an elegant look.
- 6. Position the picture preferably on a plain background of a colour of your choice positioning includes rotation and scaling.
- 7. Remove the arrows and text from the given photographic image
- 8. Type a word and apply the effects shadow emboss
- Use appropriate tool(s) from the toolbox, cut the objects from 3 files (f1.jpg, f2.jpg & f3.jpg); organize them in a single file and apply feather effects.
- 10. Display the background with your name using mask.
- 11. Make anyone of one of the parrots black & white in a given picture.

Reference Books

- 1. John Walkenbach, HerbTyson, Michael R. Groh, FaitheWempen, Lisa A. Bucki, "Microsoft® Office 2010 Bible", 3rdedition, Wiley Publishing.
- Joan Lambert, Curtis Frye ,Microsoft Office 2016 Step by Step, 1stedition,Microsoft press
- 3. Office 2016 All-In-One For Dummies, Peter Weverka, wiley publishing.
- 4. Office 2016 In Depth Joseph ,W. Habraken, 1st edition, Indianpolis.
- 5. Exploring Microsoft Office 2016 Volume 1 (Exploring for Office 2016 Series) by Mary Anne Poatsy and Keith Mulbery, 1st edition , pearson.
- 6. Adobe Photoshop by Bittu Kumar, V and Spublishers .
- 7. Photoshop CS6 in Simple Steps ,Kogent Learning Solutions Inc., wiley(2012)

Web References

- 1. https://www.tutorialspoint.com
- 2. https://technet.microsoft.com/en-us/library/dd277300.aspx
- 3. http://www.wikihow.com/Install-a-New-Operating-System-on-Your-Computer
- 4. http://www.instructables.com/id/How-To-Assemble-A-Basic-Desktop-PC

CA152: C PROGRAMMING LAB

Lectures	: —	Sessional Marks	: 40
Practicals	: 6 Periods/week	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisite:Basic mathematical skills, Logical Reasoning and Problem solving ability.

Course Objectives

- The ability to develop various menu driven programs like generation of electricity bill, evaluation of series etc.
- The practical knowledge to write C programs using 1D, 2D and Multi Dimensional arrays.
- Able to write C programs using functions and pointers.
- Able to write C programs to develop various applications using structures, Unions and Files.

Course Outcomes

At the end of the course the student will be able to

- Learn how to program basic mathematical operation using various control statements like if, if-else, switch, for, while and do-while
- Develop Programs for Arrays and String manipulations
- Exercise Programs for functions, pointers, structures and unions.
- Implement Programs for File I/O operations and Gets an idea on maximizing the usage of various C programming features.

LAB CYCLE

1. A program for electricity bill taking different categories of users, different slabs in each category. (Using nested if else statement).

Domestic level Consumption As follows:

Consumption Units	Rate of Charges(Rs.)
0 - 200	0.50 per unit
201 - 400	100 plus 0.65 per unit
401 - 600	230 plus 0.80 per unit
601 and above	390 plus 1.00 per unit

Street level Consumption As follows:

Consumption Units	Rate of Charges(Rs.)
0 - 50	0.50 per unit
100–200	50 plus 0.6 per unit
201 - 300	100 plus 0.70 per unit
301 and above	200 us 1.00 per unit

- 2. Write a program to check the number is:
 - a. Prime or not
 - b. Perfect or not
 - c. Armstrong or not
 - d. Palindrome or not
- 3. Write a C program to evaluate the following(using loops):
 - a. $1 + (x^2/2!) + (x^4/4!) + \dots$ up to ten terms
 - b. $x + (x^{3}/3!) + (x^{5}/5!) + ...$ up to 7 digit accuracy
- 4. Write a Program to perform the following:
 - a. Factorial of the given number
 - b. Fibonacci series
 - c. Roots of a quadratic equation
 - d. Entered year is leap year or not.
- 5. Write a program to print the following:



- 6. A menu driven program to display statistical parameters (using one dimensional array)
- a. Mean b. Mode
- c. Median d. Variance

- e. Standard deviation
- 7. A menu driven program with options (using one -Dimensional array)
 - a. To insert an element into array
 - b. To delete an element
 - c. To print elements
 - d. To print elements in reverse order
 - e. To remove duplicates
- 8. Write a menu driven program to perform the following:
 - a. To sort elements in an array in ascending order using Bubblesort
 - b. To search an element from the array(Linear Search)
 - c. To search an element from the array using Binary Search
 - d. To find maximum and minimum elements in an array
 - e. Sum of all elements in an array
- 9. A menu driven program with options (using two dimensional array)
 - a. To compute A+B
 - b. To compute A x B
 - c. To find transpose of matrix A

Where A and B are matrices. Conditions related to size, to be tested

- 10. Write a menu driven program in 'C' for the following: (Without using standard function)
 - a. Calculate the length of the given string and display the length.
 - b. Copy one string into another string and display both the strings
 - c. Compare two strings and display the result
 - d. Concatenate two strings and display the resultant string.
 - e. Find no.ofvowels,consonants,characters,digits,spaces in a given string
- 11. Write 'C' functions using recursion process for the following:
 - a. Factorial of a number b. Fibonacci Series
 - c. GCD d. LCM
 - e.Binary Search

- 12. A menu driven program with options (using Character array of pointers)
 - a. To insert a student name
 - b. To delete a name
 - c. To sort names in alphabetical order using Insertion Sort
 - d. To print list of names.
- 13. Write a program to perform the following operations on rational numbers (using Structures & pointers):
 - a. Read a Rational number
 - b. Addition of two Rational numbers
 - c. Subtraction of two Rational numbers
 - d. Multiplication of two Rational numbers
 - e. Display a Rational number
- 14. Write a program on files for the following
 - a. Count characters, spaces, tabs and newlines
 - b. To count frequencies of words in a given file.
- 15. a. Write a C program to copy the contents of one file into another file using command line arguments.
 - b. Write a C program to calculate area of a hall using macros.

c. Write a C program to convert number to binary using bitwise operators

Reference Books:

- Byron Gottfried, "Programming with C" (Schaum's Outlines), Tata Mcgraw-Hill, 2010
- 2. PradipDey and ManasGhosh,"Programming in C", 2/e, OXFORD.
- 3. K.Balaguruswamy,"Programming in ANSI C ",7thedition,TMH.
- 4. K. R. Venugopal&Sudeep R. Prasad," Programming with C", TMH, 1997.
- 5. Herbert Sheildt,"C Complete Reference",TMH,2000.

Web references

- 1. http://fresh2refresh.com/c-programming
- 2. https://users.cs.cf.ac.uk/Dave.Marshall/C/CE.html
- 3. http://nptel.ac.in/courses/106105085/4

CA153 :COMMUNICATION SKILLS LAB

Lectures	: —	Sessional Marks	: 40
Practicals	: 4 Periods/week	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisite: Basic Knowledge in English.

Course Objectives

- To help Students, demonstrate consistent and appropriate language use in extended conversations and discussions.
- To enable students demonstrate an understanding of a grammar structure by talking about it in pair and group work, and class Discussions.
- To facilitate students write a variety of sentence types.
- To develop the art of effective reading and answer comprehension passages.
- To equip with appropriate and spontaneous speech dynamics.
- Develop the ability to compeer professional occasions.
- To develop production and process of language useful for social and professional life.

Course Outcomes

- Students will demonstrate consistent and appropriate language use in extended conversations and discussions
- Students will demonstrate an understanding of a grammar structure by talking about it in pair and group work, and class Discussions.
- Students will write a variety of sentence types.
- Employ different skills, inferring lexical and contextual meaning and attempt comprehension passages.
- Develop appropriate speech dynamics in professional situations.
- Develop effective communication and presentation skills.
- Focus on communication skills and social graces necessary for effective communication.

1. Remedial Grammar

Articles, Prepositions, Parts of Speech, Tenses, Active and Passive Voice, Direct and Indirect Speech, Question tags, Correction of Sentences.

2. Communication Skills

- Expressions in Various Situations;
- Greeting and Introducing;
- Making Requests;
- Agreeing and disagreeing;
- Asking for and giving permissions; Offering help;
- Describing people, places, events & things.

3. Interactive Classroom Activities

- Dynamics of Professional Presentations Individual & Group
 Presentations
- Delivering Just-a-minute (JAM) Sessions, Debate.
- Telephonic Skills

4. Reading Comprehension

- The Art of Effective Reading Benefits of Effective Reading
- Types Methods of Reading
- Different Passages for Reading Comprehension
- Reading Comprehension
- Identifying the Central Idea Inferring Lexical and Contextual Meaning.
- 5. Individual Activities
- Non Verbal communication
- Role play
- News Paper Reading- Reading aloud

Reference books

- 1. KiranmaiDutt, Rajeevan, C.L.N Prakash, "A course in English Communication", 2013.
- 2. Sanjay Kumar & PushpaLatha, "Communication Skills", OUP, 2ndImpression, 2012.

- 3. Meenakshi Raman & Sangeeta Sharma, "Technical Communication", OxfordSemester Press, 6thImpression, 2012.
- 4. Meenakshi Raman & PrakashSingh, "Business Communication", 2/e, OUP, 2012.

Software

- 1. Pronunciation power I & II
- 2. Author plus Clarity.
- 3. Call Centre Communication Clarity.

Web References

- 1. https://www.wiziq.com/tutorials/english-communication-skillsimprovingyourspeech
- 2. https://Freevideolectures.com/subject/Communication-skills

I Year MCA – II Semester

CA121 : DATA STRUCTURES IN PYTHON

Lectures	: 4Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA111(Problem Solving with C), CA114(Discrete Mathematical Structures)

Course Objectives

- To learn basics and object-oriented concepts in Python language.
- To know the structure and properties of ADT.
- To familiarize linear and nonlinear data structures and their applications
- To understand various searching and sorting techniques

Course Outcomes

At the end of the course the students will be able to

- model real world problems using object oriented approach.
- Solve the problems using Python.
- Analyse algorithms using time and space complexities
- Implement various linear data structures and applications
- Solve problems using non-linear data structures
- Demonstrate various Sorting, Searching and Hashing techniques.

UNIT-I

12 Periods

Python Primer: Python Overview - Objects in Python -Expressions, Operators, and Precedence - Control Flow – Functions - Simple Input and Output - Exception Handling - Iterators and Generators - Additional Python Conveniences - Scopes and Namespaces- Modules and the Import Statement

Object-Oriented Programming: Goals, Principles, and Patterns -Software Development - Class Definitions - Inheritance - Namespaces and Object-Orientation - Shallow and Deep Copying.

UNIT-II

Array-Based Sequences: Python's Sequence Types - Low-Level Arrays - Dynamic Arrays and Amortization - Efficiency of Python's Sequence Types - Using Array-Based Sequences -Multidimensional Data Sets

Stacks, Queues, and Deques: Stacks - Queues - Double-Ended Queues

UNIT-III

Linked Lists: Singly Linked Lists - Circularly Linked Lists - Doubly Linked Lists - The Positional List ADT - Sorting a Positional List - Case Study: Maintaining Access Frequencies - Link-Based vs Array-Based Sequences

Sorting and Selection: Why Study Sorting Algorithms? - Merge-Sort - Quick-Sort - Linear-Time Sorting: Bucket-Sort and Radix-Sort-Comparing Sorting Algorithms–Selection Sort - Insertion Sort.

UNIT-IV

Trees: General Trees - Binary Trees - Implementing Trees - Tree Traversal Algorithms - Case Study: An Expression Tree.

Priority Queues: The Priority Queue Abstract Data Type - Implementing a Priority Queue – Heaps - Sorting with a Priority Queue.

Hash Tables

UNIT-V

52

Search Trees: Binary Search Trees - Balanced Search Trees - Python Framework for Balancing Search Trees - AVL Trees.

Graph Algorithms: Graphs - Data Structures for Graphs - Graph Traversals - Transitive Closure - Directed Acyclic Graphs - Shortest Paths - Minimum Spanning Trees.

Prescribed Book:

1. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Python", John Wiley & Sons, 2013

12 Periods

12 Periods

12 Periods

12 Periods

Reference Books:

- 1. Brad Miller, David Ranum, "Problem Solving with Algorithms and Data Structures", Release 3.0, 2013.
- 2. Rance D. Necaise, "Data Structures and Algorithms using Python", JOHN WILEY & SONS, 2011.

Web References:

- 1. https://docs.python.org/3/tutorial/datastructures.html#using-lists-asqueues
- 2. http://www.w3resource.com/python-exercises/
- 3. https://code.tutsplus.com/articles/advanced-python-data-structuresnet-32748

CA122: DATABASE MANAGEMENT SYSTEMS

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisites: CA111(Problem Solving with C), CA113(Operating Systems Principles).

Course Objectives

- To understand the fundamental concepts of database system.
- To learn conceptual data modeling and relational data model.
- To know about advanced formal relational Languages and SQL.
- To understand database design and Implementation.
- To learn various modules in Database management system.

Course Outcomes

At the end of the course the students will be able to:

- Familiarize with fundamental concepts of database and various database architectures.
- Design relations for Relational databases using conceptual data modelling.
- Implement formal relational operations in relational algebra and SQL.
- Identify the normalization process for relational databases.
- Use mechanisms for the development of multi user database applications.

UNIT-I

12 Periods

Databases and Database Users: Introduction, Characteristics of the Database Approach, Actors on the Scene, Workers behind the scene, Advantages of the using the DBMS Approach.

Database System Concepts and Architecture: Data Models, Schemas and Instances, Three Schema architecture and Data Independence, Database Languages and Interfaces, Centralized and Client/Server Architecture for DBMS, Classification of Database Management Systems. **Data Modeling Using the ER Model :** Conceptual Data models, Entity Types, Entity Sets, Attributes and Keys, Relationship types, Relationship sets, roles and structural Constraints, Weak Entity types, Relationship Types of Degree Higher than Two, Refining the ER Design for the COMPANY Database.

The Enhanced Entity-Relationship Model: Sub classes, Super classes and Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization and Generalization Hierarchies, Modeling of Union Types using Categories, An Example University ERR Schema, Design Choices and Formal Definitions.

UNIT-II

12 Periods

The Relational Data Model and Relational Database Constraints: Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions and Dealing with Constraint Violations.

The Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from set Theory, Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, Examples, The Tuple Calculus and Domain Calculus. **SQL:** Schema Definition, Constraints, Queries and Views: SQL Data Definitions and Data Types, Specifying Constraints in SQL, Schema Change Statements on SQL, Basic Queries in SQL, More Complex SQL Queries, INSERT, DELETE and UPDATE statements in SQL, Triggers and Views.

UNIT-III

12 Periods

Functional Dependencies and Normalization for Relational Databases

Informal Design Guidelines for Relation Schemas, Functional dependencies, Normal Forms Based in Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.

Relational Database Design Algorithms and Further Dependencies

Properties of Relational Decompositions, Algorithms fro Relational Database Schema Design, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Inclusion Dependencies, Other Dependencies and Normal Forms.

UNIT-IV

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing schedules Based on Serializability.

Concurrency Control Techniques : Two Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency control techniques, Validation concurrency control Techniques, Granularity of Data Items and multiple Granularity Locking.

Distributed Databases and Client Server Architectures: Distributed Database Concepts, Data Fragmentation, Replication, and allocation Techniques for Distributed Database Design, Types of Distributed Database Systems, An Overview of 3 Tier Client Server Architecture.

UNIT-V

Disk Storage, Basic File Structures and Hashing: Introduction, Secondary Storage Devices, Buffering of Blocks, Placing file Records on Disk, Operations on Files, Files of Unordered Records, Files of Ordered Records, Hashing Techniques, Other Primary File Organizations, Parallelizing Disk Access using RAID Technology. **Indexing Structures for Files:** Types of Single-Level Ordered Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B+ Trees, Indexes on Multiple Keys, Other Types of Indexes.

Prescribed Book

1. RamezElmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Sixth Edition, Addison-Wesley.

Reference Books

- 1. Peter Rob, Carlos Coronel, "Database Systems" Design, Implementation and Management, Eigth Edition, Thomson (2008).
- 2. C.J. Date, A.Kannan, S. Swamynathan, "An Introduction to Database

12 Periods

12 Periods

Systems", VII Edition Pearson Education (2006).

- 3. Raman A Mata Toledo, Panline K. Cushman, "Database Management Systems", Schaum's Outlines, TMH (2007).
- 4. Steven Feuerstein, "Oracle PL/SQL Programming", 10th Anniversary Edition, OREILLY (2008).

Web References

- 1. http://www.nptelvideos.in/2012/11/database-management-system.html
- 2. http://www.oracle.com/technetwork/tutorials/index.html
- 3. https://www.tutorialspoint.com/dbms/
- 4. http://www.w3schools.in/dbms/
- 5. https://www.tutorialcup.com/dbms
- 6. https://www.javatpoint.com/oracle-tutorial

CA123: COMPUTER NETWORKS

Lectures	: 4Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisites: CA112 (Computer Organization), CA113 (Operating Systems Principles).

Course Objectives

- To interpret the key concepts of computer networks.
- To illustrate layered architecture of ISO OSI and TCP/IP reference models.
- To demonstrate the principles, key protocols, functionalities & design issues of various layers in OSI reference model.
- To determine the requirements to design a computer network.

Course Outcomes

At the end of the course the students will be able to

- Describe the functions of each layer and design issues in OSI and TCP/IP model.
- Explain the types of guided transmission media and describe the functions of data link layer and its protocols.
- Analyze about different IEEE 802 standards and Data Link Layer Switching.
- Distinguish among different routing protocols.
- Describe the services of transport layer and internals of protocols such as TCP and UDP.
- Explain the functions of Application layer Protocols and concept of Multimedia.

UNIT –I

12 Periods

Introduction:

Uses of Computer Networks: Business Application, Home Applications, Mobile Users, Social Issues.

Network Hardware: Personal area networks, Local Area Networks, Metropolitan Area Networks, Wide Area Networks, and Internetworks.

NetworkSoftware: Protocol Hierarchies, Design Issues for the Layers, Connection Oriented versus Connectionless Services, Service Primitives, The Relationship of services to Protocols.

Reference Models: The OSI Reference Model, The TCP/IP Reference Model, A Comparison of OSI and TCP/IP reference Model, A Critique of the OSI Model and Protocols, A Critique of the TCP/IP reference model.

UNIT-II

12 Periods

Physical Layer:

Guided Transmission Media: Magnetic Media, Twisted Pair, Coaxial Cable, Power Lines, and Fiber Optics.

Data Link Layer:

Data Link Layer Design Issues: Services Provided to the Network Layer, Framing, Error Control, and Flow Control.

Error Detection and Correction: Error correcting Codes, Error Detecting Codes.

Elementary Data Link Protocols: A Simplex Protocol, A simplex Stopand – wait Protocol for an error-free channel, a simplex stop-and wait protocol for a noisy channel.

Sliding Window Protocols: A one-bit sliding Window Protocol, A Protocol using Go-Back-N, A Protocol using Selective Repeat.

UNIT – III

12 Periods

The Medium Access Control Sublayer

Ethernet: Classic Ethernet physical layer, Classic Ethernet MAC Sublayer protocol, Switched Ethernet, Fast Ethernet, Gigabit Ethernet.

Wireless LANs: The 802.11 Architecture and Protocol Stack, The 802.11 Physical Layer, The 802.11 MAC sub layer Protocol, The 802.11 Frame Structure.

Bluetooth: Bluetooth Architecture, Bluetooth Applications, The Bluetooth Protocol Stack, The Bluetooth Radio Layer, The Bluetooth Link Layer, The Bluetooth Frame Structure.

Data Link Layer Switching: Uses of bridges, Learning Bridges, Spanning Tree bridges, Repeaters, hubs, bridges, switches, routers and gateways.

UNIT – IV

12 Periods

The Network Layer

Network Layer Design Issues: Store and Forward Packet Switching, Services provided to the Transport Layer, Implementation of Connectionless Services, Implementation of Connection Oriented Services, Comparison of Virtual Circuit and Datagram subnets.

Routing Algorithms: The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing.

The Transport Layer:

The Transport Service: Services provided to the Upper Layers, Transport Services Primitives.

Elements of Transport Protocols: Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery.

The Internet Transport Protocols: UDP Introduction to UDP, Remote Procedure Call, and The Real time Transport Protocol.

The Internet Transport Protocols: TCP Introduction to TCP, The TCP Service Model, The TCP Protocol ,The TCP segment header ,TCP connection establishment ,TCP connection release – TCP connection management Modeling.

UNIT – V

12 Periods

The Application Layer:

DNS-The Domain Name System: The DNS Name Space, Domain Resource Records, Name Servers.

Electronic Mail: Architecture and Services, the User Agent, Message Formats, Message Transfer, Final Delivery.

The World Wide Web: Architectural Overview, Static Web Pages, HTTP – The Hyper Text Transfer Protocol.

Prescribed Book

1. Andrew S. Tanenbaum, David S. Wetherall "Computer Networks", Fifth Edition, Pearson.

Reference Books

- 1. James F.Kurose, Keith W.Ross, "Computer Networking", Third Edition, Pearson.
- 2. Behrouz A Forouzan, "Data Communications and Networking", Fourth Edition, TMH.
- 3. Michael A. Gallo, William M. Hancock, "Computer Communications and Networking Technologies", Cengage Learning (2008).

Web References:

- 1. https://wps.pearsoned.com/ecs_kurose_compnetw_6/
- 2. https://www.pearsonhighered.com/cs-resources/products/series.html

CA124: PROBABILITY & STATISTICS

Lectures	: 4Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: Basic Mathematics.

Course Objectives

- To provide knowledge on basic probability distributions and densities and their applications.
- To provide skills in applying the basic principles of statistical inference to practical problems.
- To provide the knowledge of fitting the appropriate curves, correlation and regression analysis to the data and estimate the future values.
- To apply the ANOVA models for practical problems and draw the conclusions
- To provide the basic knowledge of Reliability and the application of reliability in life testing and growth models

Course Outcomes

The student who successfully completes this course will be able to:

- Understand the basic principles in distribution theory, mathematical expectation, and various application of probability distributions.
- Understand the basic principles of statistical inference (i.e. estimation and hypothesis testing).
- Develop the linear and non linear regression models and find the relationship between the variables under study and use them for estimating the future values
- Apply the ANOVA model for practical problems in agronomy and software.
- Apply the basic ideas of reliability theory for growth models

UNIT-I (DISTRIBUTION THEORY)

Probability Distributions: Random Variables, Binomial distribution, Hypergeometric distribution, Mean and Variance of a Probability distribution, Chebyshev's theorem, Poisson Approximation to the Binomial distribution, Poisson processes.

Probability Densities: Continuous Random Variables, Normal Distribution, Normal Approximation to the Binomial Distribution, other Probability Densities: Uniform Distribution, Log-Normal Distribution, Gamma Distribution, Beta Distribution, Weibull distribution.

