

IV-B.Tech
STUDENT HANDBOOK
A.Y.2015-16/I SEM



Department of IT

MARRI LAXMAN REDDY INSTITUTIONS



**MARRI
LAXMAN
REDDY**
GROUP OF INSTITUTIONS

MLR Institute of Technology

Dundigal (V), Outhbullapur (M), R.R Dist,
Hyderabad – 500043, A.P

www.mlrinstitutions.ac.in



VISION STATEMENT

VISION STATEMENT OF MLRIT

To create and nurture competent Engineers and managers who would be enterprise leaders in all parts of the world with aims of reaching the skies and touching the stars and yet feet firmly planted on the ground – good human beings steeped in ethical and moral values.



MISSION STATEMENT

MISSION STATEMENT OF MLRIT

MLR Institute of Technology is committed to providing a positive, professional and conducive learning environment where all students are inspired to achieve their potential and strive for excellence in a global society as dignified professionals with the cooperation of all stakeholders.



GOALS OF MLRIT

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Goals of Engineering education at undergraduate / graduate level:

- Equip students with industry – accepted career and life skills
- To create a knowledge warehouse for students
- To disseminate information on skills and competencies that are in use and in demand by the industry
- To create learning environment where the campus culture acts as a catalyst to student fraternity to understand their core competencies, enhance their competencies and improve their career prospects.
- To provide base for lifelong learning and professional development in support of evolving career objectives, which include being informed, effective, and responsible participants within the engineering profession and in society.
- To prepare students for graduate study in Engineering and Technology.
- To prepare graduates to engineering practice by learning from professional engineering assignments.

VISION STATEMENT OF DEPARTMENT

“To build IT Department with commitment towards continuous improvement that adapts swiftly to 21st century challenges by developing professionals with robust technical and research backgrounds”.

MISSION STATEMENT OF DEPARTMENT

- To provide quality Teaching Learning environment and make students proficient in both theoretical and applied foundations of Information Technology.
- Create highly skilled IT engineers, capable of doing research and also develop solutions for the betterment of the nation.
- Instill professional and ethical values among students.
- To develop entrepreneurial skills in students and also motive them towards pursuing higher studies.

PROGRAM EDUCATIONAL OBJECTIVES

- PEO I** Be successfully employed as a Software Engineer in the field of Information Technology.
- PEO II** Be a successful entrepreneur and assume leadership position, responsibility within an organization.
- PEO III** Progress through advanced degree or certificate programs in engineering, business, and other professionally related fields.

PROGRAMME OUTCOMES

- PO1** An ability to apply knowledge of computing, mathematics, science, and engineering fundamentals appropriate to the discipline.
- PO2** Identify, formulate and analyze complex engineering problems reaching substantiated conclusions using principles of mathematics and engineering sciences.
- PO3** An ability to design and develop solutions for IT Problems to meet desired needs within pragmatic constraints such as economic, environmental, political, manufacturability, and sustainability.
- PO4** Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5** An ability to use and apply modern technical concepts, tools and practices in the core Information Technologies.
- PO6** An ability to analyze the local and global impact of computing on individuals, organizations, and society.

- PO7** An ability to effectively integrate IT-based solutions into the user environment constantly.
- PO8** An understanding of professional, ethical, legal, security and social issues and responsibilities.
- PO9** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10** Ability to communicate effectively with all stake holders.
- PO11** Apply Project Management skills and knowledge in Practice as a team member/leader to manage projects.
- PO12** Recognition of the need for and the ability to engage in Life Long Learning.

Our Pioneers...

MARRI LAXMAN REDDY – CHAIRMAN

Sri Marri Laxman Reddy, the founder Chairman of MLR Institutions has been in the field of education for the last 22 years with the aim of spreading quality education among children at the school & college levels. MLR Institute of Technology is the culmination of his dreams. He is also founder chairman of Marri Laxman Reddy Institute of Technology & Management, MLR Institute of Pharmacy, St. Martin's Engineering College and St. Martins Schools at Balanagar, Chintal and Malkajgiri. He is a veteran athlete of international repute.



MARRI RAJASEKHAR REDDY – SECRETARY



Sri Marri Rajashekar Reddy, the Secretary of MLR Institutions has the distinction of establishing the Institute of Aeronautical Engineering, MLR Institute of Technology, MLR Institute of Pharmacy, Vardhaman Engineering College, Vidyanjali Grammar School at L.B.Nagar and Institute of Aircraft Maintenance Engineering, approved by DGCA. He is also Treasurer of Indo-US Collaboration for Engineering Education of A.P. Chapter.

Mr. M. Rajasekhara Reddy, a person with remarkable abilities and great acumen and a dynamic leader. He is known to be the dynamic mentor of MLR Institute of Technology who is always on the spirit to take the institute to newer levels in every aspect of an "Ideal Institution" and strives hard to make every dream a reality. He likes his father Mr. M. Laxman Reddy, who has a credit of establishing Institute of Aeronautical Engineering adding a new flavor to St. Martins group of Institutions and Vidyanjali Grammar School. His ability to turn adversities into opportunities is unquestionable. The Secretary has a vision of establishing MLR Institute of Technology as a brand. He strives hard to initiate various industry oriented programs for the benefit of the students and he envisions his students to be present at the top most position in the industry

Dr. P. BHASKARA REDDY – DIRECTOR

Dr. P. Bhaskara Reddy, B.E.(ECE), M.Tech., Ph.D., F.I.S.E.E., MCSI, MISTE, MIETE, MEMCE. the Director of MLR Institute of Technology, is a young and dynamic Professor of ECE, has 26 years of Industry, Teaching, Research and Administrative experience in Reputed Engineering Colleges.

In 24 years of experience served various positions from Asst. Professor to Principal. Research & Guidance: Published 1 Book (International Edition) "Information Technology in Technical Education - Economic Development by "LAMBERT Academic Publishing" Published 9 Laboratory Manuals, 84 Research papers at National and International Level on Education, Electronics Communication, I.T, Computer Networks, E-Commerce etc. Guided 5 Research Scholars for their Doctorates, about 50 M.Tech., M.C.A and B.Tech projects. Symposiums Conducted: 11 National Level Technical Symposiums on various topics in Electronics & Communications, Computers etc.

Awards Received: 1) Bharath Jyothi Award in 2003 from IIFS, New Delhi, 2) Rastraprathiba Award in 2004 from ICSEP, New Delhi, 3) Knowledge Award from Alumni of SVHCE for the year 2001.



1.GENERAL INFORMATION

ABOUT THE COLLEGE

1.0 BEAUTIFUL CAMPUS:

Set in Sylvan surroundings away from the hustle & bustle of city life yet only 4 km away from Mahindra Satyam Technology Park on Balanagar – Narsapur state highway, the Institute is extremely conducive to academic, co-curricular and extra-curricular activities. It has large and well ventilated buildings with modern equipment in place and “State of the art”, sports facilities.

HIGHLIGHTS:

1.1 AUTONOMOUS STATUS

MLR Institute of Technology is now an Autonomous Institution!!

Under the UGC Autonomous College Scheme for a period of Six Years

1.2 PERFORMANCE

The college has been AA rated under colleges in AP by Careers360 magazine. Also, the college has been ranked at 126 by the week magazine in the Best colleges Survey-2013.

1.3 FACULTY:

The College is proud to have the best faculty, a blend of experienced and academics with eminent academicians team IIT's, NIT's and other reputed organizations teaching at the Institute that makes MLRIT as one of the best Institute pursue B.Tech, M.Tech,MCA and MBA as one of the under JNTU Hyderabad. The faculty is constantly encouraged to upgrade their qualifications and a number of them have enrolled for Ph.D. Most of the faculty members have been empowered with High Impact teaching under Wipro Mission 10X program.

1.4 INFRASTRUCTURES:

- ❖ Spacious campus and natural surroundings with plenty of greenery
- ❖ College Transport facilities from twin cities for students and staff from all corners of the city
- ❖ Air Conditioned auditorium for organizing events, workshops and seminars
- ❖ Good Canteen facility
- ❖ HDFC Bank ATM in the campus
- ❖ Fully equipped Laboratories with the state-of-art equipments

1.5 LABORATORIES:

The Institute has State of the art laboratories with 1000 plus Branded Systems equipped with latest hardware and software with online testing facility catering to the needs of CSE, IT. The Institute also has well equipped Electronic Labs, Aeronautical Engineering Labs and Workshops for ECE and Aeronautical Engineering Students. The college has recently established Microsoft, IBM for CSE/IT cadence lab for VLSI design and CATIA Aeronautical Design Lab.

1.6 CAT Centre:

The Institute is an Authorized IIM Cat Centre, which will conduct tests all through the year as per the IIM schedule.

1.7 ENGLISH LANGUAGE LABORATORY:

The Institute has established Ultramodern Computerized English language Laboratory with 60 plus Computer Systems loaded with latest Software to enhance the Softskills of Students to make the Students Industry ready.

The Library also have the previous University Exam Question papers and previous project reports from all the departments. The library contains recorded lectures of all IIT professors from NPTEL.

1.8 R&D Cell:

The Institute has an R&D Cell under the Chairmanship of ?. The R&D cell undertakes externally funded R&D projects from agencies like AICTE, DST, UGC and other similar state, private and society / trust bodies. It also undertakes research publications and interactions of faculty members with outside world.

1.9 LIBRARY:

The Institute Library has over 29000 books and 244 National and International journals and 15 Magazines that are required to all branches of Engineering. The Institute has the unique distinction of becoming Member of DELNET, Infotrac engineering online journals that connects more than 700 libraries in Asia Pacific Region. The Library has 35 Computers with 10 MB PS, Internet Facility that makes our knowledge Savvy Students to be technically competent on par with Industry professionals. NPTEL Videos and e-books, MIT courses also available.

1.10 National Programme on Technology Enhanced Learning (NPTEL)

The main objective of NPTEL program is to enhance the quality of engineering education in the country by developing curriculum based video and web courses. This is being carried out by seven IITs and IISc Bangalore as a collaborative project. In the first phase of the project, supplementary content for 129 web courses in engineering / science and humanities have been developed. Each course contains materials that can be covered in depth in 60 or more lecture hours. In addition, 110 courses have been developed in video format, with each course comprising of approximately 60 or more one-hour lectures. In the next phase other premier institutions are also likely to participate in content creation.

1.11 Co-Curricular Activities:

The Institution organizes Local Industrial Visits to Organizations like DOORDARSHAN, BSNL, and to Student Conferences like HYSEA, Student Conference at INFOSYS, Gachibowli Campus, and Government Sponsored Summits like INDO SOFT IT Summit at Hitex City Convention Centre to Interface with the Industry for Career Planning and to make them Industry Ready. The Institute focuses on Techno Management Events like Technonium and Zavtra to enhance the Technical Skills and Soft Skills to make them Employable.

1.12 Professional Bodies:

MLR Institute of Technology has the unique distinction of becoming Institutional Member in Professional bodies such as Confederation of Indian Industry (CII), Aeronautical Society of India (AeSI), Computer Society of India (CSI), Institute of Electronics and Telecommunication Engineering (IETE), Indian Society of Technical Education (ISTE), ELIAP and Hyderabad Management Association.(HMA)

1.13 Extra-Curricular Activities:

- ❖ MLRIT has State of the art facilities like Olympic Style Basketball Court, Volleyball Court, Gymnasium, Indoor Stadium, Cricket Stadium with Lush Green Outfields and 400 meter excellent track for Athletic meet. MLR Institute of Technology has been regularly conducting JNTU Zonal Games and Annual Open Invitational Volleyball, Football, Cricket Tournaments

- ❖ The Institute also organizes various Cultural Events like Traditional Day for freshers, “ZAVTRA” A National Level Technical Fest, TRISHNA - The Annual Day Celebrations, ECSTASY – A Cultural Nite by Vishal & Shekhar, Indian Idol Sri Ram, Farewell Party for final year students, Alumni Meet for Ex. Students and Graduation Day for graduated students every year to imbibe a spirit of Oneness.



NSS Activities:

A Sense of social responsibility is inculcated in Young Minds by organizing Plantation Programmes, Health Awareness Camps, Blood Donation Camps, Flood Relief Camps, Distribution of Books to School Children under Digital Literacy Programme of Microsoft by MLRIT NSS Volunteers.

1.14 In House Projects:

The students are taking part in International Project competitions hosted by major MNCs, like IBM, Microsoft and Infosys. The Great Mind Challenge hosted by IBM, Microsoft Imagine Cup and project work as part of foundation programme conducted under the aegis of Infosys are some of the important projects presently being undertaken by the students of MLRIT. Further, the students are encouraged to do In House Projects under the supervision of expert faculty members. In addition, students are encouraged to give innovative ideas and do projects under the aegis of Microsoft academic innovative alliance.

1.15 MOUs:

- BOEING
- Tech Mahindra
- Infotech Enterprises Ltd.
- IBM
- Oracle
- Sun Microsystems
- Infosys
- CA Labs
- Tata Advanced Systems
- Microsoft
- Globarena
- Wipro
- IUCEE

For giving special training programmes to engineering students and Faculty members of the institute

1.16 Student Achievements:

- ❖ Our College students got **2nd Place** out of 2100 colleges in **E-Plus Challenge 14** conducted by **The Hindu** in Hyderabad in March 2014.
- ❖ MLR Institute of Technology students have been securing **JNTUH ranks** regularly right from 1st batch itself, reflecting the core competencies of the faculty and dedicated efforts of the students.
- ❖ **Mr Venkata Rama Varma** student of 3rd year Aero has participated and stood 3rd in **National Aero-Modeling** competition conducted by Boeing held during Techfest 2014 at IIT Madras.

- ❖ **Mr. Venkata Rama Varma** student of 3rd year Aero has participated and stood 3rd in **Avion-E and Hower Mania** held during Techfest 2013 at **NIT Warangal**.
- ❖ **Mr Venkata Rama Varma and NAM Sai Teja** students of 3rd year Aero have been selected for Boeing National Aeromodeling Competition which will be held at IIT Delhi next Month.
- ❖ **Mr. Venkata Rama Varma** student of 3rd year Aero has participated and stood 1st in **Aero-Modeling Competition** held during Techfest 2013 at **Christ University**
- ❖ **Mr Venkata Rama Varma** student of 3rd year Aero has participated and stood 3rd in **Blitz Krieg Design Challenge** held during Techfest 2013 at IIT BOMBAY.
- ❖ **Mr.Varma** and team **III-Aeronautical** students got **2nd Prize** in **ICRAMAV-2013** organized by JNTUH for their **MAV** (Micro Aerial Vehicle).
- ❖ **Mr.Eshwer Reddy** student of 4th year Aero has participated and stood 2nd Prize in **Working Models** competition organized by Rotary Club.
- ❖ Three of **2nd Aero** students got **Rs. 5000/-** cash prize in **Design Competition** organized Engineers CAD Centre Hyderabad

1.17 Alumni Outreach

- ❖ The Institute has Alumni Association under the name and Style of MLR Alumni Association and conducted the First Alumni Meet on 14th Feb 2009 with the first batch Of 2008 passed out MBA students attending the meet.
- ❖ The Association has honoured the 2009 batch B.Tech, MCA along with MBA students by conducting the Second Alumni Meet at hotel Blue Fox on 13th March 2010 where more than 200 students participated in the Meet.
- ❖ The Association conducted 3rd Alumni meet for 2010 batch B.Tech, MCA & MBA students on 16th April 2011 at our college Auditorium.
- ❖ The Association conducted 4th Alumni meet for 2011 batch B.Tech, MCA & MBA students on 14th July 2012 at our college Auditorium.
- ❖ The Association conducted 5th Alumni meet for 2012 batch B.Tech & MBA students on 11th May 2013 at our college Auditorium.
- ❖ The Association conducted 6th Alumni meet for 2013 batch B.Tech, M.Tech & MBA students on 14th Feb 2015 at our college Auditorium.

1.18 Contact Information

Principal	- Dr. P. Bhaskara Reddy	- 9866678599
Dean (CS)	- Prof. K. L. Chugh	- 9866666601
Department Head CSE	- Mr.G.Kiran Kumar	- 9440759766
Department Head IT	- Dr.KVSN Rama Rao	- 9848292046
Department Head ECE	- Mr. S.V.S Prasad	- 9440840483
Department Head AERO	- Dr.M.Satyanarayana Gupta	- 9848339384
Department Head MECH	- Dr.S.Madhu	- 9160404635
Department Head MBA	- Mrs.Srulekhar	- 9603120735
Department Head H&S	- Dr. V. Radhika Devi	- 9848472797
Sr.Administrative Officer	- Mr.Prabhakar Reddy	-

2. PLACEMENT & HIGHER STUDIES

MLR Institute of Technology has a unique distinction of placing their First Batch of B.Tech Students in their prefinal year of Study and MBA Students in Multi National Companies. The Institute has so far interacted with more than 69 Companies and 233 Selections from B.Tech/MCA and MBA Programmes have taken Place.

In this direction Apart from the Placements the Institute has arranged Summer Internship Programmes with Companies like Computer Amociates, Mind Tree M/s Infotech Enterprises Ltd, Mahindra Finance, Max New York Life Insurance, Nokia Ltd , Mahindra Finance, Bajaj Capital Ltd, Reliance Money and Tata AIG for Engineering and MBA Students to develop Mentor Relationships and to get to know about the Work Culture and gain Competencies to make them Industry Ready during their Study period.