(Sections 4.1 to 4.7 and 5.1 to 5.9 of the Text Book)

UNIT – II (TESTING OF HYPOTHESIS)

12 Periods

Sampling Distribution: Populations and samples, The sampling distribution of the mean (ó known), The sampling distribution of the mean (ó unknown), The sampling distribution of the variance. Inferences Concerning Means: Point Estimation, Interval Estimation, Tests of Hypotheses, Null Hypotheses and Tests of hypotheses, Hypotheses Concerning One Mean, Relation between Tests and Confidence Intervals, Operating Characteristic Curves, Inferences Concerning Two Means.

(Sections 6.1 to 6.4 and 7.1 to 7.8 of the text book)

UNIT – III (TESTING OF HYPOTHESIS contd...) 12 Periods

Inferences Concerning Variances: Estimation of Variances, Hypotheses Concerning One Variance, Hypotheses Concerning Two Variances.

Inferences Concerning Proportions: Estimation of Proportions, Hypotheses Concerning One Proportion, Hypotheses Concerning Several Proportions.

(Sections 8.1 to 8.3 and 9.1 to 9.3 of the text book)

UNIT – IV (CURVE FITTING, CORRELATION & REGRESSION) 12 Periods

Curve Fitting: The method of Least squares, Inferences based on Least squares estimators. Correlation and Regression: Curvilinear regression, Multiple regression, Checking the adequacy of the model, Correlation, Multiple linear regression.

(Sections 11.1 to 11.7 of the text book)

12 Periods

UNIT – V (ANOVA and RELIABILITY)

Analysis of Variance: General Principles, Completely Randomized Designs, Randomized-Block Designs, Multiple Comparisons.

Applications to Reliability and Life Testing: Reliability, Failure-Time Distributions, Exponential Model in Reliability, Exponential Model in Life Testing.

(Sections 12.1 to 12.4 and 15.1 to 15.4 of the text book)

Prescribed Book

1. Miller & Freund's, "Probability and Statistics for Engineers", Sixth Edition, PHI.

Reference Book

1. J Susan Milton and Jesse C. Arnold, "Introduction to Probability and Statistics", Fourth edition, TMH,(2007).

Web References

- 1. www.britannica.com
- 2. www.math.uah.edu/stat

CA125: MANAGEMENT INFORMATION SYSTEMS

Lectures	: 4Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: No Prior Knowledge.

Course Objectives

At the end of the course, the student will understand:

- The concepts of strategic MIS, views of MIS, role and impact on management and organizations of MIS.
- How to handle system complexity and need for system analysis.

Course Outcomes

At the end of the course, the student will be able to:

- Identify the basic components of information systems and the capabilities of an information system.
- Record the current issues of information technology and relate those issues to the firm
- Understand structured system analysis and design.
- Interpret how to use information technology to solve business problems
- · Illustrate the impact of information systems in society

Unit –I

14 Periods

Management Information System(MIS): Concept, MIS: Definition, Role of the Management Information System, Impact of the Management Information System, MIS and the User, Management of as a control system, MIS: A Support to the Management, Management Effectiveness and MIS, Organization as a system, MIS: Organization Effectiveness, MIS for a Digital Firm.

Information, Knowledge, Business Intelligence: Information concepts, Information : A quality product, Classification of information, Methods of data and information collection, value of the information, General model of a Human as an Information processor, summary of information concepts and their implications, knowledge and knowledge management systems, Business Intelligence, MIS, and the Information and Knowledge.

Unit -II

Decision-Making: Decision-making concept, Decision-making process, Decision Analysis by Analytical modeling, behavioral concepts in decision making, organizational decision-making, MIS and decision-making.

Systems Engineering: Analysis and Design: System Concepts, System Control, Types of System, Handling System Complexity, Classes of Systems, General Model of MIS, The Need for System Analysis, System Analysis of the Existing System, System Analysis of a New Requirement, System Development Model, Structured System Analysis and Design.

Unit –III

Decision Support Systems and Knowledge Management: Decision Support systems(DSS): Concepts and philosophy, DSS models: Behavioral, Management Science and operation research models, Group decision support system(GDSS), Artificial Intelligence(AI), Knowledge base expert system(KBES), DSS application in enterprise, MIS and the benefits of DSS.

Unit –IV

Business Intelligence for MIS: Business Intelligence and MIS, What is Business Intelligence(BI)?, Tools and Techniques of BI, Why is BI developed?, How is BI used? Process of generation of BI, MAIA's 1KEY Agile BI suite, Case Illustration of BI, MIS and BI.

Unit –V

Applications in Service Sector: Introduction to service sector, creating a distinctive service, service concept, service process cycle and analysis, customer service design, service management system, MIS applications in service industry.

12 Periods

9 Periods

12 Periods

13 Periods

Prescribed Books

1. Waman S. Jawadekar, "Management Information Systems", 5th Edition, McGrawHill.

Reference Books

- 1. S.Sadagopan,"Management Information Systems", 2ndEdition, PHI.
- 2. Robert Schultheis and Mary Summer, "Management Information Systems The Managers View", Tata McGraw Hill, 2008.
- 3. Arora, "Management Information System", Excel Books, New Delhi.
- 4. Goyil D.P., "Management Information Systems", MACMILLAN

Web References

- 1. http://mbaexamnotes.com/management-information-systemnotes.html
- 2. https://www.tutorialspoint.com/management_information_system/ management_information_system.htm
- 3. http://engineeringvideolectures.com/course/82
- 4. http://nptel.ac.in/courses/122105022/

CA161 : DATA STRUCTURES IN PYTHON LAB

Lectures	: —	Sessional Marks	: 40
Practicals	: 6 Periods/week	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisite: CA111(Problem Solving with C),CA114(Discrete Mathematics Structures).

Course Objectives

At the end of the course the students will understand

- To develop skills to design and analyze simple linear and non linear data structures
- To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To Gain knowledge in practical applications of data structures

Course Outcomes

At the end of the course the students will be able to

- Be able to design and analyze the time and space efficiency of the data structure
- Be capable to identity the appropriate data structure for given problem
- Have practical knowledge on the application of data structures

CYCLE - I

- 1. Create a class RATIONAL and perform various operations on two Rational numbers using operator overloading.
- 2. Create a Multidimensional Vector Class and Perform possible operations on Vectors.
- 3. Simulate Credit card transactions (use Inheritance).

CYCLE - II

- 4. Implement the following operations on single linked list.
- 5. Implement the following operations on double linked list.
- 6. The Josephus problem is the following game: N people, numbered 1

to N, are sitting in a circle. Starting at person 1, a hot potato is passed. After M passes, the person holding the hot potato is eliminated, the circle closes ranks, and the game continues with the person who was sitting after the eliminated person picking up the hot potato. The last remaining person wins. Thus, if M = 0 and N = 5, players are eliminated in order, and player 5 wins. If M = 1 and N = 5, the order of elimination is 2, 4, 1, 5. Write a program to solve the Josephus problem for general values of M and N.

- 7. Merge two given linked lists.
- 8. Perform Addition and multiplications on polynomials.

CYCLE - III

- 9. Implement Stack Operations Using Arrays.
- 10. Implement Stack Operations Using Linked List.
- 11. Implement Queue Operations Using Arrays.
- 12. Implement Operations on Queue using circularly linked list.
- 13. Implement Operations on double ended Queue.
- 14. Converting infix expression to postfix expression by using stack.
- 15. Write program to evaluate post fix expression.

CYCLE-IV

- 16. Implement binary search technique recursively.
- 17. Sort given elements using
 - a. Selection Sort. b. Insertion Sort.
 - c. Merge Sort. d. Quick Sort.
 - e. Heap Sort
- 18. Construct BST and implement traversing techniques recursively.

Web References:

- 1. https://docs.python.org/3/tutorial/datastructures.html#using-lists-asqueues
- 2. http://www.w3resource.com/python-exercises/
- https://code.tutsplus.com/articles/advanced-python-data-structuresnet-32748

CA162: DATABASE MANAGEMENT SYSTEMS LAB

Lectures	: —	Sessional Marks	: 40
Practicals	: 6 Periods/week	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisite:CA111(Problem Solving with C).

Course Objectives

At the end of the course the students will understand

- The concepts of relational model and its applications
- Procedural and nonprocedural query language.
- Designing databases.
- DDL,DML,DCL commands
- PL/SQL Programming.

Course Outcomes

At the end of the course the students will be able to

- Understand how to create and place constraints on databases.
- Write simple queries to retrieve data.
- Summarize data by means of group by operation and arranging the records using order by operation
- Use database privilege operations
- Write PL/SQL programs for small applications

CYCLE-I

Aim: Marketing Company wishes to computerize their operations by using following tables.

Table Name: Client_Master

Description:This table stores the information about the clients.

Column Name	Data Type	Size	Attribute
Client_no	Varchar2	6	Primary Key and first letter should starts with 'C'
Name	Varchar2	10	Not null
Address1	Varchar2	10	
Address2	Varchar2	10	
City	Varchar2	10	
State	Varchar2	10	
Pincode	Number	6	Not null
Bal_due	Number	10,2	

TableName:Product_master

Description: This table stores the information about products.

Column Name	Data Type	Size	Attribute
Product_no should starts	Varchar2	6	Primary Key and first letter
with 'P'			
Description	Varchar2	10	Not null
Unit_measure	Varchar2	10	
Qty_on_hand	Number	8	
Record_lvl	Number	8	
Sell_price	Number	8,2	Not null, can't be 0
Cost_price	Number	8,2	Not null, can't be 0

TableName:salesman_master

Description: This table stores the salesmen working in the company
Column Name	Data Type	Size	Attribute
Salesman_id should starts with 'S'	Varchar2	6	Primary Key and first letter
Name	Varchar2	10	Not null
Address1	Varchar2	10	
Address2	Varchar2	10	
City	Varchar2	10	
State	Varchar2	10	
Pincode	Number	6	Not null
Sal_amt	Number	8,2	Should not null and zero
Target_amt	Number	6,2	Should not null and zero
Remarks	Varchar2	10	

TableName:sales_order

Description: This table stores the information about orders

Column Name	Data Type	Size	Attribute
S_order_no 'O'	Varchar2	6	Primary Key and fisrt char is
S_order_date	Date		
Client_no	Varchar2	6	Foreign key
Delve_address	Varchar2	20	
Salesman_no	Varchar2	6	Foreign key
Delve_type default 'F'	Varchar2	1	Delivery: part(P)/Full(F) and
Billed_yn	Char	1	
Delve_date s_order_date	Date		Can't be less than the
Order_status	Varchar2	10	Values in 'IN PROCESS', FULFILLED', 'BACK ORDER, 'CANCELLED'
Remarks	Varchar2	10	

TableName:sales_order_details

Column Name	Data Type	Size	Attribute
S_order_no	Varchar2	6	Primary key, foreign key references sales_order table
Product_no	Varchar2	6	Primary key, foreign key references product_master table
Qty_ordered	Number	8	
Qty_disp	Number	8	
Total_amt	Number	10,2	

Description: This table stores the information about products ordered

TableName:challan_master

Description:This table stores the information about challansmade for orders.

Column Name	Data Type	Size	Attribute
Challan_no must start with 'CH'	Varchar2	6	Primary key, first two letters
S_order_no sales_order	Varchar2	6	Foreign key references
Challan_date	Date		
Billed_yn	Char	1	Values in 'Y', 'N' default 'N'

TableName:Challan_Details

Description: This table stores the information about challan details.

Column Name	Data Type	Size	Attribute
Challan_no	Varchar2	6	Primary key, foreign key references challan_master table
Product_no	Varchar2	6	Primary key, foreign key references product_master table
Qty_disp	Number	4,2	Not null

Solve the following queries by using above tables

- 1. Retrieve the list of names and cities of all the clients.
- 2. List the various products available from product_master.
- 3. Find out the clients who stay in a city whose second letter is 'a'.
- 4. Find the list of all clients who stay in the city 'CHENNAI' or 'DELHI'.
- 5. List all the clients located at 'CHENNAI'.
- 6. Print the information from sales order as the order the places in the month of January.
- 7. Find the products with description as 'Floppy Drive' and 'Pen drive'.
- 8. Find the products whose selling price is greater than 2000 and less than or equal to 5000.
- 9. Find the products whose selling price is more than 1500 and also find the new selling price as original selling price *15.
- 10. Find the products in the sorted order of their description.
- 11. Divide the cost of product '540 HDD' by difference between its price and 100.
- 12. List the product number, description, sell price of products whose description begin with letter 'M'.
- 13. List all the orders that were cancelled in the month of March.
- 14. Count the total number of orders.
- 15. Calculate the average price of all the products.
- 16. Determine the maximum and minimum product prices.
- 17. Count the number of products having price grater than or equal to 1500.
- 18. Find all the products whose quantity on hand is less than reorder level.
- 19. Find out the challan details whose quantity dispatch is high.
- 20. Find out the order status of the sales order, whose order delivery is maximum in the month of March.
- 21. Find out the total sales made by the each salesman.
- 22. Find the total revenue gained by the each product sales in the period of Q1 and Q2 of year 2006.

- 23. Print the description and total qty sold for each product..
- 24. Find the value of each product sold.
- 25. Calculate the average qty sold for each client that has a maximum order value of 1,50,000.

CYCLE - II

Aim: A Manufacturing Company deals with various parts and various suppliers supply these parts. It consists of three tables to record its entire information. Those are as follows

S (SNO, SNAME, CITY, STATUS) P (PNO, PNAME, COLOR, WEIGTH, CITY, COST) J (JNO, JNAME, CITY) SPJ (SNO, PNO, JNO, QTY)

Get Suppliers Names for Suppliers who supply at least one red part.

- 1. Get Suppliers Names for Suppliers who do not supply part 'P2'
- 2. Using Group by with Having Clause, Get the part numbers for all the parts supplied by more than one supplier.
- 3. Get supplier numbers for suppliers with status value less the current max status value.
- 4. Get the total quantity of the part 'P2' supplied.
- 5. Get the part color, supplied by the supplier 'S1'
- 6. Get the names of the parts supplied by the supplier 'Smith' and "Black"
- 7. Get the Project numbers, whose parts are not in Red Color, from London.
- 8. Get the suppliers located from the same city.
- 9. Get the suppliers, who does not supply any part.
- 10. Find the pnames of parts supplied by London Supplier and by no one else.
- 11. Find the sno's of suppliers who charge more for some part than the average cost of that part.
- 12. Find the sid's of suppliers who supply only red parts.
- 13. Find the sid's of suppliers who supply a red and a green part.
- 14. Find the sid's of suppliers who supply a red or green part.

CYCLE - III (Employee Database)

Aim:An enterprise wishes to maintain a database to automate its operations. Enterprise divided into to certain departments and each department consists of employees. The following two tables describes the automation schemas

DEPT (DEPTNO, DNAME, LOC)

EMP (EMPNO, ENAME, JOB, MGR, HIREDATE, SAL, COMM, DEPTNO)

- 1. Create a view, which contain employee names and their manager names working in sales department.
- 2. Determine the names of employee, who earn more than there managers.
- 3. Determine the names of employees, who take highest salary in their departments.
- 4. Determine the employees, who located at the same place.
- 5. Determine the employees, whose total salary is like the minimum salary of any department.
- 6. Update the employee salary by 25%, whose experience is greater than 10 years.
- 7. Delete the employees, who completed 32 years of service.
- 8. Determine the minimum salary of an employee and his details, who join on the same date.
- 9. Determine the count of employees, who are taking commission and not taking commission.
- 10. Determine the department does not contain any employees.
- 11. Find out the details of top 5 earners of company. (Note: Employee Salaries should not be duplicate like 5k,4k,4k,3k,2k)
- 12. Display managers name whose salary is more than an average salary of his employees.
- 13. Display the names of the managers who is having maximum number of employees working under him?
- 14. In which year did most people join the company? Display the year and number of employees.
- 15. Display ename, dname even if there no employees working in a particular department(use outer join).

PL/SQL PROGRAMS

- 1. Write a pl/sql program to check the given number is strong or not.
- 2. Write a pl/sql program to check the given string is palindrome or not.
- 3. Write a pl/sql program to swap two numbers without using third variable.
- 4. Write a pl/sql program to generate multiplication tables for 2, 4, 6
- 5. Write a pl/sql program to display sum of even numbers and sum of odd numbers in the given range.
- 6. Write a pl/sql program to check the given number is palindrome or not.
- 7. The hrd manager has decided to raise the employee salary by 15%. Write a pl/sql block to accept the employee number and update the salary of that employee. Display appropriate message based on the existence of the record in emp table.
- 8. Write a pl/sql program to display top 10 rows in emp table based on their job and salary.
- 9. Write a pl/sql program to raise the employee salary by 10%, for department number 30 people and also maintain the raised details in the raise table.
- 10. Write a procedure to update the salary of employee, who are not getting commission by 10%.
- 11. Write a pl/sql procedure to prepare an electricity bill by using following table used: elect

NAME	NULL?	TYPE
MNO	NOT NULL	NUMBER(3)
CNAME		VARCHAR2(20)
CUR_READ		NUMBER(5)
PREV_READ		NUMBER(5)
NO_UNITS		NUMBER(5)
AMOUNT		NUMBER(8,2)
SER_TAX		NUMBER(8,2)
NET_AMT		NUMBER(9,2)

12. Write a pl/sql procedure to prepare an telephone bill by using following table. And print the mothly bills for each customer table used : phone.

NAME	NULL?	TYPE
TEL_NO	NOT NULL	NUMBER(6)
CITY		VARCHAR2(10)
PR_READ		NUMBER(5)
CUR_READ		NUMBER(5)
NET_UNITS	NUMBER(5)	
TOT_AMT		NUMBER(8,2)

- 12. Write a pl/sql program to raise the employee salary by 10%, who are completed there 25 years of service and store the details at ppropriate tables (define the retair_emp table).
- 13. Write a pl/sql procedure to evaluate the grade of a student with following conditions:

for pass: all marks > 40 for i class: total%>59 for ii class: total%between>40 and <60 for iii class: total%=40 Alsomaintain the details in abstract table. Tables USED

1. TABLE STD

NAME	NULL?	TYPE
NO		NOTNULLNUMBER
NAME		VARCHAR2(10)
INTNO		NUMBER
CLASS	NOT NULL	VARCHAR2(10)
M1		NUMBER
M2		NUMBER
M3		NUMBER
M4		NUMBER
M5		NUMBER

2. TABLE ABSTRACT

NAME	NULL?	TYPE
STDNO		NUMBER
STDNAME		VARCHAR2(10)
CLASS		VARCHAR2(10)
MONTH		VARCHAR2(10)
INTNO (INTERNAL NUMBER))	NUMBER
TOT		NUMBER
GRADE		VARCHAR2(10)
PERCENT		NUMBER
DAT_ENTER		DATE

- 15. Create anvarray, which holds the employee phone numbers (at least three numbers).
- 16. Create an object to describe the details of address type data.
- 17. Write a pl/sql procedure to read the data into the table as per the following description.

AttributeName	Data Type	DETAILS
EMPLOYEE NUMBER	NUMBER	
EMPLOYEE NAME	CHARACTER	
ADDRESS	OBJECT	STREET NUMBER
		STREET NAME
		TOWN
		DIST AND STATE
QUALIFICATION	CHARACTER	
PHONE NUMBER	OBJECTVARRAY	HOLDS THREE
		PHONE NUMBER

5. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.

Reference Books

1. Kevin Loney, Oracle Database 10g The Complete Reference. Tata McGraw-Hill Publishing Company Limited.

- 2. Scott Urman, Oracle 9i PL/SQL Programming. Tata McGraw-Hill Publishing Company Limited.
- 3. Parteek Bhatia, SanjivDatta and Ranjit Singh, Simplified Approach to Oracle. Kalyani Publishers.

Web References

- 1. https://www.tutorialspoint.com/dbms/
- 2. http://www.studytonight.com/dbms/introduction-to-sql
- 3. http://nptel.ac.in/courses/105102015/37
- 4. https://www.javatpoint.com/sql-tutorial

CA163 : UNIX SHELL PROGRAMMING LAB

Lectures	: —	Sessional Marks	: 40
Practicals	: 4Periods/week	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisite:CA111(Problem Solving with C).

Course Objectives

- To familiarize students with the Linux environment.
- To learn the fundamentals of shell scripting/programming.
- To provide a comprehensive introduction to Shell Programming.

Course Outcomes

- Upon completion of this course, the student will be able to:
- Run various UNIX commands on a standard UNIX/LINUX Operating system (They will be using Ubuntu flavor of the Linux operating system).
- Do shell programming on UNIX OS.
- Work confidently in Unix/Linux environment.
- Understand and handle UNIX system calls.
- Understand the inner workings of UNIX like operating systems.
- Obtain a foundation for an advanced course in operating systems.

LAB CYCLE - 1

- 1. List all the file contents in directory 'mydir' which end with 'x' and store them in a file 'file1'.
- 2. List all the files in a directory whose name start with a vowel and store them in a file 'file2'.
- 3. List all the files in a directory whose names do not begin with vowel.
- 4. List all 5 character file names in the current directory whose first character is in the range a to m, the second character is in the range c to z, the third character is in the range 4 to 9, where 4th and 5th and valid characters.
- 5. List all the files in the present directory including the files present in any sub- directories that may be present in the current directory.

- 6. Create 5 empty files empty1, empty2, empty3, empty4 and empty5.
- 7. Create a file called 'text' and store your name, age, sex and address in it and display its contents.
- 8. Make a copy of the file 'text' into another file 'newtext'.
- 9. Create a file called 'matter' and combine the contents of the file 'text' and matter into another file 'txtmat'.
- 10. Create one more link called "tmpfile" for the file "matter"
- 11. Copy the contents of 'mydir' directory to the 'newdir' directory.
- 12. Delete interactively the files created earlier .
- 13. Set up sticky bit for the directory 'newdir'
- 14. Create a directory which should have permissions 754.
- 15. Suppose the path dir1/dir2/dir3/dir4 exists in your directory. All these directories are empty. How would you remove all of them at one shot?
- Display all four letter words whose first letter is 'b' and last letter is 'k'.
- 17. Convert the input file 'report' from lower case to upper case. And copy them to the output file 'document'
- 18. Merge the contents of the file a.txt, b.txt and c.txt, sort them and display the sorted output on the screen page by page
- 19. Display the list of last 20 files present in the current directory. Also store this list in file 'profile'.
- 20. Extract the address field from a file 'text'.
- 21. Search all the lines in a file which begin with 'a','b' or 'c'.
- 22. Search all the lines in a file which end with's' to 'z'.
- 23. There are 5 files available. How would you replace all occurrences of the word "printf" in these files with the word "PRINTF".

LAB CYCLE - 2

- 1. Write a shell script to accept two numbers and perform all arithmetic operations on it.
- 2. Write a shell script to find largest of three numbers using conditional execution operators.