The Institute has arranged Campus Recruitment drives Infosy, Mind Tree Ltd, Oracle, ADP, Mahindra Satyam, Infotech Enterprises Ltd, Keane India Ltd (NTT), IBM Technologies Pvt Ltd, Tata Advanced Systems, IBM, Syntel Inc, Tech-Synergy Pvt Ltd, Adithya Software Solutions, HDFC Bank Ltd, Medha Servo drives. NR Radio & Switches Pvt.Ltd. OsiTechnologies Ltd, Genpact, Reliance Money, Nagarjuna Caments Ltd & Oasis Software Informatics, Shoppers Shop, Trident Micro Systems India, SnapDeal.com, India Mart Ltd, Power Tech, Suchir India, Quartz Infra and Engineering Pvt Ltd, Gobrah Technologies Pvt Ltd, Elbit Diagnostics, Eprism Solutions, Geo Meme Strategic Consulting, India Info Line, Water Shed project of Govt of AP, Ocean Ship Maritime etc.

The CSE students visited Infosys Infosys for the SPARK Programme which is an orientation programme on Information Technology Space.

2.1 Industry Grade Skills required for Employment

Behavioral and Communication Skills are recognized as important elements in professional development of an Engineer including English for specific purposes. Employers give considerable value to these diverse set of skills at the time of interviews.

In addition to course curriculum, every student will gain the following skills during the study period:

- Analytical and Problem solving skills
- Subject – specific knowledge
- Research and improved decision making abilities
- Oral communication skills
- Managerial skills
- Understanding of other cultures
- Confidence and competence to work in International environment

As students are the future leaders, the Responsibility, Accountability and exhibiting the leadership skills should start from the first year of engineering. Every student is advised to read / practice from the following books;

- Verbal and Nonverbal by RS Agarwal
- Baron GRE
- Wren and Martin English Grammer Book

2.2 Important criteria of Employment

In addition to the industry grade skills required for employment, the most important criteria for employment is that the student should get a minimum of 60% in academics with no backlogs to make them eligible for campus recruitments. In the recent past, many companies stipulated a cut of 68% for attending the interview / writing the test. Every student should Endeavour to achieve a minimum of 68% with no backlogs to make them suitable for picking up by good companies.

Job Portals:

1. www.freshersworld.com
2. www.monster.com
3. www.naukri.com

2.3 Higher Studies**M.Tech**

The Graduate Aptitude Test in Engineering (GATE) is an all-India examination administered and conducted in eight zones across the country by the GATE Committee comprising faculty from Indian Institute of Science, Bangalore and seven Indian Institutes of Technology on behalf of the National Coordinating Board - GATE, Department of Education, Ministry of Human Resources Development (MHRD), and Government of India.

Objective

To identify meritorious and motivated candidates for admission to Post Graduate Programmes in

Engineering, Technology, Architecture and Pharmacy at the National level. To serve as benchmark for normalization of the Undergraduate Engineering Education in the country.

This provides an opportunity for advanced engineering education in India. An M.E or M.Tech degree is a desirable qualification for our young engineers seeking a rewarding professional career. Engineering students, while in the final year of their degree course, spend considerable time in seeking an opening for studies in foreign universities.

The students are advised to pursue M.Tech in IIT's/NIT's/University Colleges.

MBA

Earning a Master's of Business Administration (MBA) degree can provide you with management skills and business expertise that open new career opportunities to you. An MBA program will also launch you into the much higher pay range that upper level managers and executives enjoy. Furthermore, in the high-level positions, an MBA degree will allow you to hold and your work will often be more interesting and rewarding.

The students are advised to pursue M.BA in IIM's/XLRI/Reputed Business Schools.

Higher Studies Abroad

TOEFL is mandatory for seeking admission in any academic course at any level- undergraduate, graduate or post graduate, in USA and Canada. Similarly UK Universities ask for IELTS for seeking admission to graduate and past graduate courses.

GRE The Graduate Record Examination (GRE) is administered by the Educational Testing Services (ETS) for admission into all graduate academic programs (except management) in universities across USA and Canada and some selected universities across the world including India. The exam is a Computer Adaptive Test and is administered at any of the Sylvan testing centers in the country after prior registration.

The GMAT is a Computer Adaptive Test administered online by Educational Testing Services (ETS) through Sylvan testing centers located in all the major cities in India. Those who wish to enroll for courses in Business Management in American universities have to take the GMAT test and submit their scores to the department.

2.4 Various Scholarships Available In India

Bharat Petroleum Scholarship For Higher Studies | Balarama Digest Scholarship | Central Institute of Indian Languages | Fair & Lovely Foundation - Project Saraswati Scholarships | Government Of India Office of the Director General of Civil Aviation Scholarship | Homi Bhabha Centre For Science Education Tata Institute of Fundamental Research Research Scholarships | HSBC Scholarships | Indian Council Of Agricultural Research Award Of National Talent Scholarship In Agriculture | Indian Institute Of Geomagnetism Research Scholars | Invention Awards For School Children | Indian Oil Corporation Ltd (IOCL) - Scholarships | Jawaharlal Nehru Memorial Fund, Jawaharlal Nehru Scholarships For Doctoral

Studies | Junior Research Scholarships For Cancer Biology Tata Memorial Centre & Tata Memorial Hospital | Jaigopal Garodia Vivekananda Trust Scholarships | Lalit Kala Akademi - Scholarship | Mahindra All India Talent Scholarships For Diploma courses In Polytechnics | National Brain Research Centre Scholarships | NTPC Scholarships | National Institute Of Science Communication And Information Resources(NISCAIR) | National Board For Higher Mathematics(NBHM) | National Thermal Power Corporation Ltd.Scholarships | National Olympiad Programme | National Level Science Talent Search Examination - 2005 | Narotam Sekhsaria Scholarship Programme | National Brain Research Centre Scholarships, Post Doctoral Fellowships | National Aptitude Test | NIIT National IT Aptitude Test | Oil And Natural Gas Corporation Ltd (ONGC) Scholarships To SC/ST Students | Office Of The Director General of Civil Aviation Scholarships Stipend to the SC/ST Candidates | Rashtriya Sanskrit Sansthan - Scholarships | Scholarships To Young Artistes | Saf-Madanjeet Singh Scholarship | Sports Authority Of India - Sports Scholarships | SAF-Madanjeet Singh Scholarship | Spic Macay Scholarships | The Childrens Foundation - Scholarships | The L&T Build-India Scholarship | The Hindu-Hitachi Scholarships | The Paul Foundation Scholarships | Technology Information Forecasting and Assessment Council(TIFAC) Women Scientist Scholarship Scheme | The Young Talent IT Scholarship The Dr.GB Scholarships Foundation |

2.5 Various International Scholarships Available In India

A * STAR India Youth Scholarship | A.M.M. Arunachalam-Lakshmi Achi Scholarship For Overseas Study | British Chevening Scholarships | Bharat Petroleum - Scholarships for Higher Studies | Cambridge Nehru Scholarships | Commonwealth Scholarship and Fellowship | Czech Government Scholarship | Chevening Technology Enterprise Scholarship Programme | Chinese Government Scholarship | Greek Government Scholarships | Israel Government Scholarship | Iranian Government Scholarship | Offer of Italian Government Scholarship | Japanese Government Scholarships | K.C.Mahindra Scholarships For Post-Graduate Studies Abroad | Lady Meherbai D.Tata Scholarships | Mexican Government Scholarship | Norwegian Government Scholarships | National Overseas Scholarships/Passage Grant for ST Candidates | Portuguese Government Scholarships | Sophia Merit Scholarships Inc | Slovak Government Scholarship | SIA Youth Scholarships | The Rhodes Scholarships India | The Ramakrishna Mission Institute Of Culture Award of Debesh-Kamal Scholarships For Studies Abroad | The Inlaks Foundation - Scholarships |

Website for Higher Studies:

1. www.higherstudyabroad.org
2. www.highereducationinindia.com

3. STUDENT CAREER ORIENTED PROFESSIONAL CERTIFICATION COURSES

As per the career plan for students of MLR Institute of Technology with a view to bridge the gap between Industry and Academia, it has been planned to equip every student with at least three International / National certification by the time he / she completes the course of study. The details of the certification courses are given below:

Branch	Year	Name of the Certification Course
Computer Science and Engineering / IT / MCA	2 nd Year	Certificate Information Technology
	3 rd Year	IBM Certified DB2 Database Associate, Infosys Campus Connect
	4 th Year	IBM Certified Rational Application Developer
	4 th Year	SUN Certified Java Programmer
Electronics and Communication Engineering	2 nd Year	Institute of Electronics and Telecommunication Engineering
	3 rd Year	Motorola @ CAMPUS
	4 th Year	IBM Certified DB2 Database Associate
Aeronautical Engineering	2 nd Year	Certificate in AutoCAD
	3 rd Year	Certificate in HighPerMesh
	4 th Year	Certificate in CATIA
Mechanical Engineering	2 nd Year	Certificate in AutoCAD
	3 rd Year	Certificate in HighPerMesh
	4 th Year	Certificate in CATIA

3.1 Help Desk

The college has set up a Help Desk for Career Guidance and overseas education. The aim of the Help Desk is to provide a platform for the students to choose the Right Destination. The students can reach the Help Desk in person or through mail at email id helpdesk@mlrinstitutions.ac.in

4. PERFORMANCE MONITORING AND GUIDANCE

4.1 Student Feedback

In case the students find it difficult to cope up / understand a particular subject, they are advised to discuss it with

- a. The Concerned Teacher
- b. The Class Teacher
- c. The Department Head
- d. The Principal

Students can use the suggestion boxes for communicating feedback. Students should mention their names so that they can be informed of the progress / more details / clarifications can be obtained.

4.2 Class Teacher

Every class is assigned a Class Teacher (a faculty member). Students can directly discuss their college related or personal problems related to studies with them. The Class Teachers are accessible to the students and they can talk to the Class Teacher or whenever they are free from class / lab work. Class Teacher will meet with the class representative on daily basis to discuss their day-to-day difficulties if any.

4.3 Class Representatives and their roles

Two students from each class are selected as the Class Representatives from the department basing on their academic performance and discipline. Department Head makes the selections.

Responsibilities of the Class Representatives:

- Collection of MIS format from Class Teacher daily.
- Communicating the departmental / college directives & information to the students.
- Collecting the feedback of difficulties faced by the students and communicating Suggestions for improvements.
- Coordinating academic events and co-curricular activities.
- Encourage students to interact for better studies, sharing books and notes.
- Compilation and submission of MIS form to class teacher at the end of the period.

4.4 Performance Counseling

Mentors will evaluate the student individually for the following:

- a. Less marks in internal exams
- b. Continuous absence (3 days) and shortage of attendance
- c. Not understanding the subject
- d. Students from Telugu medium
- e. Assistance for back log subjects etc.
- f. Communication with parents
- g. Provide help to back log students

4.5 Remedial Classes / Tutorial / Revisions

Remedial Classes are conducted for students who are weak and who do not perform well in their internal examinations / class tests or for the students who want extra help. Slots in the time table have been reserved for Tutorial where in the students are helped to solve the question in the class itself.

4.6 Backlog Management

The Mentors maintain a complete record of Examination results of each student and they counsel and guide them in preparing for backlogs. Students are provided with material and important questions are discussed.

4.7 Correspondence with parents

Parents will be informed about the performance of their ward from time to time in the semester. However, parents are requested to be in touch with the Student mentor / Department Head on a regular basis. Further, parents are sent sms on daily bases if their wards do not attend the college.

5. RULES AND REGULATIONS FOR STUDENTS

5.1 Administrative:

1. Students, admitted into this College, are deemed to have agreed to the rules and regulations of the college, as laid down by the College Authorities from time to time, and the rules lay down in this leaflet, issued at the time of admission.
2. Students should inform **any changes in the addresses/Phone No.** of their parents / guardians to the college office.
3. The college shall communicate to the parents \ guardians of the students from time to time regarding the regularity and performance in the examinations of their wards. The case of serious indiscipline on the part of the students (s) may also be communicated to parent (s) \ guardian (s).

5.2. Academic:

1. Students should **attend the classes in - time**. Late- comers shall not be permitted to enter the class room and they are likely to **lose the attendance**.
2. Students are expected to be regular to the classes. The students Shall not absent themselves for classes without prior approval. **Prior permission** shall be taken from concerned **counselor** and submitted to the **Head of the Department**.
3. In case of **ill-health**, the student should submit the **medical certificate** along with prescription, etc., from a **registered medical doctor**. The student should get the medical certificate within **two days** from the date of reporting to the college after ill health and also produce a **letter from Father/ Mother** regarding ill-health. Permission on medical grounds shall not be granted for one or two days.
4. The students should come to the laboratories with the **prescribed uniform**.
5. If a student **disturbs the class** or makes mischief, he / she will be marked absent and may be **expelled from the class**.
6. Students shall spend their **leisure time** in the library/computer center.
7. Students are expected to put up the **minimum aggregate percentage of attendance (75%)** as laid down by the JNT University. Students, falling short of 75% of attendance shall not be promoted to the next Semester \ Class.
8. Parents \ guardians of the students can contact the college authorities either in person or by post regarding discipline, regularity in attending classes, performance in the examinations, etc., of their wards.

5.3 Dress Code:

1. Students are expected to attend the college **properly dressed**. They should wear the prescribed uniform while attending laboratory classes.
2. Students are expected to **carry the identity cards**, issued by the college, in the campus. They are required to show the identity cards at the library, computer center, office, etc. Students without Identity Cards are not allowed in to the laboratory classes.

5.4 Discipline & Punctuality:

1. No student shall **enter or leave** the class room **without the permission** of the teacher.
2. **Calling students** out of their class rooms while the lecture is in progress is prohibited.
3. Students are required to help in keeping the rooms, buildings, and premises **clean and tidy**. Writing or sticking up of posters and notices on the walls is strictly prohibited.
4. Smoking, Consumption of alcohol, intoxicating drinks or drugs is **strictly prohibited** in and around the college premises. Those indulging in such activities will be put severely or expelled.
5. Students are expected to behave well with the staff, other students and the general public. Any **misbehavior**, coming to the notice of the college authorities, will be severely dealt with.
6. The conduct of the students should be exemplary not only within the premises of the college but also outside. This will help in maintaining the **image and status** of the college.

- not talk in loud tone or call each other by shouting.
8. Students are **prohibited** from loitering in the verandahs / campus during class hours, and sitting on the steps, stair-cases or parapet walls.
 9. Students are **not permitted** to resort to strikes and demonstrations within the campus. Participation in such activity entails their dismissal from the college. Any problem they face may be represented to the Counselor / Head of the Department / Principal.
 10. Students are **prohibited carrying Cell Phones** and organizing any meeting or entertainment in the college campus without the permission of the college authorities.
 11. The entry of **outsiders without permission** is prohibited. Any student found responsible for bringing outsiders into the campus for settling personal disputes with other students, shall be **expelled** from the college.
 12. The college is entitled to take any **disciplinary action**, which is deemed necessary in the case of any indiscipline on the part of the students. The same will be reflected on the **Conduct Certificate** issued at the time of leaving the college.
 13. No Student Unions, except **Professional Associations**, are **permitted** in the college.
 14. If the students cause any **damage to the college property** knowingly or unknowingly individually or in a group they have to pay **5 times to cost of property** damaged them. All the students are collectively responsible for the proper maintenance college property i.e. building, furniture, lab equipment, garden, playgrounds, etc., recovery, calculated on semester to semester basis, will be collected along with examination fee for the semester.
 15. Students should keep their **vehicles** only at the **parking place allotted** for the purpose. Vehicle riding in the campus is strictly prohibited.
 16. Sitting on the parapet wall and Riding beyond the **parking limits**, the fine will be imposed to Rs.100.00
 17. Breakage or loss of equipment /property as decided by the appropriate authority
 18. The Principal/Director may, on the recommendation of the Head of the Department, or otherwise, inflict the **following punishments** in the interests of the student discipline and the Institution: fined, curtailment attendance, denial of promotion to next semester, suspension, expulsion or such other action as deemed necessary for the maintenance of discipline in the campus.

5.5. Lab Classes:

All students must attend lab classes without fail. Those absent shall follow this procedure laid down in the prescribed format explaining valid reasons and obtain permission to attend the future classes.

5.6 Fee:

1. All students admitted into this college, will be required to pay the prescribed tuition fee and other specified fees. Failure of the same will result in the cancellation of admission. No portion of fees will be refunded under any circumstances. If any student wishes to change the college or discontinue the course at any point for any reason, he \ she shall not be permitted to do so unless he \ she pays balance amount of four years fees which he \ she would have to pay, if he \she continued till the completion of the course. His \ Her original certificates including I.e., etc., will be issued only after all the dues as stated above, are cleared by the students. All senior students must pay the college fee every year on or before the 15th of July irrespective of the reopening of the college. If they fail the fine will be imposed as per norms of the management.
2. Miscellaneous fee paid for expenditure related to training programs i.e., technical or soft skills etc., is not refundable.
3. Other than the above, if any fees are levied by the University the student has to be pay the same.

5.7. Transport:

All students who are availing the college bus facility must carry the bus-pass and must produce when demanded, failing which they will not allowed to travel in the bus. All students must travel in the allotted bus and routes. They should not change but occupy only their allotted seats throughout. Unauthorized students caught in the bus for not having the bus

pass, should pay even if they traveled for one day also. First and second year are not allowed to bring two-wheelers.