- 3. Write a shell script to check whether a particular user has logged in or not. If he has logged in, also check whether he has eligibility to receive a message or not.
- 4. Write a shell script to accept the name of the file from standard input and perform the following tests on it
 - a. File executable
 - b. File readable
 - c. File writable
 - d. Both readable & writable
- 5. Write a shell script which will display the username and terminal name who login recently in to the unix system.
- 6. Write a shell script to find no. of files in a directory.
- 7. Write a shell script to print the following format.
 - 1

12

123

1234

- 8. Write a shell script to print prime numbers up to a given range using arguments.
- 9. Write a shell script which will display the number of days in the given month and year.
- 10. Write a shell script to check whether a given number is perfect or not.
- 11. Write a menu driven shell script to copy, edit, rename and delete a file.
- 12. Write a shell script for concatenation of two strings.
- 13. Write a shell script which will display Fibonacci series up to a given number of arguments.
- 14. Write a shell script to accept student number, name, and marks in 5 subjects. Find total, average and grade. Display the result of student and store in a file called stu.dat.

Rules:

avg>=80	then	grade	А
Avg<80&&Avg>=70	then	grade	В
Avg<70&&Avg>=60	then	grade	С
Avg<60&&Avg>=50	then	grade	D
Avg<50&&Avg>=40	then	grade	Е
Else		grade	F

15. Write a shell script to accept empno,empname,basic. Find DA, HRA, TA, PF using following rules. Display empno, empname, and basic, DA, HRA, PF, TA, GROSS SAL and NETSAL. Also store all details in a file called emp.dat

Rules:

- DA is 35% of basic
- PF is 13% of basic
- IT is 14% of basic
- TA is 10% of basic
- 16. Write a shell script to satisfy the following menu options.
 - a. Display current directory path
 - b. Display todays date
 - c. Display users who are connected to the unix system
 - d. Quit
- 17. Write a shell script to delete all files whose size is zero bytes from current directory.
- 18. Write a shell script to display string palindrome from given arguments.
- 19. Write a shell script which will display Armstrong numbers from given given arguments.
- 20. Write a shell script to display reverse numbers from given argument list.
- 21. Write a shell script to display factorial value from given argument list.
- 22. Write a shell script which will find maximum file size in the given argument list.

- 23. Write a shell script which will greet you "Good Morning", "Good Afternoon", "Good Evening' and "Good Night" according to current time.
- 24. Write a shell script which will display total size of directories.
- 25. Write a shell script to sort the elements in a array using bubble sort technique.
- 26. Write a shell script to find largest element in a array.
- 27. Write a shell script to generate the mathematical tables.
- 28. Write a shell script to check whether given number is strong or not.
- 29. Write a shell script to sort elements of given array by using selection sort.
- 30. Write a shell script to search given number using binary search.
- 31. Write a shell script to find number of vowels, consonants, numbers, white spaces and special characters in a given string.
- 32. Write a shell script which merge the contents of file1, file2, file3, sort them and display the sorted output on the screen page by page.
- 33. Write a C program to copy a file into another using system calls.
- 34. Write a c program that illustrates the creation of a child process using fork system call.

Reference Books

- 1. Unix Shell Programming by Yashavant P. Kanetkar
- 2. Introduction to UNIX & SHELL programming, M.G. Venkatesh Murthy, Pearson Education
- 3. Unix concepts and applications, Fourth Edition, Sumitabha Das, TMH.

Web References

- 1. http://nptel.ac.in/courses/106108101/
- 2. http://www.doc.ic.ac.uk/~wjk/UnixIntro/
- 3. http://nptel.ac.in/courses/106108101/pdf/Lecture_Notes/

II Year MCA – I Semester

CA211 : OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —-	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisites: CA111, CA121

Course Objectives

The main objectives of this course are:

- To learn the basics of java concepts and fundamentals of platform independent object oriented language.
- To Understand the concept as well as the purpose and usage principles of inheritance, polymorphism, interfaces and packages.
- To develop skills in writing programs using exception handling techniques and multithreading.
- To understand the Event Handling, Applets and AWT
- To gain in-depth understanding of networking program.

Course Outcomes

At the end of the course, student will be able to

- Apply the syntax and semantics of java programming language and basic concepts of OOP.
- Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
- Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes and also demonstrate how the java program communicates with the console and disk files using the concept of streams.
- Implement Event Handling, Applets and AWT controls
- Design event driven GUI and web related applications and develop network programs for TCP and UDP.

UNIT –I

The History and Evolution of Java, An Overview of Java, Data Types, Variables, and Arrays, Operators, Control Statements.

Introducing Classes: Class fundamentals, Declaring the objects, Assigning Object Reference Variables, Introducing Methods, Constructors, The this keyword, Garbage Collection, the finalize() Method.

A Closer Look at Methods and Classes: Overloading Methods, Using objects as Parameters, Returning Objects, Introducing Access control, Understanding static and final keywords, Nested and Inner Classes, Varargs.

UNIT-II

Inheritance: Inheritance Basics, Using super, creating multilevel Hierarchy, when Constructors are executed, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, using final with Inheritance, The Object class.

Packages and Interfaces: Packages, Access Protection, Importing Packages, Interfaces, Default Interface Methods, Use static Methods in an Interface.

String Handling: String class, StringBuffer class, StringBuilder Class.

UNIT– III

Exception Handling: Fundamentals, Exception types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java's Built-in Exceptions, Creating Your Own Exception Subclasses.

Multithreaded Programming: The Java Threaded Model, The Main Thread, Creating a Thread, Creating Multiple Threads, Using isAlive() and join(), Thread Priorities, Synchronization, Inter Thread Communication, Suspending, Resuming, Stopping Threads, Obtaining A Thread's State.

I/O Basics: Streams, Byte streams, Character streams, Reading Console Input, Writing Console Output, The PrintWriter Class, Reading and Writing Files.

(12 Periods)

(12 Periods)

(12 Periods)

UNIT-IV

Applets - Applet Fundamentals, **The Applet Class**: Applet Basics, Applet Architecture, An Applet Skeleton, Simple Applet Display Methods, Requesting Repainting, The HTMLAPPLET Tag, Passing Parameters to Applets.

Event Handling: Two Event Handling Mechanisms, The Delegation Event Model, Event Classes, The KeyEvent Class, Sources of Events, Event Listener Interfaces, Using The Delegation Event Model, Adapter Classes, Inner Classes.

Introducing the AWT: Working with Windows, Graphics, and Text-AWT Classes, Window Fundamentals, Working with Frame Windows, Creating a Frame Window in an AWT- Based Applet, Creating a Windowed Program, Displaying Information Within a Window, Introducing Graphics, Working withColor.

UNIT-V

(12 Periods)

Using AWT Controls, Layout Managers, and Menus - AWT Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, CheckboxGroup, Choice Controls, Using Lists, Managing Scroll Bars, Using a TextField, Using a TextArea, Understanding Layout Managers, Menu Bars and Menus.

Introducing GUI Programming with Swing: Introducing Swing, Exploring Swing –Jlabel and Imagelcon, JTextField, The Swing Buttons, JTabbedPane, JScrollPaneJList, JComboBox, Trees and JTable.

Networking: Networking Basics, The Networking Classes and Interfaces, InetAddress, TCP/IP Client sockets, URL, URL connection, TCP/IP sockets Server Sockets, Datagrams.

Prescribed Book:

1. Herbert Schildt, "Java The Complete Reference", 9thEdition, McGraw Hill Education (India) Private Limited, New Delhi.

Reference Books:

1. Paul Dietel and Harvey Dietel, "Java: How to Program", Ninth Edition,PHI

- 2. Cay Horstmann, "Big Java", 4thEdition, JOHN WILEY & SONS, INC.
- 3. Y.Daniel Liang, "Introduction to Java programming", Pearson Publication.

Web References:

- 1. http://www.cplusplus.com/reference/
- 2. http://en.cppreference.com/w/
- 3. http://www.decompile.com/
- 4. http://www.programmingsimplified.com/cpp
- 5. http://www.learncpp.com/
- 6. http://www.stroustrup.com/

CA212: WEB Technologies

Lectures	: 4Periods/week	Sessional Marks	: 40
Practicals	:	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA123 (Computer Networks).

Course Objectives

- To explain basic technologies to develop web documents.
- To apply CSS to web documents.
- To demonstrate Dynamic HTML Pages and Event handling mechanism.
- To illustrate XML, Web Servers and JDBC.
- To describe Java Servlet technologies.

Course Outcomes

At the end of this course students will be able to

- Create static web pages using HTML,CSS.
- Evaluate client side Web pages using JavaScript.
- Design and describe Dynamic Web pages using JavaScript event handling.
- Create Web pages using HTML5 canvas element.
- Create XML documents and work with web servers to create web applications with JDBC.
- Write server side programs with Java Servlet Technologies.

UNIT–I

(14 Periods)

Introduction to HTML 5: Part 1 and Part 2.

Introduction to Cascading Style Sheets (CSS): Part 1 and Part 2.

UNIT-II

(14 Periods)

JavaScript: Introduction to scripting, Control Statements I and II, Functions, Arrays, Objects.

Objects and Collections. JavaScript Event Handling: deeper look.

Document Object Model (DOM):

HTML 5: Introduction to canvas: Introduction- canvas Coordinate System-Rectangles-Using Paths to Draw Lines- Drawing Arcs and Circles-Shadows-Quadratic Curves- Linear Gradients- Images-Image Manipulation: Processing the Individual Pixels of a canvas-Patterns- Transformations-Text-Resizing the canvas to fill the Browser Window.

UNIT-IV

UNIT-III

XML: Introduction- XML Basics- Structuring Data-XML Namespaces-Document Type Definitions (DTDs)- W3C XML Schema Documents-.XML Vocabularies- Extensible Stylesheet Language and XSL Transformations-Document Object Model (DOM).

JDBC: Introduction to JDBC - Connections - Internal Database Connections - Statements - Results Sets - Prepared Statements - Callable Statements.

UNIT-V

Web Servers: Introduction-HTTP Transactions- Multitier Application Architecture-Client-SideScripting versus Server-Side Scripting-Accessing Web Servers-Apache Installation

Servlets: Background, Lifecycle of a Servlet, Servlet development options, The ServletAPI, Thejavax.servlet Package, Reading Servlet parameters, Thejavax.servlet HTTP package, Handling Http Request & Responses, Using Cookies, Session Tracking.

Prescribed Books

Paul Deitel, Harvey.Deitel, Abbey.Deitel, "Internet and World Wide Web HowTo Program", Fifth Edition, PHI Pvt.Ltd.

- 1. Herbert Schildt, "Java: The Complete Reference", 9thEdition, McGraw HillEducation (India) Private Limited, NewDelhi.
- 2. Donald Bales, "Java Programming with JDBC", O'Reilly

(10 Periods)

(10Periods)

(12Periods)

Reference Books:

- 1. "Web Technologies Black Book", drematech, 2013.
- 2. Jason Cranford Teague "Visual Quick Start Guide CSS, DHTML & AJAX", 4thedition, PerasonEducation.
- 3. Tom NerinoDoli Smith "JavaScript & AJAX for the Web" Pearson Education,2007.
- 4. UttamK.Roy, "Web Technology", Oxford University Press, 2010.

Web References:

- 1. www.w3schools.com
- 2. www.tutorialspot.com
- 3. www.deitel.com

CA213: CRYPTOGRAPHY AND NETWORK SECURITY

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	:	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA123 (Computer Networks).

Course Objectives

- To describe Network security attacks, Classical and symmetric encryption schemes.
- To explain Concepts of public key encryption and key management schemes.
- To illustrate Authentication and Secure hash functions.
- To use Network security applications like Kerberos, PGP and IPSecurity.
- To demonstrate Intrusion detection and Firewall Design Principles.

Course Outcomes

At the end of the course, the students will be able to:

- Analyze common network security attacks and apply classical and symmetric encryption schemes.
- Demonstrate Analyse the concepts of public key encryption and key management schemes.
- Apply MAC, Hashing techniques and Digital signatures needed for authentication.
- Design the IP security header formats, Web Security, Email Security and knowthe applications like Kerberos, PGP.
- Explain Understand the concept of Firewalls configuration, Intrusion detection techniques and malicious software.

UNIT –I

Classical Encryption Techniques: Symmetric cipher model – substitution techniques – transposition techniques-Rotor machines-Steganography.

Block Ciphers and the Data Encryption Stands: Traditional Block Cipher Structure-The Data Encryption Standard –ADES Example-The Strength of DES-Block Cipher Design Principles.

12 Periods

MCA - R17

Number Theory: Prime number-Fermat's Euler's Theorems-Testing for Primality-The Chinese Remainder Theorem-Discrete Logarithms

Public-Key Cryptography and RSA: Principles of public-Key Crypto System-The RSA Algorithm

Other Public Crypto systems: Diffie-Hellman key exchange Algorithm.

UNIT-III

UNIT-II

Cryptographic Hash Functions: Applications of cryptographic Hash Functions-Two simple hash Functions-requirements and Security-SHA

Message Authentication codes: Message Authentication Requirements-Message Authentication Functions-Requirements for message Authentication Codes-Security of MACs- CMAC

Digital Signatures: Digital Signatures - Elgamal DSS-Schnorr DSS-NIST DSS Algorithm

UNIT-IV

Key management and Distribution: Symmetric Key Distribution-Using Symmetric Encryption-Symmetric key distribution using Asymmetric Encryption-Distribution of Public Keys-X.509 Certificates

User Authentication: Remote User –Authentication Principles-Remote user-Authentication using Symmetric Encryption- Kerberos - Remote user Authentication using Asymmetric Encryption.

Transport -Level Security: Web security Considerations-SSL-TLS.

Intruders: Intruders, Intrusion detection, Password management

Email Security: PGP-S/MIME

distributed denial of service attacks

IP Security: IP Security Overview- IP security Policy-Encapsulating Security payload- Combining Security Associations-Internet Key Exchange

Malicious Software: Viruses and related threads, virus counter measures,

UNIT-V

94

10 Periods

14 Periods

12 Periods

12 Periods

Firewalls: Firewall Design Principles, trusted system, common criteria for information technology, security evaluation.

Prescribed Book

- 1. William Stallings, Cryptography and Network Security, 6th Edition, PearsonEducation, March, 2013.
- 2. William Stallings, Cryptography and Network Security, 4th Edition, PHI. Chapters: 18.1, 18.2, 18.3, 19.1, 19.2, 19.3, 20.1, 20.2, 20.3

Reference Books

- 1. William Stallings, Cryptography and Network Security, 4th Edition, PHI.
- 2. BehrouzA. Ferouzan, "Cryptography & Network Security", Tata McGraw Hill, 2007.
- 3. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithmsand Protocols", Wiley Publications, 2003.
- 4. Charles Pfleeger, "Security in Computing", 4/e, Prentice Hall of India,2006.
- 5. Ulysess Black, "Internet Security Protocols", Pearson Education Asia,2000.
- 6. Charlie Kaufman and Radia Perlman, Mike Speciner, "Network Security, SecondEdition, Private Communication in Public World", PHI2002.
- 7. Bruce Schneier and Neils Ferguson, "Practical Cryptography", First Edition, WileyDreamtech India Pvt Ltd, 2003
- 8. Douglas R Simson "Cryptography Theory and practice", First Edition, CRC Press, 1995.
- 9. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice HallofIndia, 2002.

Web References

- 1. http://nptel.ac.in/
- 2. https://www.tutorialspoint.com/cryptography/

CA214 : OPERATIONS RESEARCH

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	:	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: Basic Programming and Mathematics.

Course Objectives

- Grasp the methodology of OR problem solving and formulate linear programming problem.
- Develop formulation skills in transportation& assignment models and finding solutions.
- Understand the basics in the field of game and decision theory problems.
- Understand project management techniques.
- Understand basic inventory models.

Course Outcomes

At the end of the course, students will be able to:

- Recognize the importance and value of Operations Research and linear programming in solving practical problems in industry.
- Interpret the transportation & assignment model solutions and infer solutions to the real- world problems.
- Recognize and solve game theory and decision theory problems.
- Gain knowledge of drawing project networks for quantitative analysis of projects.
- Know about basic inventory models.

UNIT-I

14 Periods

Linear Programming: Introduction, formulation of Linear Programming Models, Graphical solution of Linear programming Models, Maximization with Less-than-or- equal to constraints, equalities and Greater than or equal to constraints, Minimization of the objective function, the simplex Method, properties of simplex Method.

UNIT-II

Transportation problem: Basic feasible solution by north-west corner method, Vogel's approximation method, least cost method .Finding optimal solution by MODI method. Degeneracy, unbalanced transportation matrix and Maximization in transportation model.

Assignment Problem: One-to-one assignment problem, optimal solution, unbalanced assignment matrix. Traveling salesman problem.

UNIT-III

Game Theory: Introduction, Minimax -Maxmini pure strategies, Mixed Strategies and Expected Payoff, solution of 2x2 games, dominance, solution of 2xn games, solution of mx2 games, Brown's algorithm.

Decision Theory: Introduction, decision under certainty, Decision under risk- expected value criterion, expected value combined with variance criterion, decision under uncertainty, decision tree.

UNIT-IV

PERT and CPM: Introduction, PERT Network, Time Estimates for Activities, Earliest Expected completion of events, Latest Allowable Event Completion time, Event Slack Times, Critical path method.

UNIT-V

Deterministic inventory Models: Introduction, Infinite Delivery Rate with no Backordering, Finite delivery Rate with no Backordering, Infinite Delivery Rate with Backordering and finite Delivery rate with Backordering.

Prescribed Books

- S.D. Sharma,"Operations Research", KedarnathRamnath& Co, 11/e,2002.
- 2. Hiller and Liberman,"Introduction to Operations Research", MGH, 7/e,2002.
- 3. R. Pannerselvam," Operations Research", 2/e, PHI, 2006.
- 4. V.Vohra,"Quantitative techniques for management", 3/e, TMH.

10 Periods

12 Periods

12 Periods

Reference Books

- 1. J K Sharma, "Operation Research theory and applications", Third edition, Macmillan
- 2. Belly E. Gillett, "Introduction to Operations Research A computeroriented algorithmic approach", TMH(2008).
- 3. Phillips, Ravindran, James Soldberg,"Introduction to Operations Research", Wiley1976.
- 4. S.S. Rao," Optimization Theory and Applications", Wiley 1979.
- 5. Gupta and Hira, S. Chand,"Operations Research",2008.

Web References

- 1. https://www.easycalculation.com/operations-research/operations-research-tutorial.php
- 2. http://www.thelearningpoint.net/home/mathematics/an-introduction-tooperations-research
- 3. https://www.euro-online.org/web/pages/1565/euro-advanced-tutorialsin-operational-research
- 4. http://pubsonline.informs.org/series/educ

CA215 : SOFTWARE ENGINEERING

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisites:CA111(Problem Solving with C), CA125 (Management Information Systems).

Course Objectives

- To explain basic concepts of software engineering methods and practices.
- To analyze software requirements modelling.
- To develop software design concepts.
- To demonstrate software quality management and software testing techniques.
- To determine software Product, Process and Project Metrics.

Course Outcomes

At the end of the course, the student will be able to

- Identify various Process Models for Analyse, design, implement, verify, validate and maintain software systems.
- Analyse software requirements from various take holders.
- Develop architectural and component diagrams for the systems.
- Evaluate the quality of the systems build.
- Apply measures and metrics for product, process and project for cost -effective software solutions.
- Identify the impact of potential solutions to complex problems in a global society.

UNIT-I Software and Software Engineering 12 Periods

The Changing Nature of Software, The Unique nature of WebApps, Software Engineering, The Software Process ,Software Engineering Practice, Software Myths.

Process Models

A Generic Process Model, Process Assessment and Improvement, Perceptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Technology, Product and Process.

Agile Development

What is Agility?, Agility the cost of change, what is an Agile Process? Extreme Programming, Other Agile Process Models, A Tool set for the Agile Process.

UNIT-II

12 Periods

Principles that Guide Practice

Software Engineering Knowledge, Core Principles, Principles that guide each framework activity.

Understating Requirements

Requirements Engineering, Establishing the groundwork, Eliciting Requirements, Developing Use Cases, Building the Requirements Model, Negotiating Requirements, Validating Requirements

Requirements Modeling: Scenarios, Information, and Analysis Classes Requirement Analysis, Scenario Based Modeling, UML Models that support the use case, Data Modeling Concepts, Class Based Modeling.

Requirements Modeling: Flow, Behavior, Patterns and WebApps

Requirement Modeling Strategies, Flow-Oriented Modeling, Creating a Behavioral Model, Patterns for requirements Modeling, Requirements Modeling for WebApps.

Case Study 1: Prepare SRS document for computer based information system. Develop functional and non- functional requirements for the selected information system.

UNIT-III

12 Periods

Design Concepts

Design within the Context of Software Engineering, Design Process, Design Concepts, Design Model.

Architectural Design

Software Architecture, Architectural Genres, Architectural Styles, Architectural Design, Assessing Alternative Architectural Designs, Architectural Mapping using Data Flow.

Component-Level Design

What Is a Component?, Designing Class-Based Components, Conducting Component-Level Design, Component-Level Design for WebApps, Designing Traditional Components, Component-Based Development.

Case Study 2: Design and develop architectural diagrams for the system in case study 1.

UNIT-IV

12 Periods

Quality Concepts

What is Quality? Software Quality, Software Quality Dilemma, Achieving Software Quality.

Software Testing Strategies

Strategic Approach to software testing, Strategic Issues, Test strategies for Conventional Software, Test strategies for Object Oriented Software, Test strategies for WebApps, Validation Testing, System Testing, The Art of Debugging.

Testing Conventional Applications

Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing, Control Structure Testing, Black-Box Testing, Modeling-based testing, Testing for Specialized Environments, Architectures and Application, Patterns for software testing.

Case Study 3: Design and develop test cases for the system in case study 1.

UNIT-V

12 Periods

Product Metrics

A Framework for Product Metrics, Metrics for the Requirements Model, Metrics for the Design Model, Design Metrics for WebApps, Metrics for source codes, Metrics for Testing, Metrics for Maintenance.

Process and Projects Metrics

Metrics in the Process and Project Domains, Software Measurement, Metrics for Software Quality, Integrating Metrics within the software Process, Metrics for small organizations, Establishing a software metrics program.

Prescribed Book

1. Roger S.Pressman,"Software Engineering, A Practitioner's Approach", Seventh Edition.

Reference Books

- 1. Ian Sommerville, "Software Engineering", Sixth Edition, PearsonEducation.
- 2. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, "Fundamentals ofSoftware Engineering", Second Edition, PHI.
- 3. Rajib Mall, "Fundamentals of Software Engineering", Second Edition, PHI.