5.8. Library Rules

1. Library Books will be issued for 15 days time and renewal depends upon the demand of the book.
2. Silence should be strictly maintained in the library.
3. Students are responsible for the library borrower card issued to them. Loss of the library card should be reported in writing to the circulation section immediately. Duplicate library borrower card will be issued on payment of Rs.150/- after a week time from the date of application for duplicate cards.
4. The Library borrower card is not transferable.
5. **Library books must be returned on or before the due date. Any student failed to do so, 1st week –Rs.1/-per day/per book, 2nd week – Rs.2/-per day/per book and 3rd week –Rs.3/-per day/per book penalty will be imposed From 4th week-Rs.5/-per day/per book penalty will be imposed.**
6. Students shall not make any sort of conversation in any part of the library, causing inconvenience to others.
7. Students shall not bring their belongings inside the library and should keep them outside the library.
8. Students leaving from the library should be checked at the exit.
9. Tearing of pages/stealing of books will invite suspension from using of the library facilities and further disciplinary action will be taken against such students, as per college norms.
10. The borrower shall replace the **New book within 7 days, otherwise, he/she has to pay 3 times of the book cost, along with fine.** In case of lose of book.

5.9. General:

1. All the students admitted in this college have to give an **undertaking** to abide by the **rules and regulations** of this college in prescribed format given by the college.
2. All the students **should attend** the college after vacations (Dasara / Sankranthi / Christmas / Semester term / summer) on the **re-opening day** without fail.
3. Students must **deposit all the relevant original certificates and documents** at the time of the admission Office and they will not be returned until completion of the course.
4. Admission of any student can be cancelled by the Management at any point during the course for reasons which are not in consonance with the rules and regulations and which are detrin the reputation of the college.
5. All the Students are here by informed that **college authorities will not take any responsibility for loss or theft of your valuable items and money** kept in your bags or some where else. Hence I request all the students are not to keep your valuables in class room or anywhere without your presence.
6. **Fee For Issue Of Duplicates**

a) Duplicate Hall ticket	Rs. 100.00
b) Duplicate Identity Card	Rs. 100.00
c) Duplicate College Bus Pass	Rs. 50.00
d) Duplicate Study Certificate for same purpose	Rs. 50.00
e) Xerox copies of OD's	Rs. 50.00

All Breakage etc., penalties will be displayed on the Notice Board, and must be paid by the student and no student will be allowed to write examination or internal test or laboratory test, if penalties are not paid by the due date specified in the notice or circular.

5.10. Ragging

Ragging in any form inside or outside the college campus is banned/Prohibited vide Ragging Act 26 of AP. legislative Assembly 1997. Those who indulge in this uncivilized activity are liable for severe disciplinary actions besides being liable for prosecution.

SALIENT FEATURES

apprehension or threat or intimidation or outrage of modesty or injury to a student.

S. No.	Nature of Ragging	Punishment
1	Teasing, Embarrassing and Humiliating	Imprisonment Upto 6 Month or Fine Upto Rs 1000/- or Both.
2	Assaulting or using criminal Force or criminal intimidation	Imprisonment Upto 1 Year or Fine Upto Rs 2000/- or Both.
3	Wrongfully restraining or Confining or causing hurt	Imprisonment Upto 2 Years or Fine Upto Rs 5000/- or Both.
4	Causing grievous hurt kidnapping Or raping or committing unnatural offence	Imprisonment Upto 5 Years or Fine Upto Rs 10000/- or Both
5	Causing death or abating Suicide	Imprisonment Upto 10 Years or fine Upto Rs. 50000/- or Both

Note:

1. A student convicted of any of the above offences, will be, dismissed from the college
2. A student imprisoned for more than six months for any of the above offences 'will not be admitted in any other College.
3. A student against whom there is prima facie evidence of ragging in any form will be suspended from the college immediately.

Prohibition of Ragging

1. Ragging is prohibited as per act 26 of AP. Legislative assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the college.
4. Outsiders are prohibited from entering the college premises without permission.
5. All students must carry their identity cards and show them when Demanded.
6. The principal and staff will visit and inspect the rooms at any time.
7. Suspended students are debarred from entering the campus except when required to attend enquiry and to submit an explanation .

6. ACADEMIC REGULATIONS R13 FOR B.TECH. (REGULAR)

Applicable for the students of B.Tech. (Regular) from the Academic year 2013-14 and onwards

6.1. Award of B.Tech. Degree

A Student will be declared eligible for the award of the B.Tech. Degree if he fulfills the following academic regulations:

- i) Pursued a course of study for not less than four academic years and not more than eight academic years.
 - ii) Register for 224 credits and secure 216 credits.
- 6.2. Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech Course.

6.3. Credits

	I Year		Semester	
	Periods / Week	Credits	Periods / Week	Credits
Theory	03+1/03	06	04	04
	02	04	---	---
Practical	03	04	03	02
Drawing	02T/03D	06	03 06	02 04
Mini Project	---	----	---	02
Comprehensive Viva Voce	---	--	---	02
Seminar	---	---	6	02
Project	---	---	15	10

6.4. Distribution and Weight age of Marks

- i. The performance of a student in each semester / I year shall be evaluated subject – wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, Industry oriented mini-project, seminar and project work shall be evaluated for 50,50 and 200 marks respectively.
- ii. For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End-Examination.
- iii. For theory subjects, during the semester there shall be 2 midterm examinations. Each mid term examination consists of objective paper for 10 marks and subjective paper for 15 marks with a duration of 1 hour 50 minutes (20 minutes for objective and 90 minutes for subjective paper).
- iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Out of the 25 marks for internal, day-to-day work in the laboratory shall be evaluated for 15 marks and internal examination for practical shall be evaluated for 10 marks conducted by the concerned laboratory teacher. The end examination shall be conducted with external examiner and laboratory teacher. The external examiner shall be appointed from the cluster of colleges as decided by the University examination branch.
- v. For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 marks for end examination. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marks for

- internal tests. However in the I year class, there shall be three tests and the average of best two will be taken into consideration.
- vi. There shall be an industry-oriented mini-project, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II semester examination. However, the mini project and its report shall be evaluated with the project shall be submitted in report form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of mini project and a senior faculty member of the department. There shall be no internal marks for industry oriented mini project.
 - vii. There shall be a seminar presentation in IV year II semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall be evaluated by the Departmental committee consisting of Head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.
 - viii. There shall be a comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of (i) Head of the Department (ii) two Senior Faculty members of the Department. The comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the B.Tech course of study. The comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the comprehensive viva-voce.
 - ix. Out of a total of 200 marks for the project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination. The End semester Examination (viva-voce) shall be conducted by the same committee appointed for industry oriented mini project. In addition the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be conducted at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.
 - x. Laboratory marks and the sessional marks awarded by the college are not final. They are subject to scrutiny and scaling by the University wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to a Committee. The Committee will arrive at a scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same is asked for.

6.5. Attendance Requirements:

- i. A student shall be eligible to appear for University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.
- ii. Shortage of Attendance below 65% in aggregate shall in NO case be condoned.
- iii. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester or I year may be granted by the College Academic Committee.
- iv. A student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester / I year, as applicable. They may seek re-admission for that semester / I year when offered next.
- v. Students whose shortage of attendance is not condoned in any semester / I year are not eligible to take their end examination of that class and their registration shall stand cancelled.
- vi. A stipulated fee shall be payable towards condonation of shortage of attendance.

6.6. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no 6

- i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.
- ii. A student shall be promoted from II to III year only if he fulfills the academic requirement of 37 credits from one regular and one supplementary examinations of I year, and one regular examination of II year I semester irrespective of whether the candidate takes the examination or not.
- iii. A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of total 62 credits from the following examinations, whether the candidate takes the examinations or not.
 - a) Two regular and two supplementary examinations of I year.
 - b) Two regular and one supplementary examinations of I semester.
 - c) One regular and one supplementary examinations of II year II semester.
 - d) One regular examination of III year I Semester.
- iv. A student shall register and put up minimum attendance in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.
- v. Students who fail to earn 200 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

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7 COURSE CALENDAR FOR THE YEAR

Description	Period	Duration
I Sem		
Commencement of Classwork	29-06-2015	
1 st Spell of Instructions	29-06-2015	22-08-2015 (8 weeks)
I mid term exams	24-08-2015	29-08-2015 (1 week)
2 nd Spell of Instructions	31-08-2015	17-10-2015 (8 weeks)
II mid term exams	26-10-201	31-10-2015 (1 weeks)
Preparations & Practical Examinations	02-11-2015	07-11-2015 (1 weeks)
End Examinations	09-11-2015	21-11-2015 (2 weeks)
II Sem		
Commencement of Classwork	07-12-2015	
1 st Spell of Instructions	07-12-2015	30-01-2016 (8 weeks)
I mid term exams	01-02-2016	06-02-2016 (1 week)
2 nd Spell of Instructions	22-02-2016	16-04-2016 (8 weeks)
II mid term exams	18-04-2016	23-04-2016 (1 weeks)
Preparations & Practical Examinations	25-04-2016	30-04-2016 (1 weeks)
End Examinations	02-05-2016	14-05-2016 (2 weeks)

8. IV YEAR IT COURSE STRUCTURE

CODE	SUBJECT	L	P	C
57079	Object Oriented Analysis Design	4	-	4
57035	VLSI Design	4	1	4
57081	Wireless Networks and Mobile Computing	3	1	3
57047	Software testing Methodologies	3	1	3
57080	Mobile Application Development	3	1	3
57083	Human Computer Interaction	4	1	4
57617	Case Tools/Software Testing Lab	-	3	2
57618	Mobile Application Development Lab	-	3	2
	Total	21	11	25

Note: All End Examinations (Theory and Practical) are of three hours duration.
T – Tutorial L-Theory P- Practical C – Credits

9 OBJECT ORIENTED ANALYSIS DESIGN

9.0 COURSE DESCRIPTION FORM

Course Title	OBJECT ORIENTED ANALYSIS AND DESIGN			
Course Code	57079			
Regulation	R13			
Course Structure	Lectures	Tutorials	Practicals	Credits
	4	---	0	4
Course Coordinator	Dr. K. Kiran Reddy			
Team of Instructors	Dr. K. Kiran Reddy			

9.1 COURSE OVERVIEW:

The primary objective of this course is to introduce the concept of algorithm as a precise mathematical concept, and study how to design algorithms, establish their correctness, study their efficiency and memory needs. The course consists of a strong mathematical component in addition to the design of various algorithms.