Web References

- 1. https://archive.org/details/Software Engineering 7th ED By Roger S.Pressman
- http://ceit.aut.ac.ir/~91131079/SE2/SE2%20Website/Lecture %20Slides.html
- 3. www.rspa.com/spi/www.sei.cmu.edu/
- 4. http://www.pearsonhighered.com/educator/product/Software-Engineering/9780137035151.page
- 5. http://www.agilemanifesto.org/
- 6. http://www.tutorialspoint.com/software_engineering/
- 7. http://www.tutorialride.com/software-engineering/

CA251 : JAVA PROGRAMMING LAB

Lectures	:	Sessional Marks	: 40
Practicals	: 6 Periods/week	Sem.End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisites:CA111(Problem Solving with C), CA121(Data Structures in Python).

Course Objectives

At the end of the course the students will understand

- To build software development skills using java programming for real world applications.
- To implement GUI applications
- To implement concept of process synchronization.
- To learn the network programming.

Course Outcomes

At the end of the course the students will be able to

- Develop object-oriented concepts using java programming
- Create the real-time applications.
- Develop networking applications.

List of Programs

- Write a program that displays the roots of a quadratic equation ax2+bx+c=0. Calculate the discriminant D and basing on the value of D, describe the nature of roots.
- 2. Write a menu driven Program to perform the various Bitwise operators.
- 3. Write a program to perform the following operations on single dimensional array.
 - a) Find minimum and maximum elements.
 - b) Sum of the elements.
 - c) Sort given list of number.
 - d) Search for an element.
 - e) Remove duplicates.

- 4. Write a program to implement possible operations on matrix.
- 5. Write a program to implement the following on strings.
 - a) Reverse of the given string.
 - b) Check whether the given sting is Palindrome or not.
 - c) Comparison of two strings.
 - d) Sort an array of strings
 - e) Sort an array of strings using command line arguments.
- 6. Write a Program to define a student class, describe its constructor, overload the Constructors and instantiate its object.
- 7. Program to implement operations on complex numbers (Passing object to methods and use 'this' keyword).
- 8. Write a program to Implement the following bank operations (Use array of objects)

a. withdrawb.deposit c.Transfer

- 9. Write a program that displays area of different Figures (Rectangle, Square, Triangle) using the method overloading.
- 10. Write a Java program that counts the number of objects created by using static variable and static method.
- 11. Write a program that uses both recursive and non-Recursive methods to print the nth value of the Fibonacci sequence.
- 12. Write a program to perform the following:
 - a) Call by Value b) Call by Reference.
- 13. Write a program to create a player class and inherit three sub classes Cricket_Player, Hockey_Player, FootBall_Player.
- 14. Write a program to implement method overriding.
- 15. Write a program to give a simple example for abstract class.
- 16. Write a program to implement finals, blankfinals, final methods and final class. Write observations.
- 17. Write a program to find the details of the students eligible to enroll for the examination (Students, Department combinedly give the eligibility criteria for the enrollment class) using interfaces.
- 18. Write program to implement a package.

- 19. Write a program that displays number of characters, lines and words in a text file.
- 20. Write a program to implement User defined Exception and handle that exception.
- 21. Write a program to create thread lifecycle.
- 22. Write a program that displays the time continuously using threads.
- 23. Write a program to develop a producer and consumer problem using Thread.
- 24. Write an Applet program to create a simple calculator to perform addition, subtraction, multiplication and division using Button, Label and Text Field components.
- 25. Write a program to implement the following Evens: a) Keyboard event.b) Mouse event.
- 26. Write a program that implement the concept of Swing application using swing components.
- 27. Write a program to implement client-server communication using (i) TCP (ii)UDP

Web References:

- 1. http://www.cplusplus.com/reference/
- 2. http://en.cppreference.com/w/
- 3. http://www.decompile.com/
- 4. http://www.programmingsimplified.com/cpp
- 5. http://www.learncpp.com/
- 6. http://www.stroustrup.com/

CA252 : WEB TECHNOLOGIES LAB

Lectures	: —	SessionalMarks	: 40
Practicals	: 6Periods/week	Sem.EndExamMarks	: 60
Sem. End Exam Duration	: 3hours	Credits	: 02

Prerequisite:CA111(Problem Solving with C).

Course Objectives

At the end of the course the students will understand

- Basic technologies to develop web documents.
- Dynamic HTML Pages and Event handling mechanism.
- XML and Web Servers.
- Java Servlet technologies.

Course Outcomes

At the end of the course the students will be able to

- Create static web pages using HTML, CSS, and JavaScript.
- Design dynamic WebPages using client side scripting.
- Create XML documents and work with web servers to create web applications
- Write server side programs with Java Servlet Technologies.

List of Programs

- Develop and demonstrate a HTML5 document that illustrates the use of ordered list, unordered list, table, borders, padding, color, and the <div> & tag.
- 2. Write HTML5 code to provide intra and inter document linking.
- 3. Create a web page with the following using HTML5:
- a. To embed an image map in a web page
- b. To fix the hot spots
- c. Show all the related information when the hot spots are clicked
- 4. Create a web page with all types of Cascading style sheets.

- 5. Create a web page with the following using CSS:
- a. Text shadows, rounded corners and box shadows.
- b. Linear and Radial gradients.
- c. Animation
- d. Transitions and Transformations.
- 6. Create a HTML5 form that interacts with the user. Collect first name, last name and date of birth and display that information back to the user.
- Develop a HTML5 Form, which accepts any Mathematical expression. Write JavaScript code to evaluate the expression and Displays the result.
- Create a HTML5 form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
- 9. Create a home page for "Cyber book stores" that will display the various books available, the authors and prices of the books. Include a list box that contains various subjects and a "submit" button, which displays information about the books on the subject required by the user.
- 10. Create a bank entry form using appropriate form elements. The account number must not be visible on the screen. The name and address must be stored in one place. There must be a text box showing the opening balance of the customer. The user should be able to make a choice of either a deposit (or) withdrawal transaction. Accordingly, when the user deposits (or) withdraws money, the opening balance must be updated using CREDIT/DEBIT button. The user should not be able to make any entries in the opening balance text box.
- Using functions, write a JavaScript code that accepts user name and password from user. Check their correctness and display appropriate alert messages. Restrict the user to try only for a maximum of three times.
- 12. Modify the above program that suits the following requirements:
- a. After a lapse of 15 seconds, the password should be generated automatically.
- b. For impatient users, place a button that displays the passwords immediately without waiting for 15 seconds
- 13. Create an HTML5 file for registration with three text fields name, mobile number and address. Write JavaScript to validate name, mobile number and address. Mobile number should be of 10 digits. Show alert message when user enter invalid entity.
- 14. Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.
- 15. Write a program to display a form that accepts student's name, age, father name. When age field receives its focus display message that age should be 18 to 25. After losing its focus from age field verify user entered in between given values or not display respective message
- 16. Create a web page using two image files, which switch between one another as the mouse pointer moves over the images. Use the mouseover and mouseut event handlers.
- 17. Perform the following using JavaScript
 - a. To update the information into the array, in the "Click" event of the button "Update".
 - b. To sort the elements of an array (Use array object)
 - c. To find the duplicate elements of an array.
- 18. Demonstrate the following:
 - a. String and Math objects
 - b. Alphabetic and Numeric fields
 - c. Calendar object.
- 19. Write an XML file which displays the book details that includes the following:
 - 1) Title of book
 - 2) Author name
 - 3) Edition
 - 4) Price

Write a DTD to validate the above XML file and display the details in a table (to do this use XSL).

- 20. Design an XML document to store information about a student in an engineering college affiliated to ANU. The information must include college id, Name of the College, Brach, Year of Joining, and e-mail id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.
- 21. Create an XML document, which contains 10 users information. Implement a program, which takes User Id as an input and returns the user details by taking the user information from the XML document
- 22. Create tables in the database which contain the details of items (books in our case Like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.
- 23. Using java servlets and JDBC store and retrieve the following information from a database:
 - a. Name
 - b. Password
 - c. Email id
 - d. Phone number
- 24. Write a java servlet program to conduct online examination and to display student mark list available in a database.
- 25. Demonstrate Cookie and Session Management in Servlets.

- 1. www.w3schools.com
- 2. www.tutorialspot.com
- 3. www.deitel.com

CA253: TECHNICAL SEMINAR AND REPORT WRITING LAB

Lectures	:	Sessional Marks	: 40
Practicals	: 4 Periods/week	Sem.End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisite: CA151 (PC Software Lab), CA153 (Communication Skills Lab).

Course Objectives

The student should be able to

- Develop listening skills for academic and professional purposes.
- Acquire the ability to speak effectively in English in real-life situations.
- Inculcate reading habit and develop effective reading skills.
- Construct workplace documents that demonstrate understanding of management communication contexts, genres, and contemporary business topics.
- Analyse and use quantitative data in professional documents.
- Recognize, explain, and use the formal elements of specific genres of organizational communication: white papers, recommendation and analytical reports, proposals, memorandums, web pages, wikis, blogs, business letters, and promotional document.

Course Outcomes

Upon completion of this course, the student will be able to:

- Gain confidence in facing the placement interview.
- Develop effective communication skills (spoken and written).
- Interact with each other and face a wide variety of issues, topics, and situations that they are likely to come across an entry level professionals.
- Explain the ethical, international, social, and professional constraints of audience, style and content for writing situations.
- Demonstrate effective use of secondary research resources (such as electronic databases) as well as primary data gathering strategies.
- · Identify different format features in print, multimedia, and HTML

documents, and develop document design skills.

• Revise and effectively edit all assignments, including informal media (such as email messages to the instructor).

Guidelines

Selection

- Seminar topic must be of current relevance in Computer science or inter disciplinary.
- Select topic from refereed journals/magazines such as CSI, IEEE, Springer, etc. other than textual topics.
- Seminar topic abstract to be submitted to the coordinator by the target date.

PowerPoint Preparation

- i. The PowerPoint Presentation should contain the following slides:
 - Title Slide with Name, Roll No. ,etc.
 - Abstract
 - Introduction
 - Architecture /Methodology
 - Applications, Advantages, Disadvantages, Comparisons, etc. may be included wherever necessary.
 - Conclusion and References.
- ii. Contents should be neat and clear with proper diagrams & pictures wherever necessary.
- iii. Video clips / Flash animations may be used.

Presentation

- i. Presentation on the selected topic is for a minimum of 30 minutes including the discussion for 5minutes.
- ii. Reading and referring any written content continuously will not be permitted during presentation.
- iii. Credit for the participation in discussion will be awarded to the students accordingly.

Note: During presentation the examiner evaluate student performance based on body language, communication, presentation and confidence levels.

Report Preparation

- i. The final report of seminar should be prepared using Latex only
- ii. The seminar report must not be the reproduction of the original papers.
- iii. Final seminar report has to be prepared according to the rules and regulations specified by department (placed in the Moodle) and have to submit the same to the seminar coordinator for approval.
- iv. The certified seminar report to be submitted to the coordinator by the date specified.

Web Reference

1. http://gvv.mpi-inf.mpg.de/teaching/how_to_thesis/

II Year MCA – II Semester

CA221 : .NET PROGRAMMING

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisites:CA111(Problem solving with C), CA211(Objected Oriented Programming through Java).

Course Objectives

At the end of the course the students will understand

- To learn the C# language and the .NET Framework.
- To know working of Microsoft Visual Studio Development Environment.
- To use windows Forms applications with rich, highly responsive user interfaces.
- To develop web applications and Services using ASP.NET.
- To know the use of Language Integrated Query (LINQ).

Course Outcomes

At the end of the course the students will be able to

- Apply basic concepts of C# programming.
- Apply advanced concepts of C# programming.
- Develop and deploy windows applications.
- Develop and deploy web applications and web services using ASP.NET.
- Develop database driven applications using XML and LINQ

UNIT-I

(12 Periods)

Introducing C#, Writing a C# Program, Variables and Expressions. Flow Control, More About Variables, Functions.

UNIT-II:

(12 Periods)

Debugging and Error Handling , Introduction to Object-Oriented Programming, Defining Classes, Defining Class Members. Collections, Comparisons and Conversions.

UNIT-III:

(12 Periods)

Generics, Additional OOP Techniques, Basic Windows Programming. Advanced Windows Forms Features, Deploying Windows Applications.

UNIT-IV

(12 Periods)

ASP.NET Web Programming Web Services, Deploying Web Applications.

UNIT-V:

(12 Periods)

File System Data, XML. Introduction to LINQ, Applying LINQ.

Text Books:

 Karli Watson, Christian Nagel, Jacob Hammer Pedersen, Jon Reid, and Morgan Skinner, BEGINNING VISUAL C# 2012, Wiley Publishing, Inc.

Reference Books:

- 1. Stephen C. Perry, Core C# and .NET, Pearson Education, 2006.
- 2. Herbert Scheldt, C#: The Complete Reference, TATA McGraw Hill Publishing.
- 3. Andrew Troelsen, Pro C# and the .NET Platform, A! Press.
- 4. Kevin Hoffman, Microsoft Visual C# 2005 Unleashed, Sams Pearson India.

- 1. https://en.wikipedia.org/wiki/.NET_Framework
- 2. www.dotnetjalps.com/.../Dynamic-URL-of-asp-net-web-service

CA222: WEB SERVICES

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite:CA211(Objected Oriented Programming through Java), CA212(Web Technologies).

Course Objectives

At the end of the course the students will understand

- J2EE Multi-Tier architecture.
- Server side scripting with Java Server Pages.
- XML parsers and Enterprise Java beans.
- RMI, Java Mail and CORBA.
- Web services and its related technologies.

Course Outcomes

At the end of the course the students will be able to

- Design dynamic web pages with JSP.
- Develop DOM and SAX parsers.
- Create Enterprise Java Beans.
- Use Java Mail, RMI and CORBA in real time web applications.
- Create and consume Web Services.

UNIT – I	(12 Periods)
Java 2 Enterprise Edition Overview	
J2EE Multi-Tier Architecture	
UNIT – II	(12 Periods)
Java and XML	
Java Server Pages	
UNIT – III	(12Periods)

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Enterprise JavaBeans Java Mail API

UNIT – IV

(12 Periods)

Java Interface Definition Language and CORBA Java Remote Method Invocation

UNIT – V

(12 Periods)

SOAP

Universal Description, Discovery, and Integration (UDDI) Web Services Description Language (WSDL)

Prescribed Book

1. Jim Keogh, "The complete Reference J2EE", Tata McGraw Hill.

Reference Books

- 1. SubrahmanyamAllamraju et.al, "Professional Java Server Programming", SPD/APress.
- 2. Stephanie Bodoff, Eric Armstrong, Jennifer Ball, Debbie Bode Carson, Lan Evans, Dale Green, Kim Haase, Eric Jendrock, "The J2EE Tutorial", Pearson Education.
- 3. DreamtechSoftwre Team, "Java Server Programming", Dream tech Press.
- 4. B.V.Kumar, S.Sangeetha, S.V.Subrahmanya, "J2EE Architecture", Tata McGraw Hill.
- 5. James McGovern & Rahim Aditya, "J2EE 1.4 Bible", Wiley publications.

- 1. https://www.safaribooksonline.com/library/view/ advancedjavanetworking/0130844667/
- 2. http://www.tutorialspoint.com/listtutorials/java/j2ee/1
- 3. http://docs.oracle.com/javaee/6/tutorial/doc/
- 4. http://www.j2eebrain.com/

CA223 : DESIGN AND ANALYSIS OF ALGORITHMS

Lectures	:	4 Periods/week	Sessional Marks	:	40
Practicals	:	_	Sem. End Exam Marks	:	60
Sem. End Exam Duration	:	3 hours	Credits	:	04

Prerequisite: CA111(Problem solving with C),CA121(Data Structures in Python).

Course Objectives

At the end of the course the students will understand

- The methods for designing efficient algorithms using various data structures.
- The performance of algorithms.
- The application of mathematical tools in computing to solve fundamental problems.
- The concept of classification of algorithms

Course Outcomes

At the end of the course the students will be able to

- Compute time and space complexity of algorithms.
- Deduce the recurrence relations that describe the time complexity of recursively-defined algorithms that employ these strategies.
- Implement real time applications based on various data structures.
- Design algorithms using divide and conquer, greedy, and dynamic programming strategies and recite algorithms that employ these strategies.
- Design algorithms using backtracking and branch and bound strategies and recite algorithms that employ these strategies.
- Understand the P, NP, NP hard, and NP complete classes.

UNIT – I

10 Periods

Introduction

What is Algorithm, Algorithm Specification: Pseudo code Conventions, Recursive Algorithms; Performance Analysis: Space Complexity, Time

Complexity, Asymptotic notation, Performance Measurement; Randomized Algorithms: Basics of probability theory, Randomized algorithms, Identifying the repeated element, Primality Testing, Advantages and Disadvantages.

Elementary Data Structures

Stacks and Queues; Trees: Terminology, Binary Trees; Dictionaries: Binary Search Trees; Priority Queues: Heaps, Heap sort; Sets and disjoint set Union: Introduction, union and find operations; Graphs: Introduction, Definitions, Graph Representations.

UNIT – II

Divide - and - conquer

General Method, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick sort, Selection Problem, Strassen's Matrix Multiplication, Convex Hull: some geometric Primitives, The Quick Hull Algorithm, Graham's scan, An 0(nlogn) divide - and -conquer algorithm.

The Greedy Method

The general Method, Knapsack Problem, Tree Vertex Splitting, Job sequencing with deadlines; Minimum cost spanning trees: Prim's Algorithm, Kruskal's Algorithm; Optimal Storage on tapes, Optimal Merge patterns, Single Source shortest paths.

UNIT – III

Dynamic Programming

The general method, Multi-stage graphs, All pairs shortest paths, Single source shortest paths, Optimal Binary Search Trees, String editing, 0/1 Knapsack, Reliability design, The traveling sales person problem, Flow shop Scheduling.

UNIT – IV

118

Basic Traversal and Search Techniques

Techniques for Binary Trees, Techniques for graphs: Breadth First Search and Traversal, Depth First Search; Connected Components and Spanning Trees, Bi-connected components and DFS.

12 Periods

10 Periods

Back Tracking

The general method, The 8-queens problem, sum of subsets, Graph coloring, Hamiltonian Cycles, Knapsack Problem.

UNIT – V

10 Periods

Branch and Bound

The Method: Least Cost search, The 15 puzzle, control abstractions for LC search, Bounding, FIFO Branch - and - Bound, LC Branch and Bound; 0/1 knapsack problem: LC Branch and Bound solution, FIFO Branch and Bound solution; Traveling Sales person

NP-Hard and NP – complex problems

Basic concepts : Non deterministic algorithms , The classes NP hard and NP complex Cooks theorem

Prescribed Book

1. Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, "Fundamentals of Computer Algorithms", Second Edition, Universities Press

Reference Books

- 1. Hopcraft.J.E, Ullman.J.D, "The design and analysis of algorithms ANOVA", First edition, Pearson publishers.
- 2. I.Chandra Mohan, "Design and Analysis of Algorithms", PHI.
- 3. Thomos H Cormen, Charles ELeisevson, Ronald, Revart Clifford stein, "Introduction to algorithms", Third edition, PHI.

- 1. http://nptel.ac.in/courses/106101060/
- 2. http://www.personal.kent.edu/~rmuhamma/Algorithms/algorithm.html
- 3. http://www.facweb.iitkgp.ernet.in/~sourav/daa.html

CA224(A): ARTIFICIAL INTELLIGENCE

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite:CA111(Problem solving with C), CA121(Data Structures in Python).

Course Objectives

- To develop the student's understanding of the issues involved in trying to define and simulate intelligence.
- To familiarize the student with specific, well known Artificial Intelligence methods, algorithms and results.
- To provide the student additional experience in the analysis and evaluation of complicated systems.
- To provide the student with paper and proposal writing experience.

Course Outcomes

- Understand the fundamental concepts of artificial intelligence and ability to apply problem solving techniques for solving simple AI problems.
- Ability to represent the given natural language sentences in predicate/ proposition logic.
- Ability to represent knowledge as rules and infer new knowledge using forward/ backward reasoning.
- Ability to represent the given natural language information as weak or strong slot-and-filler structures.
- Ability to get familiarized to various planning techniques.
- Understand the concepts of connectionist models and expert systems.

UNIT-I

12 Periods

What is AI?

The AI Problems, The Underlying Assumption, What is AI Technique?, The level of the Model, Criteria for Success.

Problems, Problem spaces & Search

Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the design of Search Programs, Additional Problems.

Heuristic search techniques Generate and Test, Hill Climbing, Best First Search, Problem Reduction, Constraint Satisfaction, Means Ends Analysis.

UNIT-II

12 Periods

Knowledge Representation Issues

Representations and Mappings, Approaches to Knowledge Representation, Issues in Knowledge Representation, The Frame Problem.

Using Predicate Logic

Representing Simple Facts in Logic, Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Natural Deduction.

Representing knowledge using Rules

Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward Reasoning, Matching, Control Knowledge

UNIT-III

12 Periods

12 Periods

Symbolic Reasoning under Uncertainty

Introduction to Non-monotonic Reasoning, Logics for Non-monotonic Reasoning, Implementation Issues, Augmenting a Problem Solver, Implementation: Depth-First Search, Implementation: Breadth-First Search

Weak slot & filler Structures: Semantic Nets, Frames

UNIT-IV

Planning

Overview, An Example Domain : The Blocks World, Components of a Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Other Planning Techniques

Natural Language Processing

Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing

UNIT-V

12 Periods

Commonsense

Qualitative Physics, Commonsense Ontologies, Memory Organization, Case-Based Reasoning

Expert Systems

Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition

Prescribed Book

1. Knight K, "Artificial Intelligence", TMH (Third Edition)

Reference Books

- 1. Michael Negnevitsky, "Artificial Intelligence A Guide to Intelligent Systems", Third Edition, Pearson Education.
- 2. Winston P.H, "Artificial Intelligence", Addison Wesley (1993)

Web References

1. http://www.myreaders.info/html/artificial_intelligence.html

CA224(B): COMPUTER GRAPHICS AND MULTIMEDIA

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: Basic Mathematics.

Course Objectives

- To provide students with a foundation in graphics applications programming, and analyze where to apply the computer graphics.
- Analyze different display systems and their techniques.
- Analyze various Output Primitives and Design the algorithms for generating various geometric shapes like line, circle and ellipse.
- Design and analyze the 2D & 3D Geometric Transformations, Pipe lines and viewing coordinates.
- Extract scene with different clipping methods and its transformation to graphics display device.
- Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.

Course Outcomes

- Develop a facility with the relevant mathematics of computer graphics.
- Have a knowledge and understanding of the structure of an interactive computer graphics system.
- Design algorithms for different geometric shapes line, circle, ellipse...etc.
- Perform transformations (rotation, scaling, and translation, shearing) on geometric objects.
- Have a knowledge and understanding of techniques for representing 3D geometrical objects.
- Have a knowledge and understanding of interaction techniques.
- Perform line clipping by different techniques against viewing window.
- Perform polygon clipping against viewing window.
- Have a knowledge and understanding of geometrical transformations and 3D viewing.

124

UNIT-I

Overview of Computer Graphics

Video Display Devices, Raster Scan Displays, Random Scan Displays, Color CRT Monitors, Direct View Storage Tubes, Flat Panel Displays, Raster Scan Systems, Random Scan Systems, Input Devices

Graphical User Interfaces and Interactive Input Methods

The User Dialogue, Windows and Icons, Input of Graphical Data, Input Functions

UNIT-II

Output Primitives

Points and Lines, Line-Drawing Algorithms: DDAAlgorithm, Bresenham's Line Algorithm, Line Function, Circle Generation Algorithms, Ellipse **Generation Algorithms**

Attributes of output Primitives

Line Attributes, Color and GrayScale levels, Area Fill Attributes, Character Attributes, Bundled Attributes, Antialiasing.

UNIT-III

Two Dimensional Geometric Transformations

Basic Transformations, Matrix Representation and Homogenous Coordinates, Composite Transformations, Other Transformations.

Two Dimensional Viewing

The Viewing pipeline, Viewing Coordinates Reference Frame, Window to Viewport Coordinate Transformations, Two Dimensional Viewing Functions, Clipping Operations, Point Clipping, Line Clipping: Cohen-Sutherland Line Clipping, Polygon Clipping: Sutherland-Hodgeman Polygon Clipping, Curve Clipping, Text Clipping, Exterior Clipping.

UNIT-IV

Three Dimensional Concepts: Three Dimensional Display Methods.

Three Dimensional Object Representations: Polygon Surfaces, Quadric Surfaces, Super quadrics

14 Periods

10 Periods

14 Periods

Three Dimensional Geometric and Modeling Transformations:

Translation, Rotation, Scaling, Other Transformations, Composite Transformations, Three Dimensional Transformation Functions.

Three Dimensional Viewing:

Viewing pipeline, Viewing Coordinates, Projections, Clipping

UNIT – V

12 Periods

Multimedia Authoring and data representations: Introduction to multimedia and hypermedia, WWW, overview of multimedia software tools.

Multimedia Authoring and Tools: Multimedia authoring some useful editing and authoring tools, VRML.

Graphics and Image data representation: Graphics/Image data types, popular file formats.

Color in image and Video: Color models in images, Color models in Video.

Fundamental concepts in video: types of video signals, analog video, digital video.

Prescribed Book

- 1. Donald Hearn, M. Pauline Baker, "Computer Graphics", Forth Edition, Pearson Education (2011)
- 2. Ze-Nian Li, Mark S. Drew , "Fundamentals of multimedia", Pearson education 2007.

Reference Books

- 1. ShaliniGovil-Pai, "Principles of Computer Graphics Theory and Practice using open GL and Maya", Springer (2007)
- 2. ISRD group, "Computer Graphics", ace series, TMH (2006)
- 3. Amearendra N. Sinha, Arun D Udai, "Computer Graphics", TMH (2008)

- 1. https://www.tutorialspoint.com/computer_graphics/
- 2. www.tutorialspoint.com/dip/Computer_Vision_and_Graphics.htm
- 3. https://www.wiziq.com/tutorials/computer-graphics

CA224(C): SOFTWARE PROJECT MANAGEMENT

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA215(Software Engineering).

Course Objectives

- To understand the roles of the project manager
- To understand the threats and opportunities in project management
- To gain Expertise in size, effort and cost estimation techniques
- To understand the techniques available to keep the project's aims and objectives, under control
- To understand how to approach non-technical problems
- To appreciate management issues like team structure, group dynamics

Course Outcomes

Upon completion of the course, the students will be able to

- Comprehend the roles of the project manager.
- Identify the threats and opportunities in project management.
- Gain knowledge about size, effort and cost estimation techniques.
- Apply the techniques available to keep the project's aims and objectives, under control.
- Analyze the different approaches of non-technical problems.
- Appreciate the management issues like team structure, group dynamics.

UNIT - I

12 Periods

INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT

Project Definition — Contract Management – Activities Covered by Software Project Management, Plan, Methods and Methodologies- Ways of Categorizing Software Projects Problem with Software Projects – Setting Objectives Stakeholders- Requirements Specification, Management Control – Overview of Project Planning – Stepwise Project Planning.

UNIT - II PROJECT EVALUATION

Programme Management, Managing the Allocation of Resources, Strategic Programme Management, Creating a Programme, Aids to Programme Management, Benefits Management-Evaluation of Individual Projects – Technical Assessment – Cost Benefit Analysis – Cost Benefit Evaluation Techniques – Risk Evaluation –Cash Flow Forecasting – Software Effort Estimation

UNIT-III

ACTIVITY PLANNING

Objectives of Activity Planning – Project Schedule – Project and Activities - Sequencing and Scheduling Activities – Network Planning Models – Formulating a Network Model – Adding the Time Dimension -Forward Pass – Backward Pass –Identifying Critical Path - Activity Float – Shortening Project Duration – Identifying Critical Activities - Activity on Arrow Networks – Risk Management – Categories -Risk - Framework – Identification – Assessment – Planning – Management – Evaluating Risk to the Schedule – PERT Technique – Mote Carlo Simulation – Resource Allocation – Nature Of Resources – Identifying Resource Requirements – Scheduling Resources – Creating Critical Paths – Counting the Cost - Publishing the Resource Schedule .

UNIT - IV

MONITORING AND CONTROL

Framework – Collecting the Data –Visualizing Progress – Cost Monitoring – Earned Value Analysis – Prioritizing Monitoring – Getting Project Back to Target – Change Control – Managing Contracts – Introduction – The ISO 12207 Approach –Supply process –Types of Contract – Stages in Contract Placement – Typical Terms Of a Contract – Contract Management – Acceptance.

UNIT - V

MANAGING PEOPLE AND ORGANIZING TEAMS

Introduction – Understanding Behavior – Organizational Behavior - Selecting the Right Person for the Job – Instruction in the Best Methods – Motivation

12 Periods

12 Periods

 The Oldham – Hackman Job Characteristics Model – Working in Groups
 Becoming a Team –Decision Making – Leadership – Organizational Structures – Stress – Health and Safety.

Prescribed Book

1. Bob Hughes, Mike Cotterell, "Software Project Management", Fourth Edition, Tata McGraw Hill, 2006.

Reference Books

- 1. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001
- 2. Royce, "Software Project Management", Pearson Education, 1999.
- 3. Jalote, ⁻"Software Project Management" in Practice, Pearson Education, 2002
- 4. Robert T. Futrell, Donald F. Shefer and Linda I. Shefer, "Quality Software Project Management", Pearson Education, 2003.

- 1. https://www.tutorialspoint.com/management_concepts/ project_management_softwares.htm
- 2. http://www.tutorialride.com/software-engineering/concepts-of-projectmanagement.htm
- 3. https://www.docsity.com/en/study-notes/computer-science/softwareproject-management/
- 4. http://nptel.ac.in/courses/106101061/29

CA224(D) : LOGISTICS & SUPPLY CHAIN MANAGEMENT

Lectures	: 4Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite:CA115(Accountancy and Financial Management), CA125(Management Information Systems).

Course Objectives

At the end of the course, the student will

- Understand The methods to maximize overall value generated in business process
- Demonstrate the techniques to optimise pre and post production inventory levels
- Understand Process to make available products whenever required
- Provide flexible planning and control mechanism
- Learn the methods to reduce transportation costs
- Understand the scope and practice of business logistics and supply chain management

Course Outcome

Upon the completion of the course the students will be able to

- Propose the methods to make available the right quantity of right quality products at the right place and time in right condition.
- Know the best services to consumers
- Demonstrate the methods to reduce the cost of operations
- Gain knowledge on effective management of the logistics and supply chain
- Recollect the methods to maximize overall value generated in business
 process
- Model optimal plans and control mechanisms

UNIT I: INTRODUCTION

Business Logistics/Supply Chain - A Vital Subject: Business Logistics Defined, The Supply Chain, The Activity Mix, Importance of Logistics/ Supply Chain (SC), Business Logistics/SC in the Firm, Objectives of Business Logistics/SC.

Logistics/Supply Chain Strategy and Planning: Corporate Strategy, Logistics/SC Strategy, Logistics/SC Planning, Selecting the Proper Channel Strategy, Measuring Strategy Performance.

UNIT II: MANAGING FLOWS

Designing Distribution Networks and Applications to e-Business: The Role of Distribution in the Supply Chain, Factors Influencing Distribution Network Design, Design Options for a Distribution Network, e-Business and the Distribution Network, Distribution Networks in Practice.

Network Design in the Supply Chain: The Role of Network Design in the Supply Chain, Factors Influencing Network Design Decisions, Framework for Network Design Decisions, Models for Facility Location and Capacity Allocation, The Role of IT in Network Design, Making Network Design Decisions in Practice.

Network Design in an Uncertain Environment: The Impact of Uncertainty on Network Design, Discounted Cash Flow Analysis, Representations of Uncertainty, Evaluating Network Design Decisions Using Decision Trees, AM Tires: Evaluation of Supply Chain Design Decisions Under Uncertainty, Risk Management and Network Design, Making Supply Chain Decisions Under Uncertainty in Practice.

UNIT III: INVENTORY

Managing Economies of Scale in a Supply Chain:Cycle Inventory: The Role of Cycle Inventory in a Supply Chain, Economies of Scale to Exploit Fixed Costs, Economies of Scale to Exploit Quantity Discounts, Short-Term Discounting: Trade Promotions, Managing Multiechelon Cycle Inventory, Estimating Cycle Inventory-Related Costs in Practice.

Managing Uncertainty in a Supply Chain: Safety Inventory: The Role of Safety Inventory in a Supply Chain, Determining Appropriate Level of

15 Periods

Safety Inventory, Impact of Supply Uncertainty on Safety Inventory, Impact of Aggregation on Safety Inventory, Impact of Replenishment Policies on Safety Inventory, Managing Safety Inventory in a Multiechelon Supply Chain, The Role of IT in Inventory Management, Estimating and Managing Safety Inventory in Practice

UNIT IV: TRANSPORTATION

Transportation in a Supply Chain: The Role of Transportation in a Supply Chain, Modes of Transportation and Their Performance Characteristics, Transportation Infrastructure and Policies, Design Options for a Transportation Network, Trade-Offs in Transportation Design, Tailored Transportation, The Role of IT in Transportation, Risk Management in Transportation, Making Transportation Decisions in Practice

Sourcing Decisions in a Supply Chain: The Role of Sourcing in a Supply Chain, In-House or Outsource, Third- and Fourth-Party Logistics Providers.

Transport Decisions: Transport Service Selection, Vehicle Routing, Vehicle Routing and Scheduling.

UNIT V: ORGANISATION AND CONTROL 10 Periods

Organization Structure – need and development. Organizational – Choices, Orientation and positioning. Interfunctional and interorganisational management – alliances and partnerships. Control – Process framework, system details, information, measurement and interpretation.

Prescribed Books

- Ronald H. Ballou and Samir K. Srivastava, Business Logistics and Supply Chain Management, Pearson education, Fifth Edition (CHAPTERS 1,2, 7, 15 and 16)
- Sunil Chopra and Peter Meindl, Supply Chain Management-Strategy Planning and Operation, PHI Learning / Pearson Education, 2007. (CHAPTERS 4, 5, 6, 10, 11, 13, 14.1, 14.2, 14.3)

Reference Books

1. Bowersox Donald J, Logistics Management – The Integrated Supply Chain Process, Tata McGraw Hill, 2010.

- 2. Vinod V. Sople, Logistics Management-The Supply Chain Imperative, Pearson. 2012.
- 3. Coyle et al., The Management of Business Logistics, Thomson Learning, 7th Edition, 2004.
- 4. Mohanty R.P and Deshmukh S.G, Supply chain theories and practices, Biztantra publications, 2007.
- 5. Leenders, Johnson, Flyn, Fearon, Purchasing and supply management, Tata McGraw Hill, 2010.

- 1. https://www.wiziq.com/tutorials/supply-chain-management
- 2. https://www.vskills.in/certification/tutorial/logistics-and-supply-chainmanagement/
- 3. http://www.tutorialspoint.com/supply_chain_management/

CA224(E): OPEN SOURCE SYSTEMS

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA212(Web Technologies).

Course Objectives

At the end of the course the students will understand

- Basic concepts of PHP language and developing web applications.
- PHP Browser Handling and form data access.
- Creation of database driven web applications.
- Ajax for partial rendering.
- The use of XML and RSS with PHP.

Course Outcomes

At the end of the course the students will be able to

- Develop web applications using Apache, PHP, and MySQL and apply the OOP concepts.
- Create database driven web applications.
- Create powerful web applications using Ajax.
- Create images at the web server.
- Manipulate XML documents using PHP and Create RSS.

UNIT – I

12 Periods

12 Periods

Essential PHP

Operators and Flow Control

Strings and Arrays.

UNIT – II

Reading Data in Web Pages

PHP Browser-HANDLING Power.

UNIT – III Object Oriented Programming Advanced Object Oriented Programming File Handling.

UNIT – IV

Working with Databases Sessions, Cookies, and FTP Ajax

UNIT – V

Advanced Ajax Drawing Images on the Server XML and RSS.

Prescribed Book

1. Steven Holzner, "PHP: The Complete Reference", TATA McGraw Hill, 2015.

Reference Books

- 1. W. Jason Gilmore,"Beginning PHP and MySQL: From Novice to Professional", Apress.
- Steve Suehring, Tim Converse, Joyce Park, "PHP 6 and MySQL 6 Bible", Wiley Publishing, Inc.

Web References

- 1. https://www.w3schools.com/php/
- 2. https://www.tutorialspoint.com/php/
- 3. www.javatpoint.com/php-tutorial
- 4. www.tutorialrepublic.com/php-tutorial/
- 5. https://www.codeproject.com > Web Development > PHP

12 Periods

CA225(A): EMBEDDED SYSTEMS

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA112(Computer Organization), CA113(Opreating Systems Principles).

Course Objectives

- To study the overview of Embedded System Architecture
- To focus on distributed Embedded Architecture and its accessing protocols
- To understand about the design methodologies in hardware and software design

Course Outcomes

- Explain various embedded system applications and design requirements
- Construct embedded system hardware
- Develop software programs to control embedded system
- Generate product specification for embedded system

UNIT - I

12 Periods

12 Periods

Introduction

Embedded systems overview-design challenge-optimizing metricsprocessor technology-IC technology-design technology-automationsynthesis-verification: hardware/software co-simulation-trade-offs.

UNIT - II

Processing Elements

Custom single purpose processor design-RT level custom single purpose processor design-optimizing custom single purpose processors-General purpose processor's software: architecture, operation, programmer's view and development environment – ASIPs - selecting a microprocessor - general purpose processor design.

UNIT - III Memory

Introduction-memory write ability and storage Permanence-common memory types-composing memory-memory hierarchy and caches-advanced RAM.

UNIT - IV Interfacing

Introduction-communication basics-microprocessor interfacing: I/O addressing, interrupts, DMA-Arbitration-multilevel bus architecturesadvanced communication principles-serial protocols-parallel protocolswireless protocols-Standard single purpose processor's peripherals: timers, counters, watchdog timers, UART, PWM, LCD controllers, keypad controllers, stepper motor controllers, ADC and RTC.

UNIT -V

Applications

Digital camera-washing machine-cell phones-home security systemsfinger print identifiers - cruise control - printers - Automated teller machine.

Prescribed Book

1. Frank Vahid and Tony Givargis, "Embedded system design: A unified hardware/Software introduction", Third edition, John Wiley & sons, 2010.

Reference Books

- 1. Wayne Wolf, "Computers as Components: Principles of Embedded Computing System Design", Morgan Kaufman Publishers, 2008.
- 2. Jonathan.W.Valvano, "Embedded Microcomputer systems: Real Time Interfacing", Third edition, cengage learning,2012
- 3. Santanuchattopadhyay, "Embedded system Design", PHI Learning Pvt. Ltd., 2010
- 4. Steave Heath, "Embedded system Design", Second edition, 2003
- 5. Daniel D. Gajski, Samar. Abdi, Andreas. Gerstlauer, "Embedded system design: Modeling, synthesis and verification", Springer, 2009.

Web References

136

- 1. http://esd.cs.ucr.edu/
- 2. https://www.tutorialspoint.com/embedded_systems/es_overview.htm
- 3. http://nptel.ac.in/courses/108102045/1

12 Periods

12 Periods

CA 225(B): IMAGE PROCESSING USING MATLAB

Lectures	: 4 Periods/week	Sessional Marks	:	40
Practicals	: —	Sem. End Exam Marks	:	60
Sem. End Exam Duration	: 3 hours	Credits	:	04

Prerequisite: CA111(Problem solving with C).

Course Objectives

- Study the image fundamentals and mathematical transforms necessary for image processing
- To instigate the various image processing techniques
- To originate the various image enhancement techniques

Course Outcomes

Upon Completion of the course, student will be able to

- Understand the various mathematical transforms of a digital image
- Realize the image enhancement, image restoration and image compression techniques
- Bring out morphology, image segmentation and representation techniques
- Write programs in Matlab
- Demonstrate Matlab functions in Image Processing tool box of Matlab
- Solve problems of Image processing using Matlab

UNIT – I

8 Periods

16 Periods

What Is Digital Image Processing?, Background on MATLAB and the Image Processing Toolbox, Fundamentals- The MATLAB Desktop, Using the MATLAB Editor/Debugger, Saving/Retrieving Work session data, Digital Image Representation, Image I/O and display, Classes and image types, M-function programming,

UNIT – II

IntensityTransformations and Spatial Filtering:Intensity Transformation Functions, Histogram Processing and function plotting, Spatial Filtering, Image processing toolbox standard spatial filters. **Filtering in the Frequency Domain**: The 2-D Discrete Fourier Transform, Computing And Visualizing 2-D Discrete Fourier Transform In Matlab, Filtering in the Frequency Domain, Obtaining Frequency Domain Filters from spatial filters, Generating Filters Directly In The Frequency Domain, High pass Frequency Domain Filters.

UNIT – III

Image Restoration: A Model of the Image Degradation/Restoration Process, Noise models, Restoration in the presence of noise only- Spatial Filtering, Periodic Noise Reduction by Frequency Domain filtering. Modeling the Degradation function, Direct inverse filtering, Wiener filtering, Constrained Least Squares Filtering **Image Compression**: Background, Coding Redundancy, Spatial Redundancy, Irrelevant Information, JPEG and Video compression.

UNIT – IV

Morphological Image Processing: Preliminaries, Erosion and Dilation, Combining Erosion and Dilation, Labeling connected components, Morphological Reconstruction, Gray-Scale morphology.**Image Segmentation**: Point, Line and Edge Detection, Line Detection using Hough Transform, Thresholding, Region-Based Segmentation

UNIT – V

Color Image Processing: Color Image representation in Matlab.

Case Study: Mammogram Preprocessing:Collect mammogram images from mini-MIAS Database, Remove Digitization Noise, Artifact Suppression and Background Separation, Pectoral Muscle Segmentation.

Prescribed Books

1. Rafael C Gonzalez, Richard E. Woods, Steven L. Eddins, 'Digital Image Processing Using Matlab', 2nd Edition.

Reference Books

138

 Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing' Pearson Education, 3rd Edition.

10 Periods

14 Periods

- 2. Milan Sonka, Vaclav Hlavac, Roger Boyle, 'Image Processing, Analysis, and Machine Vision', 3rd Edition.
- 3. A.K.Jain, 'Fundamentals of Digital Image Processing' PHI.
- 4. Stormy Attaway Ph.D. Boston University D, 'Matlab: A Practical Introduction to Programming and Problem Solving 3 edition, 2013
- JawadNagi, Sameem Abdul Kareem, FarrukhNagi, Syed Khaleel Ahmed. (2010) Automated Breast Profile Segmentation for ROI Detection Using Digital Mammograms, IEEE EMBS Conference on Biomedical Engineering & Sciences (http://people.idsia.ch/~nagi/ conferences/iecbes_breast_cancer.pdf)

- 1. http://www.imageprocessingbasics.com/
- 2. www.imageprocessingplace.com/root_files_V3/tutorials.htm
- 3. www.library.cornell.edu/preservation/tutorial/intro/intro-01.html
- 4. www.olympusmicro.com/primer/digitalimaging/javaindex.html
- 5. http://www.mathworks.com
- 6. https://www.cs.washington.edu/research/metip/tutor/tutor.html
- 7. https://www.engineersgarage.com/articles/image-processing-tutorialapplications.
- 8. http://www.bogotobogo.com/Matlab/Matlab_Tutorial_ Digital_ Image_Processing_l.php
- 9. https://www.youtube.com/watch?v=3St0byWYcEI

CA225(C): OBJECT ORIENTED MODELING AND DESIGN USING UML

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA215(Software Engineering).

Course Objectives

At the end of the course the students will understand

- The concepts and terms used in the object-oriented approach to systems analysis and design.
- The importance of object-oriented analysis and design and its limitations.
- The process of object-oriented analysis and design to software development.
- The importance and function of each UML model throughout the process of object-oriented analysis and design and explaining the notation of various elements in these models.

Course Outcomes

At the end of the course the students will be able to

- Construct models to Show the importance of systems analysis and design in solving complex problems.
- Differentiate how the object-oriented approach differs from the traditional approach to systems analysis and design.
- Explain the importance of modelling and how the Unified Modelling Language (UML) represents an object-oriented system using a number of modelling views.
- Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation.
- Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships.
- Show the role and function of each UML model in developing objectoriented software.

 Apply the Rational Software Suit for the construction of UML models and expressing the appropriate notation associated with each model.

UNIT-I

12 Periods

Introduction

What is Object Orientation, What is OO Development, OO Themes, Evidence for Usefulness of OO Development.

Modeling as Design Technique

Modeling, Abstraction, Three Models

Class Modeling

Object and Class Concepts, Link and Association concepts, Generalization and Inheritance, A Sample Class Model.

Advanced Class Modeling

Advanced Object and Class Concepts, Association Ends, N-Ary Association, Aggregation, Abstract Classes, Multiple Inheritance, Metadata, Reification, Constraints, Derived data and packages

UNIT-II

12 Periods

State Modeling

Events, States, Transitions and Conditions, state diagrams, state diagram behaviour.

Advanced State Modeling

Nested State Diagrams, Nested states, signal generalization, concurrency, A Sample state Model.

Interaction Modeling

Use Case Models, Sequence Models, and Activity Models.

Advanced Interaction Modeling

Use Case Relationships, Procedural Sequence Models, Special Constructs for Activity Models.

UNIT-III

Process Overview

Development Stages, Development Life Cycle.

System Conception

Devising a system Concept, Elaborating a Concept, Preparing a Problem Statement.

Domain Analysis

Overview of analysis, Domain Class Model, Domain State model, Domain Interaction Model, Iterating the Analysis.

UNIT-IV

12 Periods

Application Analysis

Application Interaction Model, Application Class Model, Application State Model, Adding Operations.