9.2 PREREQUISITES:

Level	Credits	Periods/Weeks	Prerequisites
UG	4	5	Object Oriented Programming

9.3 COURSE ASSESSMENT METHODS:

Session Marks (25M)	University End Exam Marks	Total Marks
<p>Mid Semester Test There shall be two midterm examinations. Each midterm examination consists of subjective type and objectivetype tests. The subjective test is for 10 marks of 60 minutes duration. Subjective test of shall contain 4 questions; the student has to answer 2 questions, each carrying 5 marks. The objective type test is for 10 marks of 20 minutes duration. It consists of 10 Multiple choice and 10 objective type questions, the student has to answer all the questions and each carries half mark</p>	75	100

<p>First midterm examination shall be conducted for the first two and half units of syllabus and second midterm examination shall be conducted for the remaining portion.</p> <p>Assignment Five marks are earmarked for assignments. There shall be two assignments in every theory course. Marks shall be awarded considering the average of two assignments in each course.</p>		
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9.4 EVALUATION SCHEME

S. No	Component	Duration	Marks
1	I Mid Examination	90 minutes	20
2	I Assignment	-	5
3	II Mid Examination	90 minutes	20
4	II Assignment	-	5
5	External Examination	3 hours	75

I. COURSE OBJECTIVES:

- Understand** the concept of object oriented modeling and its benefits.
- Design** interface between classes and objects.
- Demonstrate** the usage of use case in capturing requirements for a software system.
- Explain** interaction diagram for modeling the dynamic aspects of a software system.
- Demonstrate** the facets of the unified process approach to design and build a software system

9.5 COURSE OUTCOMES:

- Explain** the importance of modeling.
- Demonstrate** the Conceptual model of UML and SDLC.
- Illustrate** classes and relationships.
- Demonstrate** common mechanisms and diagrams.
- Explain** advanced relationships, interfaces and packages.
- Define** classes modeling techniques and instances modeling techniques.
- Illustrate** object diagrams.
- List** interaction modeling techniques.
- Describe** interaction diagrams and their modeling techniques.
- State** use case modeling techniques.
- Demonstrate** activity diagram and their modeling techniques.
- Explain** events and signals and their modeling techniques
- Demonstrate** state machines and state chart diagrams.
- Explain** the terms and concepts of component and deployment.
- Demonstrate** component and deployment diagram.
- Analyzing** and modeling library application.

9.6 HOW PROGRAM OUTCOMES ARE ASSESSED:

	Program Outcomes	Level	Proficiency assessed by
A	An ability to apply the knowledge of mathematics, Computing, Science and engineering to solve Computer Science and Engineering problems.	H	Assignments, Tutorials, Exams
B	An ability to design and conduct engineering experiments, as well as to analyze and interpret data.	S	Assignments, tutorials
C	An ability to design and construct a hardware and software system, component, or process to meet desired needs, within realistic constraints.	H	Assignments, Tests
D	Graduates will demonstrate an ability to visualize and work on laboratory and Multi-disciplinary tasks individually or as a member within the teams.	N	-----
E	An ability to demonstrate skills to use the techniques, modern engineering Tools, Software and equipments necessary to analyze computer engineering Problems.	H	Assignments, Tests
F	An understanding of professional, social and ethical responsibility	S	Lectures
G	An ability to recognize the global issues like green initiatives and alternate energy recognize the rural requirements.	S	----
H	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	N	Lectures
I	Graduate will develop confidence for self education and acquire new knowledge in the computing discipline and ability and practice for Multi-disciplinary tasks as a member within the teams	H	Assignments, Tutorials, Exams
J	To communicate effectively	N	-----
K	An ability to use the techniques, skills and modern engineering tools practice necessary for Engineering practice.	H	Assignments, Tutorials
L	Graduates are able to participate and succeed in competitive examination like GRE, GATE, TOEFL, GMAT etc	N	Assignments, Tutorials
M	The use of current application software and the design and use of operating systems and the analysis, design, testing and documentation of	H	Assignments, Tutorials

	computer programs for the use computer science and engineering technologies .		
N	An ability to setup an enterprise.	S	Assignments,

N=None S=Supportive H=Highly Related

9.7 SYLLABUS:

UNIT - I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, and Software Development Life Cycle.

UNIT – II

Basic Structural Modeling: Classes, Relationships, common Mechanisms and diagrams.

Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT – III

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

Basic Behavioral Modeling –II: Use cases, Use case Diagrams, Activity diagrams

UNIT – IV

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space chart diagrams.

Architectural Modeling: Component, Deployment, Component Diagrams, Deployment diagrams

UNIT – V

Pattern and frame works, Aircraft Diagrams, **Case Study:** The Unified Library application.

Text Books:

1. GradyBooch, JamesRumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.
2. Hans, Erik Eriksson Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY, Dreamtech India Pvt. Ltd.

References:

1. Meilir Page Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY, Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGrawHill Companies.
4. Applying UML and Patterns: An introduction to Object Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
5. Mark Priestley: Practical Object-oriented Design with UML, TATA McGrawHill.

9.8 COURSE PLAN:

At the end of the course, the students are able to achieve the following Course Learning Outcomes.

Lecture No.	Course Learning Outcomes	Topics to be covered	Reference
1 - 2	Explain the importance of modeling	Importance of Modeling, Principles of Modeling. Object Oriented Modeling. http://nptel.ac.in/video.php?subjectId=106101061	T1:26-32,R1:77-84 T1:32-33,R1:57-72
3 - 4	Demonstrate the Conceptual model of uml and SDLC	Conceptual model of UML. Architecture, Software Development Life Cycle. http://www.nptel.ac.in/courses/106105087/pdf/m02L03.pdf	T1:39-52 T1:52-57,R2:64-72
5 - 7	Illustrate classes and relationships	Classes, Modeling the vocabulary, responsibilities, modeling the distribution of Modeling non software things, modeling primitive types of a system. Relationships: Terms and concepts Modeling single dependencies, Modeling single inheritance, Modeling structural relationships, Creating webs of relationships. http://www.nptel.ac.in/courses/108105057/Pdf/Lesson-37.pdf	T1:39-52 T1:52-57,R2:64-72
8 - 12	Demonstrate common mechanisms and diagrams	Common mechanisms and diagrams: Notes, Stereotypes, Tagged values and constraints .Modeling comments, new building blocks, new properties, semantics, Extending UML. Diagrams, view and models, modeling different views of a system, modeling different level of abstraction, modeling complex views. Advanced structural modeling, Advanced classes Classifiers, Modeling semantics of a class, choosing right kind of a classifier.	T1:39-52 T1:52-57,R2:64-72
13 - 20	Explain advanced relationships, interfaces and packages	Advanced Relationships: advanced dependency, generalization, association Realization. Refinement relationships, Modeling webs, Creating webs of relationships. Interfaces, Types, Roles, Realization. Modeling the seams in a seam. Static and dynamic types, Making interfaces understandable and approachable. Packages, visibility, importing and exporting, modeling group of elements, architectural views, Scaling up to large systems.	T1:39-52 T1:52-57,R2:64-72.
21 - 24	Define classes modeling techniques and instances modeling techniques	Common modeling techniques : Modeling simple collaboration, logical databaseschema, Forward and Reverse Engineering Instances: Terms and Concepts, Common modeling Techniques, Modeling concrete Instances.	T1:127-129,R1:107-234 T1:130-134 T1:207-213