System Design

Overview of system Design, Estimating Performance, Making a Reuse Plan, Breaking a System into Subsystem, Identifying Concurrency, Allocation of Subsystems, Management of data storage, Handling Global Resources, Choosing a Software Control Strategy, Handling Boundary Conditions, Setting Trade-off priorities, Common Architecture of ATM System

UNIT-V

12 Periods

Class Design

Overview of Class Design, Realizing Use Cases, Designing Algorithms, Recursion Downward, Refactoring, Design Optimization, Reification of Behaviour, Adjustment of Inheritance, Organizing a class design.

Implementation Modeling

Overview of Implementation, Fine Tuning classes, fine tuning Generalization, Realizing Associations, Testing.

Programming Style

Object Oriented Style, Reusability, Robustness, Extensibility, Programming-in large.

Prescribed Book

 Michael Blaha, James Rumbaugh, "Object Oriented Modelling and Design with UML", Second Edition, Pearson Education; Second edition (2011)

Reference Books

- 1. Meilir Page-Jones, "Fundamentals of Object Oriented Design in UML", Pearson Education (2008).
- 2. Pascal Roques, "Modeling Software Systems Using UML", Wiley (2008)
- 3. Simon Benett, Steve Mc Robb, "Object Oriented Systems Analysis and Design using UML", Second Edition, TMH (2007).
- 4. Mark Priestley, "Practical Object Oriented Design with UML", Second Edition, TMH (2008).
- 5. Grady Booch, James Rumbaugh, "The Unified Modeling Language User Guide", Pearson (2008).

- 1. www.tutorialspoint.com/object_oriented_analysis_design/
- 2. https://www.tutorialspoint.com/uml/uml_overview.htm
- https://www.tutorialspoint.com/object_oriented...design/ ooad_pdf_version.html
- 4. uml-tutorials.trireme.com
CA225(D): ADVANCED DATABASE MANAGEMENT SYSTEMS

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA121(Data Structures in Python), CA122(Database Management Systems).

Course Objectives

- To understand database systems architecture and catalog and the importance of it in database technology.
- To implement aggregate operations and outer joins combining operations using pipelining using heuristics in query optimization.
- To define and discuss the importance of Distributed Transaction and Recovery Management.
- To understand the Object Oriented DBMSs Concepts and Design and models required for Object Oriented Data design.
- To narrate emerging database technologies and applications like Mobile databases.

Course Outcomes

Upon the completion of course student able to

- Understand System Architecture and Catalog.
- Familiarize Distributed DataBase Concepts.
- Design Distributed Relational Database system, ORDBMS and Object DBMSs concepts.
- Understand and use the solutions related to advanced database concepts
- Develop models using advanced database concepts.

UNIT - I

12 Periods

Database systems architecture and the system Catalog: System architectures for DBMSs, Catalogs for Relational DBMSs, System catalog information in oracle.

Distributed DBMS Concepts and Design:

Introduction, function and architecture of a Distributed DBMS.

UNIT - II

Distributed DBMS Concepts and Design:

Distributed Relational Database Design- transparencies in a Distributed DBMS.Date's Twelve Rules for Distributed DBMS.

Distributed DBMS Advanced Concepts:

Distributed Transaction Management, Distributed Concurrency Control -Distributed Deadlock Management Distributed Database Recovery. The X/Open, Distributed Transaction processing model, Replication Servers.

UNIT - III

Introduction to Object DBMSs:

Advanced Database Applications -Weaknesses of RDBMSs, Object oriented Concepts, Storing objects in a Relational Database, Next generation Database systems.

Object Oriented DBMSs Concepts and Design:

Introduction to Object Oriented Data Models and DBMSs, OODBMS perspectives, Persistence, Issues in OODBMSs.

UNIT - IV

Object Oriented DBMSs Concepts and Design:

The object Oriented Database, System Manifesto, Advantages and Disadvantages of OODBMSs, Object oriented Database Design.

Object relational DBMSs:

Introduction to Object, relational Database systems, the third generation Database manifesto, Postgres, an early ORDBMS, SQL3.

UNIT - V

Emerging database technologies and applications:

Mobile databases, multimedia databases, geographic information systems, genome data management.

12 Periods

12 Periods

XML and Internet Databases:

Structured, semi structured, and unstructured data, XML Hierarchical (Tree) Data model.

Prescribed Books

- 1. ThomasM Connolly and Carolyn E.Begg., "Database Systems, A practical approach to design, implementation and management"
- 2. ElmasriNavate, "Fundamentals of Database Systems", 5/e, Pearson Education.

Reference Book

1. Ozsu, "Principles of Distributed Database Systems", 2/e, PHI

- 1. www.cs.uoi.gr/~pitoura/grdb01/sylabus.html
- 2. https://en.wikipedia.org/wiki/Databases
- 3. www.cs.duke.edu/courses/fall07/cps216/

CA225(E): CYBER SECURITY

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA213(Cryptography and Network Secuirity).

Course Objectives

At the end of the course the students will understand

- Fundamentals of information security and threats, data leakage & prevention.
- Cyber security policies and Evolutions.
- Cyber security objectives and decision makers.
- Cyber governance issues.
- Cyber management issues.

Course Outcomes

At the end of the course the students will be able to

- Identify common security vulnerabilities/attacks, principles and concepts, Data protection and content analysis techniques.
- Know polices, laws & regulations and counter measures.
- Know the concepts of security frameworks, security policy objectives and security documentation.
- Analyze copyright & Trademarks, cyber user issues and conflict issues.
- Analyze risk management in various sectors and data backup procedures.

UNIT –I

12 Periods

Information Security and Threats: Information Security, Information Assets, Threats to Information Assets.

Fundamentals of Information Security: Elements of information security, Principles and concepts –data security, Types of controls.

Data Leakage: Introduction –Data Leakage, Organizational Data Classification, Location and Pathways, Content Awareness, Content

Analysis Techniques, Data Protection, DLP Limitations, DRM-DLP Conundrum.

UNIT –II

Cyber Security Introduction: Cyber Security, Cyber Security policy, Domains of Cyber Security Policy: Laws and Regulations, Enterprise Policy, Technology Operations, Technology Configuration, Strategy Versus Policy.

Cyber Security Evolution: Productivity, Internet, e-commerce, Counter Measures, Challenges.

UNIT – III

Cyber Security Objectives: Cyber Security Metrics, Security Management Goals, Counting Vulnerabilities, Security Frameworks, Security Policy Objectives.

Guidance for Decision Makers: Tone at the Top, Policy as a Project, Cyber Security Management: Arriving at Goals, Cyber Security Documentation.

UNIT-IV

Cyber Governance Issues: Net Neutrality, Internet Names and Numbers, Copyright and Trademarks, Email and Messaging.

Cyber User Issues:Malvertising, Impersonation, Appropriate Use, Cyber Crime, Geo location, Privacy.

Cyber Conflict Issues: Intellectual property Theft, Cyber Espionage, Cyber Sabotage, Cyber Welfare.

UNIT-V

Cyber Management Issues: Fiduciary Responsibility, Risk Management, Professional Certification, Supply Chain, Security Principles, Research and Development.

Cyber Infrastructure Issue: Banking and finance, Health care, Industrial Control systems.

12 Periods

12 Periods

12 Periods

Data Backup: Data Backup, Types of Backup, Backup Procedures, Types of Storage.

Prescribed Books

- NASSCOM "Handbook of Security Analyst", SSC/Q0901, 2015. (For Unit -I& Unit-V)
- Jennifer L. Bayuk, J. Healey, P. Rohmeyer, Marcus Sachs, Jeffrey Schmidt, Joseph Weiss "Cyber Security Policy Guidebook" John Wiley & Sons 2012.(For Unit-II, Unit-III, Unit-IV & Unit-V)

Reference Books

- 1. Rick Howard "Cyber Security Essentials" Auerbach Publications 2011.
- 2. Richard A. Clarke, Robert Knake "Cyberwar: The Next Threat to National Security & What to Do About It" Ecco 2010.
- 3. Dan Shoemaker Cyber security The Essential Body of Knowledge, 1st ed. Cengage Learning 2011.
- 4. Augastine, Paul T.," Cyber Crimes and Legal Issues", Crecent Publishing Corporation, 2007.

- 1. http://resources.infosecinstitute.com/pivoting-exploit-system-anothernetwork/
- 2. http://www.civilserviceindia.com/subject/General-Studies/notes/basicsof-cyber-security.html
- 3. https://www.nist.gov/publications/cio-cyber-security-notes
- 4. unipune.ac.in/cins/cybersecurity

CA261 : .NET PROGRAMMING LAB

Lectures	: —	Sessional Marks	: 40
Practicals	: 6 Periods/week	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisite:CA111(Problem solving with C),CA211(Objected Oriented Programming through Java).

Course Objectives

- To learn the C# language and the .NET Framework.
- To know working of Microsoft Visual Studio Development Environment.
- To use windows Forms applications with rich, highly responsive user interfaces.
- To develop web applications and Services using ASP.NET.
- To know the use of Language Integrated Query (LINQ).

Course Outcomes

- Apply basic concepts of C# programming.
- Apply advanced concepts of C# programming.
- Develop and deploy windows applications.
- Develop and deploy web applications and web services using ASP.NET.
- Develop database driven applications using XML and LINQ.

LIST OF PROGRAMS

- 1. Write a program to demonstrate OOPs concepts in C#.
- 2. Write a program to demonstrate Exception handling in C#.
- Write a program to illustrate the concepts of events & delegates in C#.
- 4. Write a program to demonstrate multi-threaded programming in C#.
- 5. Write a program to demonstrate generics.
- 6. Write a program to demonstrate StreamWriters and StreamReaders.
- 7. Write a program to demonstrate Building and consuming a multi file assembly.
- 8. Write a program to demonstrate DML and DDL Commands using ADO.NET.

- 9. Write a program to build a data driven ASP.NET Web application.
- 10. Write a program to demonstrate ASP.NET controls.
- 11. Write a program to demonstrate Windows Forms Controls.
- 12. Write a program to demonstrate the building of a simple Windows Forms Application.
- 13. Develop a project which displays the student information in the relevant fields from the database which already exists.

- 1. https://www.tutorialspoint.com
- 2. howtostartprogramming.com
- 3. https://www.microsoft.com/net/tutorials/csharp/getting-started
- 4. https://www.w3schools.com/asp/

CA262:WEB SERVICES LAB

Lectures	: —	Sessional Marks	: 40
Practicals	: 6 Periods/week	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisites:CA211(Objected Oriented Programming through Java), CA212(Web Technologies).

Course Objectives

At the end of the course the students will understand

- J2EE Multi-Tire architecture.
- Server side scripting with Java Server Pages.
- XML parsers and Enterprise Java beans.
- RMI, Java Mail and Corba.
- Web services and its related technologies.

Course Outcomes

At the end of the course the students will be able to

- Design dynamic web pages with JSP.
- Develop DOM and SAX parsers.
- Create Enterprise Java Beans.
- Use Java Mail, RMI and CORBA in real time web applications.
- Create and consume Web Services.

List of Programs

- 1. Write a program to Integrate JSP & Servlets.
- 2. Write an application using JSP Technology.
- 3. Write a program to demonstrate Java Bean using JSP Implicit objects.
- 4. Write a program to demonstrate cookie & Sessions using JSP.
- 5. Write a program to demonstrate Statefull/Stateless Session Bean.
- 6. Write a program to demonstrate XML SAX Parser.
- 7. Write a program to demonstrate XML DOM Parser.
- 8. Write a program to demonstrate Java Mail.
- 9. Write a program to demonstrate Remote Method Invocation.

- 10. Write a program to demonstrate CORBA using Java IDL.
- 11. Write a program to implement the operation can receive request and will return a response in two ways.
- 12. One Way operation
- 13. Request Response.
- 14. Write a program to implement business UDDI Registry entry.
- 15. Write a program to implement WSDL Service.
- 16. Demonstrate how to describe web services.

- 1. http://www.tutorialspoint.com/listtutorials/java/j2ee/1
- 2. http://docs.oracle.com/javaee/6/tutorial/doc/
- 3. http://www.j2eebrain.com/

CA263 :SOFT SKILLS LAB

Lectures	: —	Sessional Marks	: 40
Practicals	: 4 Periods/week	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisite: CA153(Communication Skills Lab).

Soft Skills are emotion based competencies that define an individual. The objective is to develop the intellectual, emotional and social understanding of every student and to make students become productively engaged citizens with knowledge, skills, dispositions and confidence to participate fully in life. It guides the students toward competency in thinking, reasoning, social, civic responsibility, character, communication and employability.

The methodology includes interactive sessions, role-play, team-work /group work /pair-work, group discussion, peer evaluation and written examination. The emphasis is on learning by doing.

Course Objectives

- Students will be trained to acquire conclusions using well-structured and logical reasoning. To develop a reasonable line of argument by using valid and reliable evidence.
- To extend their abilities to develop the art of effective reading fluently and confidently a variety of texts for various purposes.
- To enable the students use phrasal verbs, one-word substitutes and idiomatic expressions in an apt manner.
- To equip students with appropriate and spontaneous speech dynamics.
- To develop production and process of language useful for social and professional life.

Course Outcomes

- Employ different skills, inferring lexical and contextual meaning and attempt comprehension passages.
- Comprehend and use language with accuracy, clarity and discernment. Use confidently phrases and idioms for effective communication.
- To develop appropriate and spontaneous speech dynamics in professional situations (presentations, group discussions, etc.).

- Focus on communication skills and social graces necessary for effective communication.
- Students express ideas in a non-judgemental environment which encourages synthesis and creative applications.
- 1. Employability: Interview Skills: Types of interviews, FAQS in interviews, Mock Interviews.
- 2. Resume's writing
- 3. Group Discussions:
 - Participate as an effective member of a team.
 - Exhibits leadership abilities and team building.
 - Group dynamics, modulation of voice.
- 4. Reading Skills:
 - Intensive and Extensive Reading-strategies -Skimming and Scanning-reading comprehension
 - Reading a Newspaper editorials-analyzing.
 - Vocabulary: Idioms and Phrases, One-word substitutes, Error finding, Correction of sentences
- 5. Behavioural Skills: Attitude, Confidence, Stress & Time Management. Non – Verbal Communication - Kinesics.

6. Presentation Skills –

- a) Reviews film story- poem
- b) Communication Skills extempore.
- c) Role Plays.

Learning Resources

- 1. A Course in English Communication by KiranmaiDutt, Rajeevan, CLNPrakash, 2013.
- 2. English Idioms by Jennifer SeidlW.McMordie, OUP, VEdition, 2009.
- 3. Hari Mohan Prasad & Rajneesh Mohan-How to prepare for Group Discussion and Interview, 2nd Edition, TMT.
- 4. Edgar Thrope, ShowickThrope- Winning at Interviews, Pearson E ducation, 2007.
- 5. Wallace Masters Personality Development, Cengage Learning, 2008

III Year MCA – I Semester CA311:DATA MINING AND BIG DATA

Lectures	:	4 Periods/week	Sessional Marks	:	40
Practicals	:	_	Sem. End Exam Marks	:	60
Sem. End Exam Duration	:	3 hours	Credits	:	04

Prerequisite: CA122(Database Management Systems).

Course Objectives

- To introduce the basic concepts of Data Warehouse and Data Mining techniques.
- To discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
- To understand the need and application of Map Reduce
- To understand the various search algorithms applicable to Big Data
- To develop further interest in research and design of new Data Mining techniques.

Course Outcomes

Upon completion of this course, the students will be able to

- Process raw data to make it suitable for various data mining algorithms.
- Discover and measure interesting patterns from different kinds of databases.
- Apply the techniques of clustering, classification, association finding, feature selection and visualization to real world data.
- Design algorithms by employing Map Reduce technique for solving Big Data problems
- Design solutions for problems in Big Data by suggesting appropriate clustering techniques

UNIT – I

Data Warehouse and OLAP Technology: An Overview: What is Data Warehouse? - A Multidimensional Data Model - Data warehouse Architecture - From Data Warehousing to Data Mining

Data mining – Introduction, Data mining on what kind of data , Data mining functionalities classification of Data mining systems, Major issues in Data mining

UNIT – II

Mining Association rules in large databases - Association rule mining, Mining single-Dimensional Boolean association rules from Transactional databases, Mining multi-Dimensional Association rules from relational Databases and Data Warehouses

UNIT – III

Classification and Prediction - Introduction classification by decision tree induction, Bayesian Classification. Other classification methods, classification by back propagation, Prediction, classifier accuracy

UNIT – IV

Cluster analysis – Introduction types of data in cluster analysis a categorization of major clustering methods portioning methods, hierarchical methods, Density based methods,: DBSCAN, Grid-based method : STRING, Model based clustering method: Statistical Approach, outlier analysis.

UNIT – V

Big Data: Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications.

Hadoop: Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands, Anatomy of File Write and Read., HadoopMapReduce paradigm. Writing HadoopMapReduce Programs

Prescribed Books

- 1. Jiawei Han MichelineKamber, "Data mining & Techniques", Morgan Kaufmann publishers
- 2. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
- 3. Chris Eaton, Dirk deroos et al., "Understanding Big data", McGraw Hill, 2012.
- 4. Tom White, "HADOOP: The definitive Guide", O Reilly 2012.

12 Periods

12 Periods

12 Periods

Reference Book

1. Frank J.Ohlhorst, "Big Data Analytics: Turning Big Data Into Big Money", 2nd Edition, TMH, 2012.

- 1. http://www.tutorialspoint.com/data_mining/
- 2. https://www.tutorialspoint.com/big_data_tutorials.htm
- 3. http://www.datasciencecentral.com/profiles/blogs/17-short-tutorials-alldata-scientists-should-read-and-practice
- 4. http://nptel.ac.in/courses/110106064/

CA312: MOBILE APPLICATION DEVELOPMENT USING ANDROID

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisites: CA111(Problem solving with C), CA163(Unix and Shell Programming).

Course Objectives

At the end of the course the students will understand

- characteristics of mobile applications.
- Intricacies of UI required by mobile applications.
- design aspects of mobile application.
- development and programming of mobile applications.

Course Outcomes

At the end of the course the students will be able to

- Understand the Android application architecture, including the roles of the task stack, activities, and services.
- Build user interfaces with fragments, views, form widgets, text input, lists, tables, and more.
- Use advanced UI widgets for scrolling, tabbing, and layout control.
- Present menus via the Android action bar and handle menu selections.
- To develop advanced mobile applications that accesses the databases and the web.

UNIT – I

12 Periods

Getting Started With Android Programming:

What Is Android? - Android Versions, Features of Android, Architecture of Android, Android Devices in the Market, The Android Market, The Android Developer Community. Setting up An Android Studio Development Environment, Creating Your First Android Application, Anatomy of an Android Application.

UNIT – II

Activities, Fragments, and Intents: Understanding Activities - Applying Styles and Themesto an Activity, Hiding the Activity Title, Displaying a Dialog Window, Displaying a Progress Dialog, Displaying a More Sophisticated Progress Dialog.

Activities, Fragments, and Intents: Fragments-Adding Fragments Dynamically, Life Cycle of a Fragment, Interactions between Fragments. Calling Built-In Applications Using Intents -Understanding the Intent Object, Using Intent Filters, Displaying Notifications.

UNIT – III

Getting to know the Android User Interface: Understanding the Components of a Screen -Views and ViewGroups, LinearLayout, AbsoluteLayout, TableLayout, RelativeLayout, FrameLayout, ScrollView.

Getting to know the Android User Interface: Adapting to Display Orientation- AnchoringViews, Resizing and Repositioning.Utilizing the Action Bar - Adding Action Items to theAction Bar, Customizing the Action Items and Application Icon, Creating the User InterfaceProgrammatically.

UNIT – IV

Designing your User Interface with Views: Using Basic Views - textView View, Button, ImageButton, EditText, CheckBox, ToggleButton, RadioButton, and RadioGroupViews, ProgressBar View, AutoCompleteTextView View.

Designing your User Interface with Views: Using List Views to Display Long Lists-ListView View, Using the Spinner View.

UNIT – V

Displaying Pictures and Menus with Views: Using Image Views to Display Pictures-Gallery and ImageView Views, Using Menus with Views-Creating the Helper Methods, Options Menu, Context Menu.

Data Persistence: Creating and Using Databases- Creating the DBAdapter Helper Class, Using the Database Programmatically, Pre-Creating the Database.

12 Periods

12 Periods

12 Periods

Prescribed Book

1.Wei-MengLee,"Beginning Android 4 Application Development",Wiley India (Wrox).

Reference Books

- 1. Reto Meier, "Professional Android 4 Application Development", Wiley India, (Wrox).
- 2. James C Sheusi,"Android Application Development for Java Programmers", Cengage Learning.
- 3. Sam's "Teach Yourself Android Application Development in 24 Hrs", Lauren Darcy and Shane Conder, 2/e.
- 4. Wallace Jackson,"Android apps for absolute beginners", Apress.

- http://blogs.msdn.com/b/ie/archive/2010/11/17/html5-and-real-worldsite-performance-seventh-ie9-platform-preview-available-fordevelopers.aspx
- 2. https://www.tutorialspoint.com/mobile_development_tutorials.htm
- 3. https://www.tutorialspoint.com/android/
- 4. https://developer.android.com/training/basics/firstapp/creatingproject.html

CA313: CLOUD COMPUTING

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA123(Computer Networks)

Course Objectives

- To understand the concepts of Cloud Computing.
- To learn Taxonomy of Virtualization Techniques.
- To learn Cloud Computing Architecture.
- To acquire knowledge on Aneka Cloud Application Platform.
- To learn Industry Cloud Platforms.

Course Outcomes

At the end of the course student will:

- Understand the key dimensions of the challenge of Cloud Computing.
- Understand the concept of virtualization and how this has enabled the development of Cloud Computing.
- Know the fundamentals of cloud, cloud Architectures and types of services in cloud.
- Understand scaling, cloud security and disaster management.
- Design different Applications in cloud.
- Explore some important cloud computing driven commercial systems.

UNIT-I

12 Periods

Introduction: Cloud computing at a glance, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies.

Principles of Parallel and Distributed Computing: Eras of Computing, Parallel Vs Distributed computing, Elements of Parallel Computing, Elements of Distributed Computing, Technologies for Distributed Computing.

Virtualization: Introduction, Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.

UNIT-II

Cloud Computing Architecture: Introduction, Cloud reference model, Types of clouds, Economics of the cloud, open challenges.

Aneka: Cloud Application Platform: Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloud programming and Management.

Concurrent Computing: Thread Programming: Introducing Parallelism for Single machine Computation, Programming Application with Threads, Multithreading with Aneka, Programming Applications with Aneka Threads.

UNIT-III

High-Throughput Computing: Task Programming: Task Computing, Task-based Application Models, Aneka Task-Based Programming.

Data Intensive Computing: Map-Reduce Programming: What is Data-Intensive Computing, Technologies for Data-Intensive Computing, Aneka MapReduce Programming.

UNIT-IV

Cloud Platforms in Industry: Amazon Web Services, Google AppEngine, Microsoft Azure, Observations.

Cloud Applications: Scientific Applications, Business and Consumer Applications.

Advanced Topics in Cloud Computing: Energy Efficiency in Clouds, Market Based Management of Clouds, Federated Clouds/ InterCloud, Third Party Cloud Services.

UNIT-V

SA Management in Cloud Computing: Traditional Approaches to SLO Management, Types of SLA, Life Cycle of SLA, SLA Management in Cloud, Automated Policy-based Management.

Data Security in the Cloud: An Introduction to the Idea of Data Security , The Current State of Data Security in the Cloud, Homo Sapiens and

12 Periods

12 Periods

12 Periods

Digital Information, Cloud Computing and Data Security Risk, Cloud Computing and Identity, The Cloud, Digital Identity, and Data Security, Content Level Security - Pros and Cons.

Prescribed Books

- 1. Raj kumarBuyya, Christian Vecchiola, S.ThamaraiSelvi, "Mastering Cloud Computing", McGraw Hill Education (2013).
- 2. Raj kumarBuyya, James Broberg, AndrZejGoscinski, "Cloud Computing Principles and Paradigms", Wiley Publications.

Reference Books

- 1. Michael Miller, "Cloud Computing", Pearson Education.
- 2. 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.
- 3. George Reese, "Cloud Application Architectures", ISBN: 8184047142,Shroff/O'Reilly, 2009.
- 4. KailashJayaswal, JagannathKallakurchi, Donald J. Houde, Dr. Deven Shah, "Cloud Computing Black Book", Dreamtech Press.

- 1. https://webobjects.cdw.com/webobjects/.../cloud-computing/
- 2. www.webopedia.com
- 3. https://technet.microsoft.com/en-us/magazine/hh509051.aspx

CA314(A): MACHINE LEARNING USING R

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisites: CA111(Problem solving with C), CA124(Probability and Statistics), CA224(Artificial Intelligence).

Course Objectives

- To introduce the concepts of 'R' programming language
- To introduce the basic concepts and techniques of Machine Learning
- To have a thorough understanding of the Machine learning techniques using selected example implementation in R.
- To study the various probability based learning techniques using R
- To understand modeling and measuring performance of the model
- To introduce specialized machine learning application areas.

Course Outcomes

Upon completion of the course, the students will be able to:

- Write simple programs in R
- Discuss machine learning topics
- Apply the machine learning strategy for any given problem
- Solve machine learning problems using R
- Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
- Design systems that uses the appropriate graph models of machine learning in R
- Modify existing machine learning algorithms to improve classification
 efficiency
- Demonstrate performance measures of the algorithms

UNIT-I :INTRODUCTION

12 Periods

The origins of machine learning, Uses and abuses of machine learning - Machine learning successes, the limits of machine learning,

Machine learning ethics, **How machines learn -** Data storage, Abstraction, Generalization, Evaluation, **Machine learning in practice -** Types of input data, Types of machine learning algorithms, Matching input data to algorithms.

Machine learning with R: Installing R packages -Loading and unloading R packages, **Managing and Understanding Data - R data structures-** Vectors, Factors, Lists, Data frames, Matrixes and arrays.

Managing data with R - Saving, loading, and removing R data structures, Importing and saving data from CSV files.

Exploring and understanding data - Exploring the structure of data, Exploring numeric variables, Measuring the central tendency – mean and median, Measuring spread – quartiles and the five-number summary, Visualizing numeric variables – box plots, Visualizing numeric variables – histograms, Understanding numeric data – uniform and normal distributions, measuring spread – variance and standard deviation, Exploring categorical variables, measuring the central tendency – the mode, Exploring relationships between variables, Visualizing relationships – scatter plots, Examining relationships – two-way cross-tabulations

UNIT - II : LAZY LEARNING AND PROBABILISTIC LEARNING 12 Periods

Understanding nearest neighbor classification - The k-NN algorithm, Measuring similarity with distance, choosing an appropriate k, preparing data for use with k-NN, Why is the k-NN algorithm lazy, **Example –** diagnosing breast cancer with the k-NN algorithm, Probabilistic Learning – Classification Using Naive Bayes - Understanding Naive Bayes - Basic concepts of Bayesian methods , Understanding probability, Understanding joint probability, computing conditional probability with Bayes' theorem, The Naive Bayes algorithm, Classification with Naive Bayes, The Laplace estimator, Using numeric features with Naive Bayes, **Example – filtering mobile phone spam with the Naive Bayes** algorithm

UNIT –III : DECISION TREES AND REGRESSON 12 Periods

Divide and Conquer – Classification Using Decision Trees and Rules

Understanding decision trees- Divide and conquer, The C5.0 decision

tree algorithm, Choosing the best split, Pruning the decision tree, **Example** – identifying risky bank loans using C5.0 decision trees, Understanding classification rules- Separate and conquer, The 1R algorithm, The RIPPER algorithm, Rules from decision trees, What makes trees and rules greedy?, **Example – identifying poisonous mushrooms** with rule learners, Forecasting Numeric Data – Regression Methods - Understanding regression, Simple linear regression, Ordinary least squares estimation, Correlations, Multiple linear regression, **Example –** predicting medical expenses using linear regression, Understanding regression trees and model trees- Adding regression to trees, **Example** – estimating the quality of wines with regression trees and model trees

UNIT – IV

12 Periods

BLACK BOX METHODS AND EVALUATING MODEL PERFORMANCE

Neural Networks and Support Vector Machines- Understanding neural networks

From biological to artificial neurons, Activation functions, Network topology, The number of layers, The direction of information travel, The number of nodes in each layer, Training neural networks with back propagation, **Example – Modeling the strength of concrete with ANNs, Understanding Support Vector Machines-** Classification with hyper planes, The case of linearly separable data, The case of nonlinearly separable data, Using kernels for non-linear spaces, **Example – performing OCR with SVMs**

Evaluating Model Performance - Measuring performance for classification - Working with classification prediction data in R, A closer look at confusion matrices, Using confusion matrices to measure performance, Beyond accuracy – other measures of performance, The kappa statistic, Sensitivity and specificity, Precision and recall, The Fmeasure Visualizing performance trade-offs, ROC curves, **Estimating future performance-** The holdout method, Cross-validation, Bootstrap sampling

UNIT-V : Improving model performance & specialized machine learning topics 12 Periods

Tuning stock models for better performance - Using caret for automated parameter tuning Creating a simple tuned model, Customizing the tuning process, Improving model performance with meta-learning - Understanding ensembles, Bagging, Boosting, Random forests, Training random forests, Evaluating random forest performance, Working with proprietary files and databases - Reading from and writing to Microsoft Excel, SAS, SPSS, and Stata files, Querying data in SQL databases, Working with online data and services ,-Downloading the complete text of web pages, Scraping data from web pages, Parsing XML documents, Parsing JSON from web APIs, Working with domain-specific data - Analyzing bioinformatics data, Analyzing and visualizing network data, Improving the performance of R

Prescribed Book

1. Machine Learning with R Brett Lantz second edition, Packt Publishing Ltd, 2015

Reference Books

- 1. Stephen Marsland Machine Learning An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
- 2. Tom M Mitchell Machine Learning First Edition, McGraw Hill Education, 2013.
- Peter Flach Machine Learning: The Art and Science of Algorithms that Make Sense of Data – First Edition, Cambridge University Press, 2012.
- 4. Norman Matloff The Art of R Programming, No Starch Press, 2011

- 1. http://videolectures.net/Top/Computer_Science/Machine_Learning/
- 2. http://www.cs.cmu.edu/~tom/pubs/MachineLearning
- 3. https://onlinecourses.nptel.ac.in/noc17_cs26/preview
- http://www.it-ebooks.info/search/?q=Machine+learning+ using+R&type=title

- 5. https://in.mathworks.com/campaigns/products/ppc/google/machinelearning-with-matlab.html?s_eid=psn_40621491592&q=machine% 20learning%20tutorial
- 6. https://www.toptal.com/machine-learning/machine-learning-theory-anintroductory-primer
- 7. https://www.tutorialspoint.com/mahout/mahout_machine_learning.htm
- 8. https://www.youtube.com/watch?v=b5NIRg8SjZg&list=PLFze15 KrfxbH8SE4FgOHpMSY1h5HiRLMm
- 9. https://www.analyticsvidhya.com/blog/2015/01/introduction-online-machine-learning-simplified-2/
- 10. http://machinelearningmastery.com/start-here/#r

CA314(B): SOFT COMPUTING

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisites: CA224(A)(Artificial Intelligence, Data Mining), Data Mining Basics.

Course Objectives

- To conceptualize the working of human brain using ANN.
- To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inference systems.
- To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience.
- To provide the mathematical background for carrying out the optimization and familiarizing genetic algorithm for seeking global optimum in self- learning situation.

Course Outcomes

Upon completion of the course, the students will be able to:

- Analyze and develop the applications using fuzzy logic.
- Design inference systems.
- Understand the difference between learning and programming and explore practical applications of Neural Networks (NN).
- Appreciate the importance of optimizations and its use in computer engineering fields and other domains.
- Understand the efficiency of a hybrid system and how Neural Network and fuzzy logic can be hybridized to form a Neuro-fuzzy network and its various applications.

UNIT – I: INTRODUCTION TO SOFT COMPUTING 10 Periods

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT-II: GENETIC ALGORITHMS

Introduction, Building block hypothesis, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, JSPP (Job Shop Scheduling Problem), TSP (Travelling Salesman Problem), Differences & similarities between GA & other traditional methods, Applications of GA.

UNIT -III : NEURAL NETWORKS

Machine Learning using Neural Network, Adaptive Networks – Feed Forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance Architectures – Advances in Neural Networks.

UNIT-IV: FUZZY LOGIC

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions-Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making

UNIT-V: NEURO-FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rule base Structure Identification – Neuro-Fuzzy Control – Case Studies.

Prescribed Book

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, EijiMizutani, "Neuro-Fuzzy and Soft computing", Prentice-Hall of India, 2003

Reference Books

- 1. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 2007.
- 2. S.N.Sivanandam, S.N.Deepa, "Introduction to Genetic Algorithms", Springer, 2007.

14 Periods

12 Periods

12 Periods

3. S. Rajasekaran and G.A.V.Pai,Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI,2003

- 1. http://www.myreaders.info/html/soft_computing.html
- 2. https://en.wikipedia.org/wiki/Soft_computing
- 3. http://www.softcomputing.net/tutorial.html

CA314(C): SOFTWARE TESTING AND QUALITY ASSUARANCE

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA215 (Software Engineering).

Course Objectives

- To make the students proficient in checking the software to find errors and remove them if found.
- To make the learners understand the concept that the testing is the last step before releasing software is performed at the end of software development life cycle.
- To make the learners aware of functional testing tools.

Course Outcomes

Upon completion of the course, the students will be able to:

- Aware of different types of testing.
- Understand the concept of object oriented testing with examples.
- Aware of test cases preparation, management, execution and reporting using functional test tool.

UNIT – I

12 Periods

Basic Concepts and Preliminaries: Quality Revolution, Software Quality, Role of Testing, Verification and Validation, Failure, Error, Fault and Defect, Notion of software reliability, Objective of Testing, Test case, Issues, Activities, Levels, Test case selection, white-Box and Black-Box testing, Test Plan and Design, test tools and automation.

Unit Testing: Concept, Static, Defect Prevention, Dynamic, Mutation testing, Debugging, Tools

Control Flow Testing: Basic idea, Outline, Control flow graph, Paths in a control flow graph, path selection criteria, Generating Test input, Examples of test data selection

UNIT – II

Data Flow Testing: General Idea, Data Flow Anomaly, Overview of Dynamic Data Flow Testing, Data Flow Graph, Data Flow Term, Data Flow Testing Criteria, Comparison of Data Flow Test Selection Criteria, Feasible Paths and Test Selection, Criteria Comparison of Testing Techniques.

Domain Testing: Domain Error, Testing for Domain Errors, Sources of Domains, Types of Domain Errors, ON and OFF Points, Test Selection Criterion.

System Integration Test: Concept. Different Types of Interfaces and Interface Errors, Granularity of System Integration Testing, System Integration Techniques, Software and Hardware Integration, Test Plan for System Integration, Off-the-Shelf Component Integration.

UNIT - III

Functional Testing: Concepts of Howden, Complexity of Applying Functional Testing, Pairwise Testing, Equivalence Class Partitioning, Boundary Value Analysis, Decision Tables, Random Testing, Error Guessing, Category Partition.

System Test Design: Test Design Factors, Requirement Identification, Characteristics of Testable Requirements. Test Objective Identification. Modeling a Test Design Process, Modeling Test Results, Test Design Preparedness Metrics, Test Case Design Effectiveness

System Test Planning and Automation: Structure of a System Test Plan, Introduction and Feature Description, Assumptions, Test Approach, Test Suite Structure, Test Environment, Test Execution Strategy, Test Effort Estimation, Scheduling and Test Milestones, System Test Automation, Evaluation and Selection of Test Automation Tools. Test Selection Guidelines for Automation, Characteristics of Automated Test Cases, Structure of an Automated Test Case, Test Automation Infrastructure

UNIT – IV

12 Periods

System Test Execution: Basic Ideas, Modeling Defects, Preparedness to Start System Testing, Metrics for Tracking System Test, Orthogonal Defect Classification, Defect Causal Analysis, Beta Testing, First Customer

12 Periods

12 Periods

174

Shipment, System Test Report, Product Sustaining, Measuring Test Effectiveness

Acceptance Testing: Types, Criteria, Selection, Test Plan, Test Execution, Test Report, Testing in eXtreme Programming

Software Reliability: What, Definition, Factors influence, Applications, Operational Profile, Reliability Models

UNIT – V

12 Periods

Test Team Organization: Test Groups, Software Quality Assurance Group, System Test Team hierarchy, Effective Stafng of Test Engineers, Recruiting Test Engineers, Retaining Test Engineers, Team Building.

Software Quality: Five Views of Software Quality, McCall's Quality Factors and Criteria, ISO 9126 Quality Characteristics, ISO 9000:2000 Software Quality Standard

Maturity Models: Basic Idea in Software Process, Capability Maturity Model, Test Process Improvement, Testing Maturity Model

PrescribedBook

1. Kshirasagarnaik, priyadarshitripathy, "Software Testing and Quality Assurance:Theory and Practice", Wiley.

Reference Books

- 1. Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing Principles and practices", Pearson Education.
- 2. Dr. K.V.K.K.Prasad, "Software Testing Tools", Dream Tech Press.
- 3. Brian Marick, "The craft of software Testing", Pearson Education.
- 4. Edward Kit, "Software Testing in the Real World", Pearson.
- 5. Meyers, "Art of Software Testing", John Wiley.

- 1. https://www.tutorialspoint.com/software_testing_dictionary/ quality_assurance.htm
- 2. www.guru99.com/software-testing.html
- 3. www.qatutorial.com/

CA314(D) : ENTERPRISE RESOURCE PLANNING

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA115 (Accountancy and Financial Management),

CA125(Management Information Systems).

Course Objectives:

- To understand the foundations of Enterprise planning
- To understand the business benefits of ERP systems
- To understand information systems development process for enterprise systems.
- To discuss about ERP systems in various sectors.

Course Outcomes:

Upon completion of the course, the students will be able to:

- Differentiate traditional systems development and ERP systems development.
- Analyze functional modules of ERP.
- Develop information systems for an enterprise.
- Apply ERP principles in various sectors.

UNIT-I:

12Periods

Foundation for Understanding ERP systems: The emergence of ERP systems, Business benefits of ERP, ERP modules, ERP design alternatives, The business case for ERP, The challenge of implementing an ERP system

UNIT-II:

10 Periods

Planning, Design and Implementation ERP systems: Traditional systems development, The ERP systems Development, ERP implementation steps

Case: Response to request for proposal (RFP) for an ERP system

UNIT-III:

ERP-Sales and Marketing: Management control process in sales and marketing, Sales and marketing modules in ERP system, ERP customer relationship management, Integration of sales and distribution with other modules

Case: Atlantic manufacturing sales

UNIT-IV:

ERP Systems-Accounting & Finance: Accounting & Finance processes, Management control processes in accounting, financial modules in ERP systems, new role for management Accounting

Case: Atlantic manufacturing accounts

UNIT-V:

ERP–Production and Material Management: Background, Production planning and manufacturing processes, Management Control processes in production and manufacturing, Production modules in ERP, Materials management in ERP, The future of ERP in manufacturing and the supply chain.

ERP systems- Human resources: Human Resource modules in ERP systems

Case: HR in Atlantic manufacturing.

Prescribed Book

1. Mary Sumner, "Enterprise Resource Planning", Pearson Education, 2013.

Reference Books

- David L. Olson, "Managerial issues of Enterprise Resource Planning systems" Of TMH
- 2. Edition 2004.
- 3. Ellen Monk "Enterprise Resource Planning" Cengage, 2012.
- 4. Alexis Leon "Enterprise Resource Planning" 2e, TMH ,2012

12Periods

14Periods

- 5. Goyal "Enterprise Resource Planning" TMH, 2012
- 6. Jagan Nathan Vaman "ERP Strategies for Steering Organizational competence and
- 7. Competitive Advantage" TMH, 2012.
- 8. Rajesh Ray "Enterprise Resource Planning "TMH, 2012
- 9. JyotindraZaveri, Enterprise Resource Planning, HPH, 2012

- 1. https://www.tutorialspoint.com/management_concepts/ enterprise_resource_planning.htm
- 2. http://www.managementstudyguide.com/enterprise-resourceplanning.htm
- 3. http://gurukpo.com/erp-system/

CA314(E): INFORMATION RETRIEVAL SYSTEMS

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite:CA111(Problem solving with C), CA122(Database Management Systems), Data Mining Basics.

Course Objectives

- To make the students study the text processing techniques which are required to produce basic document retrieval systems.
- To help the students in finding features on commercial information retrieval systems through physical inspection.

Course Outcomes

Upon completion of the course, the students will be able to:

- Aware of Content-based retrieval approaches Boolean, vector space, and probabilistic approaches.
- Understand the search techniques for commercial, digital information access and retrieval systems.

UNIT – I

12 Periods

12 Periods

Introduction to Information Processing systems: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

Information Retrieval System Capabilities: Search, Browse, Miscellaneous, standards.

UNIT – II

Cataloging and Indexing: History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction.

Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext and XML data structure, Hidden Markov Models.
UNIT – III

12 Periods

Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages.

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

UNIT – IV

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the INTERNET and Hypertext.

Information Visualization: Introduction, Cognition and Perception, Information visualization Techniques.

UNIT – V

12 Periods

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems.

Multimedia Information Retrieval Systems: Spoken Language Audio retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Image Retrieval, Video Retrieval.

Prescribed Book

1. Gerald J. Kowalski, Mark T. Maybury, "Information Storage and Retrieval Systems", Springer International Edition, 2005.

Reference Books

- 1. W. B. Frakes, Ricardo Baeza-Yates, Information Retrieval Data Structures and Algorithms: Prentice Hall PTR, 2000.
- 2. R. Baeza-Yates, Modern Information Retrival: Pearson Education, 2000.
- 3. R. Korfhage, Information Storage & Retrieval: John Wiley & Sons, 2006.
- 4. UttamSarmah, "Information Storage and Retrieval Systems", Aayu Publications (2015)

- G. Marchionini , Intersection of information retrieval and humancomputer interaction Available: http://www.youtube.com/ watch?v=noMQjrACHxQ
- 2. http://slidewiki.org/deck/345_information-retrieval-lecture-series#tree-0-deck-345-1-view
- 3. https://www.smartzworld.com/notes/information-retrieval-systems-irs/

CA315(A): INTERNET OF THINGS

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite:CA225(A)(Embedded Systems)

Course Objectives

The objective of the course is to understand:

- TheVision and Introduction of IoT.
- IoT Market perspective.
- Data and Knowledge Management and use of Devices in IoT Technology.
- State of the Art IoT Architecture.
- Real World IoT Design Constraints, Industrial Automation and Commercial Building Automation in IoT.

Course Outcomes

At the end of the course the student will be able to:

- Understand the vision of IoT from a global context.
- Determine the Market perspective of IoT.
- Use of Devices, Gateways and Data Management in IoT.
- Building state of the art architecture in IoT.
- Application of IoT in Industrial and Commercial Building Automation and Real World Design Constraints.

UNIT – I

12 Periods

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoTthe global context, A use case example, Differing Characteristics.

M2M to IoT – A Market Perspective – Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies.

UNIT – II

M2M to IoT-An Architectural Overview– Building architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management

UNIT –III

IoT Architecture-State of the Art - Introduction, State of the art.

Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model.

UNIT – IV

IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control

UNIT – V

Industrial Automation- Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things.

Commercial Building Automation- Introduction, Case study: phase onecommercial building automation today, Case study: phase two- commercial building automation in the future.

Prescribed Book

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the

12 Periods

12 Periods

12 Periods

Internet of Things:Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.

Reference Books

- 1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1stEdition, VPT, 2014.
- Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013

- 1. https://onlinecourses.nptel.ac.in/noc17_cs22/preview
- 2. http://www.cisco.com/c/en_in/solutions/internet-of-things/overview.html
- 3. https://www.microsoft.com/en-in/internet-of-things/
- 4. https://networks.nokia.com/innovation/iot
- 5. https://www.hcltech.com/Internet-of-Things-IoT
- 6. http://www.techmahindra.com/services/NextGenSolutions/IoT/ default.aspx

CA315(B):BIOINFORMATICS

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA111(Problem solving with C), Data Mining Basics.

Course Objectives

- To get exposed to the domain of bioinformatics
- To understand Genomic data acquisition and analysis
- To learn comparative and predictive analysis of DNA and protein sequence
- To understand Phylogenetic inference etc.
- To learn to model bioinformatics based applications
- To study the Microarray technologies for genome expression

Course Outcomes

Upon Completion of the course, the students will be able to

- Deploy the data warehousing and data mining techniques in Bioinformatics
- Model bioinformatics based applications
- Work on the protein sequences
- Use the Microarray technologies for genome expression
- Align gene sequences
- Find evolutionary distance among various species
- Gain knowledge in bioinformatics research issues.

UNIT-I: INTRODUCTION

Need for Bioinformatics technologies – Overview of Bioinformatics technologies – Structural bioinformatics – Data format and processing – secondary resources- Applications – Role of Structural bioinformatics - Biological Data Integration System.