25 - 26	Illustrate object diagrams	Modeling Prototypical Instances. Object Diagrams: Modeling Object structures, Forward and Reverse Engineering.	T1:214-215 T1:219-223,R1:138
27 - 28	List interaction Modeling techniques.	Interactions: Terms and Concepts. Common Modeling Techniques, ModelingFlow of control.	T1:229-238,R1:138-157
29 - 31	Describe interaction diagrams and their modeling techniques.	Interaction Diagrams: Terms and Concepts. Common Modeling Techniques: Modeling Flow of control by time ordering, Modeling Flow of control by Organization. Forward and Reverse Engineering.	T1:267-272,R1:138-157 T1:273-278
32 - 35	State use case modeling techniques.	Use case: Terms and Concepts. Common Modeling Techniques: Modeling the behavior of an element. Use case diagrams: Terms and Concepts. Common Modeling Techniques: Modeling the Context of a system, Modeling the requirements of a system, Forward and Reverse Engineering.	T1:244-251, R5:45-70 T1:251-52,R5:45- 70 T1:256- 25 8
36 - 37	Demonstrate activity diagram and their modeling techniques.	Activity Diagrams: Terms and Concepts. Common modeling techniques: Modeling a Workflow, Modeling an Operation .Forward and Reverse engineering.	T1:281-290 T1:290-294 T1:300- 305
38 - 40	Explain events and signals and their modeling techniques.	Events and Signals: Terms and Concepts. Common modeling Techniques: Modeling a Family of signals, Modeling exceptions.	T1:281-290 T1:290-294 T1:300- 22 T1:306-311
51 - 55	Demonstrate state machines and state chart diagrams.	State Machines: Terms and Concepts, Common modeling Techniques, Modeling the lifetime of an object. Processes and Threads: Terms and concepts, Modeling multiple Flows of Control, modeling inter process communication. Time and Space: Terms and Concepts. Modeling Timing and constraints, Modeling the distribution of objects, Modeling objects that migrate. State chart diagrams: Terms and Concepts, Modeling Reactive objects, Forward and Reverse engineering.	T1:312-328,R5:437-444 T1:333-344 T1:344-347 T1:348-352 T1:355-360
56 - 61	Explain the terms and Concepts Of component and deployment.	Components: Terms and Concepts. Modeling Executable and Libraries,modeling tables, Files and Documents, modeling an API, modeling Source code. Deployment: Terms and Concepts, Modeling Processors and Devices, Modeling the Distribution of Components.	T1:355-360 T1:367-373 T1:373-378
	Explain the terms and Concepts Of component	Components: Terms and Concepts. Modeling Executable and Libraries, modeling tables, Files and Documents,	T1:355-360 T1:367-373 T1:373-378

	and deployment.	modeling an API, modeling Source code. Deployment: Terms and Concepts, Modeling Processors and Devices, Modeling the Distribution of Components.	
62-65	Understand modeling library Application	The unified library Application	T1:434-438

9.9 MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES:

Course Objectives	Program Outcomes													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
I.	H	H	H			S			H		S	H		
II.	H		S	S	S	H	S		S	H	S			H
III.	H	H	H	H	H	S	H		H		S			
IV.	H		H	S	S	H	S					S	H	S
V.	H	S	H	H		S	H		H					S
VI.	H		S		H							S		S

S=Supportive H=Highly Related

9.10 MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES:

Course Outcomes	Program Outcomes													
	A	B	C	D	E	F	G	H	I	J	k	L	M	N
a.	H	H	H			S			H		S	H		
b.	H		S	S	S	H	S		S	H	S			H
c.	H	H	H	H	H	S	H		H		S			
d.	H		H	S	S	H	S					S	H	

															S
e.	H	S	H	H		S	H		H						S
f.	H	H	H	S			S	H	S	H		S	H		
g.	H		S	S	S	H	S		S	H	S				H
h.	H	H	H	H	H	S	H		H		S				
i.	H		H	S	S	H	S					S	H		S
j.	H	S	H	H		S	H		H						S
k.	H	H	H	S			S	H	S	H		S	H		
l.	H		S	S	S	H	S		S	H	S				H
m.	H	H	H	H	H	S	H		H		S				
n.	H		H	S	S	H	S					S	H		S
o.	H	S	H	H		S	H		H						S
p.	H	H	H	S			S	H	S	H		S	H		

S=Supportive H=Highly Related

9.11 OBJECTIVE QUESTIONS:

UNIT I

1. Which one of the following is not principle of modeling?
 1. Choose your models well
 - 2. Every model may not be expressed at different at different levels of decision .**
 3. The best models are connected to reality.
 4. No single model is sufficient.
2. Which one of the following view express the requirements of the system?
 - 1. Usecase**
 2. Design
 3. Process
 4. Implementation.
3. UML is a ----- modeling language.
 - 1. general - purpose.**
 2. object-purpose.
 3. architecture-purpose.
 4. code-purpose.
4. We build models so that we can better ----- the system we are developing]

1. misunderstand
- 2. understand**
3. guide
4. misguide.
5. - - - is a central part of all the activities that lead up to the deployment of good software]

1. Modeling

2. Coding
3. Testing
4. Analysis
6. What is a model?
 1. A model is a modification of reality
 2. A model is a justification of reality
- 3. A model is a simplification of reality**
4. A model is a constucation of reality

7. UML stands for

1. Uniform Modeling Langage

2. Unified Modeling Langage

3. United Modeling Langage
4. Unique Modeling Langage
8. Models tell us to - - - - - a system as it is (or) as we want it to be

1. visualize

2. specify.
3. constructing.
9. Models permit us to - - - - - the structure or behavior of a system

1. visualize

2. specify .

3. constructing.
4. document.
10. Models give us a template that guides us in system.

1. visualize

2. specify.

3. constructing.

4. document.

UNIT II

1. The approach to software development is decidedly a part of the mainstream.
1. algorithmic.

2. object-oriented.

3. procedural.
4. modeled.

2. In an algorithmic approach the main building block of all software is the

1. class.

2. abstract class.

3. object.

4. module.

3. Visualizing, specifying, constructing, & documenting object-oriented systems are exactly the purpose of the

1. C language

-
2. C++ language.
 3. pascal language .
 - 4. Unified modeling language .**
 4. In , any program can call any other program.
 - 1. modular.**
 2. object.
 3. procedural.
 4. component.
 5. An object contains
 - 1. attributes & methods.**
 2. only attributes.
 3. only methods.
 4. classes.
 6. In abstraction, we concentrate on
 1. minor details.
 2. procedures.
 3. processes.
 - 4. important details.**
 7. helps us in protecting privacy of objects
 - 1. Encapsulation**
 2. Abstraction.
 3. Inheritance.
 4. Polymorphiism .
 8. A is rendered as a rectangle with tabs.
 1. interaction.
 2. node.
 - 3. component.**
 4. state.
 9. Which one of the following is grouping thing?
 1. class .
 - 2. package.**
 3. use case.
 4. collaboration.
 10. An is a class whose objects own one or more processes or threads and therefore can initiate Control activity.
 - 1. Active class.**
 2. Abstact class.
 3. Alternate class.
 4. Interface class.

UNIT III

1. things are the organizational parts of UML models.
 1. structure
 2. behavioral
 - 3. grouping**
 4. annotational
2. things are the explanatory prts of UML models.

-
1. structure
 2. behavioral
 3. grouping
 - 4. annotational**
3. An is a collection of operations that specify a service of a class or component.
- 1. interface**
 2. active class
 3. use case
 4. interaction
4. A is a physical & replaceable part of a system that conforms to and provides the realization of
- Set of interfaces.
1. node
 2. Class
 - 3. Componet**
 4. Collaboration
5. A node is rendered as a
1. rectangle.
 2. ellipse.
 - 3. cube.**
 4. square.
6. A is rendered as a rounded rectangle.
1. interaction.
 2. node.
 3. component.
 - 4. state.**
7. A is rendered as an ellipse with dasned lines.
1. class.
 - 2. collaboration.**
 3. vsecase.
 4. component.
8. Which one of the following diagram is an interation diagram? .
1. class.
 2. object.
 - 3. sequence.**
 4. statement
9. A diagram is an interaction diagram that emphasizes the structural organization of the objects that sends and recive messages.
- 1. collaboration.**
 2. object.
 3. sequence.
 4. component.
10. The UML' s provide a semantic backplane that contains all the ports of all the models of a system,
- each part related to one another in a consistent fashion.
1. adornments .
 - 2. specifications.**

3. common divisions.
4. extendibility mechanisms.

UNIT IV

1. A is a specialization relationship in which objects of the specialized element are substitutable for objects of the generalized element.
 1. dependency.
 - 2. generalization.**
 3. realization.
 4. message.
2. A is a semantic relationship between classifiers where in one classifier specifies a contract that another classifier guarantees to carry out.
 1. dependency.
 2. generalization.
 - 3. realization.**
 4. message.
3. UML includes diagrams.
 1. seven.
 2. eight.
 - 3. nine.**
 4. ten.
4. Which one of the following diagram address the dynamic view of a system?
 1. class.
 2. object.
 3. component.
 - 4. statechart.**
5. Which one the following diagram address the static view of a system?
 1. interaction.
 2. activity.
 3. statechart.
 - 4. component.**
6. A extends the properties of a UML building block, allowing you to create new information in that element's specification.
 - 1. tagged value.**
 2. Stereotype.
 3. Constraint
 4. Adornmrnts.
7. A extends the semantics of a UML building block ,allowing you to add new rules or modify existing ones.
 1. tagged value.
 2. stereotype.
 - 3. Constraint**

4. Adornmrnts.
- 8.A extends the vocabulary to the UML,allowing you to create new kinds of building block
 - that are derived from existing ones out that are specific to your problem.
 1. tagged value.
 - 2. stereotype.**
 3. Constraint
 4. Adornmrnts.
- 9.. is the fourth phase of the process when the software is turned into the hands of the user community.
 1. Inception.
 2. Blaboration.
 3. Construction.
 - 4. Transition.**
- 10.The coding phase roughly maps to the phase.
 1. inception.
 2. elaboration.
 - 3. construction.**
 4. trasion.