MCA - R17

12 Periods

UNIT- II

DATAWAREHOUSING AND DATA MINING IN BIOINFORMATICS

Bioinformatics data – Data ware housing architecture – data quality – Biomedical data analysis –DNA data analysis – Protein data analysis – Machine learning – Neural network architecture-Applications in bioinformatics

UNIT- III : MODELING FOR BIOINFORMATICS 12 Periods

Hidden markov modeling for biological data analysis – Sequence identification – Sequence classification – multiple alignment generation – Comparative modeling – Protein modeling –genomic modeling – Probabilistic modeling – Bayesian networks – Boolean networks – Molecular modeling – Computer programs for molecular modeling

UNIT-IV : PATTERN MATCHING AND VISUALIZATION 12 Periods

Gene regulation – motif recognition and motif detection – strategies for motif detection –Visualization – Fractal analysis – DNA walk models – one dimension – two dimension – higher dimension – Game representation of Biological sequences – DNA, Protein, Amino acid sequences

UNIT-V: MICROARRAY ANALYSIS

Microarray technology for genome expression study – image analysis for data extraction –preprocessing – segmentation – gridding, spot extraction, normalization, filtering – cluster analysis – gene network analysis – Compared Evaluation of Scientific Data Management Systems– Cost Matrix – Evaluation model ,Benchmark, Tradeoffs

Prescribed Books

- 1. Yi-Ping Phoebe Chen (Ed), "Bio Informatics Technologies", First Indian Reprint, Springer Verlag, 2007.
- 2. N.J. Chikhale and VirendraGomase, "Bioinformatics-Theory and Practice", Himalaya Publication House, India, 2007

Reference Books

- 1. Zoe lacroix and Terence Critchlow, "Bio Informatics Managing Scientific data", First Indian Reprint, Elsevier, 2004
- 2. Bryan Bergeron, "Bio Informatics Computing", Second Edition, Pearson Education, 2003.
- 3. Arthur M Lesk, "Introduction to Bioinformatics", Second Edition, Oxford University Press, 2005
- 4. Burton. E. Tropp, "Molecular Biology: Genes to Proteins ", 4th edition, Jones and Bartlett Publishers, 2011
- 5. Dan Gusfield, "Algorithms on Strings Trees and Sequences", Cambridge University Press, 1997.
- 6. P. Baldi, S Brunak , Bioinformatics, "A Machine Learning Approach ", MIT Press, 1998

- 1. http://lectures.molgen.mpg.de/online_lectures.html
- 2. https://www.omixon.com/bioiformatics-for-beginners-interactive-programming-tutorials/
- 3. http://www.mrc-lmb.cam.ac.uk/rlw/text/bioinfo_tuto/introduction.html
- 4. https://www.ncbi.nlm.nih.gov
- 5. https://nihlibrary.nih.gov/training/bioinformatics
- 6. http://abacus.bates.edu/bioinformatics1/
- 7. https://digitalworldbiology.com/bioinformatics-tutorials

CA315(C):DEVOPS

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA215, Basics of Computing.

Course Objectives

- To provide the concepts and tools used to implement DevOps as a method for delivering systems to the enterprise with increased quality and velocity.
- To identify common issues in the development processes of systems and presents techniques to improve these processes through crossorganizational collaboration, shared responsibility, automated builds, testing, delivery, and monitoring.
- To offer the opportunity to get hands-on experience with common tools used in the industry to bridge the gap between abstract concepts and practical skills.

Course Outcomes

Upon completion of this course, students should be able to:

- Demonstrate an understanding of the need for DevOps and the problems it solves.
- Demonstrate an understanding of the DevOps concepts and practices (including its relationship to Agile, Lean and IT Service Management (ITSM)).
- Describe the role of workflows, communication and feedback loops.
- Define critical success factors and key performance indicators.
- Apply DevOps concepts in an enterprise environment by automating processes using tools
- Demonstrate an understanding of Continuous Integration and Delivery workflows.
- Describe the role of monitoring and the ways in which it helps IT and business succeed.

MCA - R17

UNIT-I

What Is DevOps? - Introduction - Why DevOps? - DevOps Perspective -DevOps and Agile - Team Structure - Coordination - Barriers.

The Cloud as a Platform - Introduction - Features of the Cloud - DevOps Consequences of the Unique Cloud Features.

Operations - Introduction - Operations Services - Service Operation Functions - Continual Service Improvement - Operations and DevOps.

UNIT-II

Overall Architecture - Do DevOps Practices Require Architectural Change? - Overall Architecture Structure - Quality Discussion of Micro service - Architecture - Amazon's Rules for Teams - Micro service Adoption for Existing Systems.

Building and Testing - Introduction - Moving a System through the Deployment - Pipeline - Crosscutting Aspects - Development and Precommit Testing - Build and Integration Testing - UAT/Staging/Performance Testing - Production - Incidents.

Deployment - Introduction - Strategies for Managing a Deployment - Logical Consistency – Packaging - Deploying to Multiple Environments - Partial Deployment - Rollback - Tools.

UNIT-III

Monitoring - Introduction - What to Monitor - How to Monitor - When to Change the Monitoring Configuration - Interpreting Monitoring Data -Challenges - Tools - Diagnosing an Anomaly from Monitoring Data-the Case of Platformer.com.

Security and Security Audits - What Is Security? - Threats - Resources to Be Protected - Security Roles and Activities - Identity Management -Access Control - Detection, Auditing, and Denial of Service - Development - Auditors - Application Design Considerations - Deployment Pipeline Design Considerations.

Other Ilities - Introduction - Repeatability - Performance - Reliability -Recoverability - Interoperability - Testability - Modifiability.

Business Considerations - Introduction - Business Case - Measurements and Compliance to DevOps Practices - Points of Interaction BetweenDev and Ops.

12 Periods

12 Periods

12 Periods

12 Periods

Supporting Multiple Datacenters - Introduction - Current State - Business Logic and Web Tiers - Database Tier - Other Infrastructure Tools - Datacenter Switch - Testing.

Implementing a Continuous Deployment Pipeline for Enterprises -Introduction - Organizational Context - The Continuous Deployment Pipeline - Baking Security into the Foundations of the CD Pipeline - Advanced Concepts.

Migrating to Microservices - Introduction to Atlassian - Building a Platform for Deploving Microservices - BlobStore: A Microservice Example -Development Process - Evolving BlobStore.

UNIT-V

UNIT-IV

Operations as a Process - Introduction - Motivation and Overview - Offline Activities - Online Activities - Error Diagnosis - Monitoring.

The Future of DevOps - Introduction - Organizational Issues - Process Issues - Technology Issues - What About Error Reporting and Repair? -Final Words.

Prescribed Book

1. Len Bass, Ingo Weber, Liming Zhu, "DevOps: A Software Architect's Perspective". Addison-Wesley (2015).

Reference Books

- 1. Jennifer Davis & Katherine Daniels, "Effective DevOps: Building a Culture of Collaboration, Affinity, and Tooling at Scale", O'Reilly (2015).
- 2. Kim, Gene, Behr, Kevin, & Spafford, George, "The phoenix project: A novel about IT, DevOps, and helping your business win: IT Revolution Press", ISBN 978-0988262591 (2013).

Web Resources

- 1. https://aws.amazon.com/devops/resources/
- 2. https://theagileadmin.com/what-is-devops/
- https://techbeacon.com/53-essential-resources-devops-practitioners 3.

CA315(D): E-COMMERCE

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: CA115(Accountancy and Financial Management)

Course Objectives

The course should enable the student to:

- Describe E-Commerce Framework.
- Explain Electronic System for Payment.
- Learn use of E-commerce Advertising and Marketing
- Understand business documents and Digital Library.
- Understand use of multimedia for E-Commerce.

Course Outcomes

The student should be able to

- Understand the basics of E-Commerce.
- Know all e-payment systems.
- Familiar with E-Commerce advertising.
- Familiar with all digital business documents used.
- Familiar with multimedia systems.

UNIT-I

12 Periods

Electronic Commerce: Electronic Commerce Framework; Electronic Commerce and Media Convergence; The Anatomy of E-Commerce Application; Electronic Commerce Organization Applications- The Network Infrastructure for Electronic Commerce: Market Forces Influencing the I-Way; Components of the I Way; Network Access Equipment; the Last MIIe: Local Roads and Access Ramps; Global Information Distribution: Networks: Public Policy Issues Shaping the I-Way.

UNIT – II

The Internet as a Network Infrastructure: The Internet Terminology;

Chronological History of the Internet NSFNET: Architecture and Components: Globalization of the Academic Internet: Internet Governance: The Internet Society – An Overview of Internet Applications – Electronic Commerce; World Wide Web(WWW) as the Architecture: Web Background: Hypertext Publishing: Technology behind the Web: Security and the Web- Consumer-Oriented Electronic Commerce: Oriented Applications; Mercantile Process Models Mercantile Models from the Consumer's Perspective; Mercantile Models from the Merchant's Perspective.

UNIT – III

Electronic Payment Systems: Types of Electronic Payment Systems; Smart Cards and Electronic Payment Systems; Credit Card-Based Electronic Payment systems: Risk and Electronic Payment Systems Designing Electronic Payment systems - Inter organizational Commerce and EDI: Legal, security, and Privacy Issues: EDI and Electronic Commerce - EDI Implementation, MIME, and Value-Added Networks : Standardization and EDI;EDI Software Implementation: EDI Envelope for Message Transport: Value-Added Networks (VANs); Internet – Based EDI.

UNIT - IV

Intra-organization Electronic Commerce: Internal Information System: Macro forces and Internal Commerce; Work-Flow Automation and Coordination; Customization and Internal Commerce; Supply Chain Management (SCM) - The Corporate Digital Library: Dimensions of Internal Electronic Commerce Systems; Making a Business Case for a Document Library; Types of Digital Document Library; Types of Digital Documents; Issues behind Document Infrastructure; Corporate Data Warehouses.

UNIT - V

Advertising and Marketing on the Internet: The New Age of Information-Based Marketing; Advertising on the Internet; Charting the On-Line Marketing Process: Market Research - Consumer Search and Resource Discovery; Search and Resource Discovery Paradigms; Information Search and Retrieval; Electronic Commerce Catalogs or Directories ; Information Filtering; Consumer - Data Interface; Emerging Tools - On Demand

12 Periods

12 Periods

Education and Digital Copyrights; Computer- Based Education and Training; Technological Components of Education ON-Demand; digital Copyrights and Electronic Commerce.

Prescribed Book

1. Ravi Kalakota and Andrew B.Whinston,"Frontiers of Electronic Commerce", Pearson Education Inc., New Delhi, 2009

Reference Books

- 1. Henry Chan, Raymond Lee. TharanDillan and E.Chany, E-Commerce, Wiley, 2003.
- 2. DanjelMinoli and EmunaMimoli, Web Commrece Technology, Tata McGraw Hill,1999.
- 3. Marilyn Greenstein and Todd M Feinman, an Electronic Commerce, Tata McGraw Hill Edition.
- 4. Craig Patridge, Gigaibit Networking, Addison Wesley, 1994

- 1. http://nptel.ac.in/courses/106105084/35
- 2. https://www.tutorialspoint.com/e_commerce/
- 3. https://ecommerceguide.com/
- 4. http://www.htmlgoodies.com/beyond/webmaster/projects/electroniccommerce-tutorial.html

CA315(E): SOCIAL NETWORK ANALYSIS

Lectures	: 4 Periods/week	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 04

Prerequisite: Data Mining Basics.

Course Objectives

- To understand the concept of semantic web and related applications.
- To learn knowledge representation using ontology.
- To understand human behavior in social web and related communities.
- To learn visualization of social networks.

Course Outcomes

At the end of the course, the student will be able to

- relate network theory concepts and social networks
- Learn the various social networks
- Learn the current data set of social networks
- · Learn the mathematical models in social networks

UNIT-I:INTRODUCTION

Introduction to Semantic Web: Limitations of current Web – Development of Semantic Web - Emergence of the Social Web – Social Network analysis: Development of Social Network Analysis - Key concepts and measures in network analysis – Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities – Webbased networks – Applications of Social Network Analysis.

UNIT-II

12 Periods

12 Periods

MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION

Ontology and their role in the Semantic Web: Ontology-based knowledge Representation – Ontology languages for the Semantic Web: Resource Description Framework – Web Ontology Language - Modeling and

Graph theory – Centrality – Clustering – Node -Edge Diagrams – Matrix representation - Visualizing online social networks, Visualizing social networks with matrix - based representations – Matrix and Node-Link Diagrams – Hybrid representations – Applications – Cover networks – Community welfare - Collaboration networks - Co-Citation networks.

aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals - Ontological representation of social relationships - Aggregating and reasoning with social network data - Advanced representations.

UNIT-III: EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL 12 Periods NETWORKS

Extracting evolution of Web Community from a Series of Web Archive -Detecting communities in social networks - Definition of community -Evaluating communities – Methods for community detection and mining – Applications of community mining algorithms - Tools for detecting communities social network infrastructures and communities -Decentralized online social networks – Multi – Relational characterization of dynamic social network communities.

UNIT-IV

PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES

Understanding and predicting human behavior for social communities – User data management - Inference and Distribution – Enabling new human experiences - Reality mining - Context - Awareness - Privacy in online social networks – Trust in online environment – Trust models based on subjective logic - Trust network analysis - Trust transitivity analysis -Combining trust and reputation – Trust derivation based on trust comparisons - Attack spectrum and countermeasures.

UNIT-V

VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS

12 Periods

Prescribed Books

- 1. Peter Mika, "Social Networks and the Semantic Web", First Edition, Springer 2007.
- 2. BorkoFurht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer, 2010.

Reference Books

- 1. GuandongXu, Yanchun Zhang and Lin Li, "Web Mining and Social Networking Techniques and applications", First Edition Springer, 2011.
- 2. Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", IGI Global Snippet, 2008.
- Max Chevalier, Christine Julien and Chantal Soulé -Dupuy, "Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling", IGI Global Snippet, 2009.
- 4. John G Breslin, Alexander Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.

- 1. http://nptel.ac.in/courses/106106146/
- 2. http://lrs.ed.uiuc.edu/tse-portal/analysis/social-network-analysis/
- 3. http://www.kstoolkit.org/Social+Network+Analysis
- 4. http://www.analytictech.com/networks/whatis.htm
- 5. http://www.orgnet.com/sna.html

Lectures	: —	Sessional Marks	:100
Practicals	:-	Sem. End Exam Marks	: —
Sem. End Exam Duration	: -	Credits	: 02

Learning Objectives

At the end of the course, the student will understand

- concepts from a high-quality online education system containing a global population of learners
- content to make informed decisions about how to work with activities, assessments and forums
- concepts to conduct inquiry, synthesize knowledge, apply knowledge for real systems

Learning Outcomes

At the end of the course, the student will be able to

- learn from a high-quality online education system containing a global population of learners
- focus priorities in content, materials and assignments
- work with activities, assessments and forums
- Learn concepts to conduct inquiry
- develop synthesize knowledge
- apply knowledge for industrial applications
- gain factual knowledge

Massive Open Online Courses (MOOCs) are courses available for anyone to enroll. MOOCs provide an affordable and flexible way to learn new skills. Each student should learn any one course by registering for courses through Online instruction from standard e-learning portals like SWAYAM, NPTEL, COURSERA, EdX, etc.

"Enrolment of MOOCs course will be initiated from the date of commencement of class work for II Year I Semester and submit the course completion certificate on or before the last instruction day of III Year I Semester"

Note: List of MOOCs courses will be announced by the Board of Studies at the time of commencement of class work for II Year I Semester.

CA351: DATA MINING AND HADOOP LAB

Lectures	: —	Sessional Marks	: 40
Practicals	: 6 Periods/week	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisites: CA111(Problem solving with C), CA121(Data Structures in Python)

CourseObjectives

- To learn the algorithms used for various types of Data Mining Problems.
- To discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
- Exercise the data mining techniques with varied input values for different parameters.
- To understand setting up of Hadoop Cluster
- To solve problems using Map Reduce Technique
- To solve Big Data problem

CourseOutcomes

Upon of completion of this course, students will be able to

- Ability to understand the various kinds of tools.
- Demonstrate the classification, clustering and etc. in large data sets.
- Ability to add mining algorithms as a component to the exiting tools.
- Ability to apply mining techniques for realistic data.
- Set up multi-node Hadoop Clusters
- Apply Map Reduce algorithms for various algorithms
- Design new algorithms that uses Map Reduce to apply on Unstructured and structured data

LAB CYCLE 1(Data Mining) (Using Java, WEKA or any open source data miningtool)

- 1. Write a program to Generate Association rules by using Apriori algorithm
- 2. Write a program to implement naïve Bayesian classification

- 3. Write a program to implement k-means clustering algorithm
- 4. Write a program to implement k-mediods clustering algorithm
- 5. Write a program to implement dbscan algorithm

LAB CYCLE 2 (Hadoop)

- 1. Implement the following Data structures in Java a)Linked Lists b) Stacks c) Queues d) Set e) Map
- 2. Study and configure Hadoop for big data. Use web based tools to monitor your Hadoop setup.
- 3. Implement the following file management tasks in Hadoop:
 - · Adding files and directories
 - Retrieving files
 - Deleting files

Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command lineutilities.

- 1. Run a basic Word Count Map Reduce program to understand MapReduce Paradigm.
- 4. Implement Matrix Multiplication with Hadoop Map Reduce

- 1. nptel.ac.in/courses/106106093/35
- 2. https://www.cse.iitb.ac.in/infolab/Data/Talks/krithi-talk-impact.pp
- 3. https://hortonworks.com/hadoop-tutorial/hello-world-an-introduction-tohadoop-hcatalog-hive-and-pig/
- 4. https://developer.ibm.com/hadoop/docs/getting-started/tutorials/ overview-tutorial/overview-lab-1-getting-started-hadoop-biginsights-2/

CA352: MOBILE APPLICATION DEVELOPMENT USING ANDROID LAB

Lectures	: —	Sessional Marks	: 40
Practicals	: 6 Periods/week	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: 3 hours	Credits	: 02

Prerequisite: CA111(Problem solving with C), CA163(Unix and Shell Programming).

Course Objectives

- To make the learners install and set up the android application development environment.
- To make the students design apps by displaying windows and also working with intents.
- To make the students develop applications by using menus with views.
- To make the students work with data files and SQLite database.

Course Outcomes

Upon of completion of the course, students will be able to:

- Build custom android applications.
- Design and develop apps with good user interface by using menus and views.
- Design and develop apps with pictures and action bars.
- Develop apps that store data in files and databases.

LIST OF PROGRAMS

- 1. Create an Android application that shows "Welcome to Android" and run it on the emulator.
- 2. Create an application that displays a dialog window using an activity.
- 3. Create an application that displays the progress of an operation.
- 4. Create an application that obtains result from an activity.
- 5. Create an application that dynamically adds a fragment.
- 6. Create a screen that has input boxes for Name, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button.

- 7. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout
- 8. Create an application that uses the basic views of Android.
- 9. Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents.
- 10. Create a user registration application that stores the user details in a database table.
- 11. Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.

Learning References

- 1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox)
- 2. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox)
- 3. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning,
- 4. Sams Teach Yourself Android Application Development in 24 Hrs, Lauren Darcy and Shane Conder, 2nd ed.
- 5. Android apps for absolute beginners, Wallace Jackson, Apress.
- 6. Introduction to Android application development, Joseph Annuzzi, Lauren Darcey, Shane Conder, 4ed.
- 7. Android apps with Eclipse, OnurCinar.

CA353: MINI PROJECT WORK

Lectures	: —	Sessional Marks	:100
Practicals	: 4 Periods/week	Sem. End Exam Marks	: —
Sem. End Exam Duration	: —	Credits	: 02

Prerequisites: Basic knowledge in software development phases.

Course Objectives

- To transform the theoretical knowledge into application software.
- To gain experience in organization and implementation of a small project.
- To acquire confidence to carry out major project in the subsequent semester.
- To develop a System/application/tool by using any Programming Language.
- To analyze and design the system using any UML tool.

Course Outcomes

Upon of completion of the course, students will be able to:

- Analyze the problem statement.
- Model the content/architecture/interface/component for the system.
- Design the test cases to check the standards of the system.
- Prepare an environment to deploy the system.

PLAN AND DISTRIBUTION OF MARKS:

We	Week 1: Problem statement.		10 marks	
0 th	Rev	iew:		
	0	Identification of title	5 marks	
	0	Literature survey/scope	5 marks	
We	ek	2,3,4: System Analysis	15 marks	
•	Sy	stem Requirement Specification(SRS)		
•	So	ftware Engineering Paradigm applied		
•	Da	ta models (like DFD), Control Flow diagrams	, State Diagrams/	

Sequence diagrams, Entity Relationship Model, Class Diagrams/CRC Models/Collaboration Diagrams/Use-case Diagrams/Activity Diagrams depending upon your project requirements

1st Review:

0	Methodology adopted	5 marks
0	PPT presentation	5 marks
0	Answers to queries	5 marks

Week 5,6,7: System Design

- Modularisation details
- Data integrity and constraints
- Database design, Procedural/Object Oriented Design
- User Interface Design
- Architecture design
- Component design
- Test Cases

2ndReview:

0	Design aspects	5 marks
0	PPT presentation	5 marks
0	Answers to queries	5 marks
Week	8: System Implementation (coding)	15 marks
Week	9: System testing	15 marks
Week	10: Conclusion and Future Enhancements	10 marks
Annex	ure	
0	User Manual	
0	Screens	
0	Bibliography and References used.	
3 rd Rev	iew:	
0	Results obtained	10 marks
0	PPT presentation	10 marks

15 marks

0	Answers to queries	10 marks
0	Project report	10 marks
Final R	eview:	20 marks
0	Presentation skills	05 marks
0	Viva-Voce	15 marks

NOTE:

- (i) Projects should not be developed using the old packages like Dbase III plus, Foxpro, Visual Foxpro and MS-Access. Also, projects should not be developed using the combination of Visual Basic as the front end and MS-Access as the back end. Latest technologies/versions of the software are to be used. The project work should compulsorily include the software development. Physical installations or configuring the LAN/WAN or theoretical projects or study of the systems, which doesn't involve software development, are strictly not allowed.
- (ii) C/C++ languages should not be used for any Information Management System Project for example Hospital/Reservation/Library/School/ College Management System etc.
- (iii) Students can also develop applications using tools/languages/software not listed above, if they are part of latest technologies. Use the latest versions of the software packages for the project development.

III Year MCA – II Semester

CA361 : MAJOR PROJECT WORK

Lectures	: —	Sessional Marks	: 40
Practicals	: —	Sem. End Exam Marks	: 60
Sem. End Exam Duration	: —	Credits	: 10
Project Period	: Six months		

Prerequisites: CA353.

Course Objectives

- To analyze and design the system using any object-oriented modeling tool.
- To develop a system/application/tool in any domain.

Course Outcomes

Upon of completion of the course, students will be able to:

- Understand all kinds of domains.
- Define a problem in any domain.
- Analyze, design and implement the system.
- Design the test cases to check the standards of the system.
- Prepare a report for system development.

Three Stages in Project adjudication:

- 1) Presentation of Problem Statement and Problem Approval by Guide.
- 2) Progress Approval by System Demonstration with results(Internal) 40 Marks
- 3) Final Presentation with Documentation(External Project Viva-Voce)-60 Marks

Note: Students are advised to follow the instructions of CA353.



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