UNIT V

- 1.The view of a system encompasses the threads and processes that form the system's concurrency and syncnronization mechanisms.
 1. design
 2. usecase
 - 3. process**
 4. deployment
- 2.The view of a system excompasses the nodes that form the system's hardware topology on which the system executes.
 1. design
 2. usecase
 3. process
 - 4. deployment**
- 3.The view of a system excompasses the components and files that are used to assemble and release the physical system.
 - 1. implementation.**
 2. usecase
 3. process
 4. deployment
- 4.The analysis phase roughly maps to the phase.
 - 1. inception .**
 2. elaboration.
 3. construction.
 4. trasion.
- 5.The design phase roughly maps to the phase.
 1. inception.
 - 2. elaboration.**
 3. construction.

4. transition.
6. Aggregation is a kind of relationship .
1. is-a.
 2. to-a.
 3. was-a
 - 4. has-a.**
7. Use only when you have an is-a-kind-of relationship.
1. dependency.
 2. association.
 3. aggregation.
 - 4. generalization.**
8. Use only when the relationship you are modeling is not structural.
- 1. dependencies.**
 2. associations.
 3. aggregations.
 4. generalizations.
9. can be drawn in a separate compartment at the bottom of the class icon.
1. usability.
 - 2. responsibility**
 3. package.
 4. state.
10. An association that connects exactly two classes is called a
- 1. binary association.**
 2. Ternary association.
 3. normal association.
 4. single association.

UNIT- VI

1. A is just the face the class at the near end of the association presents to the other end of the association.
1. name.
 - 2. role.**
 3. multiplicity.
 4. aggregation.
2. diagrams are especially important in modeling the function of system.
1. statechart.
 2. deployment.
 - 3. Activity**
 4. sequence.
3. You use diagrams to illustrate data structures, the static snapshots of instances of the things found in class diagrams
1. Usecase.
 - 2. object.**
 3. collaboration.
 4. sequence.
4. Implementation view consists of diagrams.

1. class
 2. interaction
 - 3. component**
 4. deployment
5. The UML specifies one standard stereotype that applies to notes is .
- 1. requirement.**
 2. metaclass.
 3. exception.
 4. power type.
6. From the following diagrams you can convert from one to the other without loss of information.
- 1. sequence & collaboration.**
 2. sequences & class .
 3. collaboration & use case.
 4. deployment and use case.
7. diagrams emphasize the event-ordered behavior of an object, which is especially useful in modeling reactive system.
- 1. statechart.**
 2. sequence.
 3. component.
 4. deployment.
8. Notes may be attached to more than one element by using
1. associations.
 - 2. dependences.**
 3. generalizations.
 4. aggregations.
9. are textual or graphical items that are added to an element's basic notation and are used to visualize details from the element's specification.
1. Notes.
 2. Stereo types.
 3. Tagged values.
 - 4. Adornments.**
10. A tagged value is rendered as a enclosed by brackets and placed below the name of another element.
1. integer.
 2. float.
 - 3. string.**
 4. varchar.

UNIT- VII

1. Which one of the following standard stereotype specifies that the classifier is a Stereo type, that may be applied to other elements?
- 1. Stereo type**
 2. Documentation
 3. Exception
 4. Metaclass

-
- 2.A is a semantically classed abstraction of a system,meaning that it represents a complete and self-consistent simplification of reality ,created in order to better understand the system
1. diagram.
 2. View.
 - 3. Model.**
 4. Sub system.
3. Which one of the following diagram is a structural diagram?
1. Use case.
 2. Activity.
 - 3. component.**
 4. statechart.
4. Which one of the following diagram is a behavioral diagram?
1. class.
 2. objects.
 3. component.
 - 4. sequence.**
5. Wich one of the following attribute declaration is legal of name,multiplication & type?
1. name : string.
 2. + orgin.
 3. head:*item.
 - 4. namejO.1J : string.**
- 6.An operation is said to be polymorphic when
- 1. you can specify operations with the same signature at different print in the hierarchy.**
 2. you can specify operations with the different signature at same print in the hierarchy
 3. you can specify operations with the different signature at different print in the hierarchy
 4. you can specify operations with the same signature at same print in the hierarchy
- 7.. is a physical element that exists at run time and that represents a computational Resource,generally having at least some memory and often processing capability.
1. signal.
 2. Component
 - 3. Node**
 4. Subsystem
- 8.A well structured classifier is coupled.
1. fightly.
 2. loosly.
 3. sequentially.
 - 4. parallely.**
- 9.The visibility of private is .
1. +
 2. #
 3. -
 - 4. I**
- 10.. is a specification of the range of allowable cordinalities that a set may assume.
[08M01]
1. visibility.

2. scope.

3. attribute.

4. multiplicity.

UNIT- VIII

1..... is a physical and replacable part of a system that conforms and provides the realization of a set of interfaces

1. signal.

2. Component.

3. Node

4. Subsystem.

2..... is specification of an asynchronous stimulus communicated between instances.

1. Signal.

2. Component.

3. Node

4. Subsystem

3..... is a description of a set of sequence of actions, including variants, that a system performs that yields an observable result of value to a particular actor.

1. Signal.

2. Component

3. Node.

4. Usecase

4..... stereotype specifies a classifier whose objects are the children of a given parent.

1. Signal.

2. Component

3. Node.

4. Usecase

5..... stereotype specifies a class whose attributes and operations are all class scoped.

[08S09]

1. Signal.

2. Component

3. Node.

4. Usecase

6. Which one of the following stereotype is used to apply to dependency relationships among packages?

1. extend.

2. access.

3. include.

4. become.

7. Which one of the following constraint in generalization relationships, apply only in the context of multiple inheritance.

1. overlapping.

2. Complete.

3. Incomplete.

4. Implementation.

8..... stereotype specifies that the source is given special visibility into the target.

1. derive.

2. friend.

- 3. refine.
- 4. use.
- 9. stereotype specifies that the target is an historical ancestor of the source.
 - 1. send.
 - 2. copy.
 - 3. trace.**
 - 4. extend.
- 10. standard constraint specifies that objects of the parent may have no more than one of the children as a type
 - 1. complete.
 - 2. Incomplete.
 - 3. Disjoint.**
 - 4. Overlapping.

9.12 TUTORIAL QUESTION BANK

GROUP - A (SHORT ANSWER QUESTIONS)

S. No.	Question	Blooms Taxonomy Level	Course Outcomes
UNIT – I INTRODUCTION TO UML			
1.	Define UML.	Knowledge	1
2.	Explain modelling.	Understand	2
3.	Describe the history of uml.	Knowledge	2
4.	List out the method wars.	Knowledge	1
5.	State the goals of UML.	Knowledge	2
6	Describe the importance of modelling .	Knowledge	1
7	Define the basic building blocks of uml.	Knowledge	2
8	Explain the things in uml.	Understand	2
9	Classify structural things.	Understand	1
10	Classify behavioral things in uml.	Understand	1
11	Define grouping things.	Knowledge	2
12	Define class.	Knowledge	1
13	Define class and object.	Knowledge	2
14	Define an Interface.	Knowledge	2
15	Define collaboration.	Knowledge	1

16	Describe component.	Knowledge	1
17	Explain about active class	Understand	2
18	Compare relationships.	Understand	2
19	Define Uml diagrams.	Knowledge	1
20	Explain common mechanisms in uml.	Understand	1
UNIT – II			
BASIC STRUCTURAL MODELLING ,ADVANCED STRUCTURAL MODELLING			
1	Define classes .	Knowledge	4
2	Explain about name .	Understand	5
3	Describe an attribute.	Knowledge	5
4	Define responsibilities.	Knowledge	3
5	Define modelling vocabulary of system.	Knowledge	3
6	Define distribution of responsibilities in a system.	Knowledge	4
7	Define dependency.	Knowledge	4
8	Define generalization.	Knowledge	4
9	Explain association.	Understand	4
10	Discuss about aggregation.	Understand	5
11	List the simple dependencies.	Knowledge	4
12	Demonstrate the modeling of single inheritance.	Apply	4
13	Discuss modelling structural relationships.	Understand	5
14	Define note.	Knowledge	5
15	Define stereotypes.	Knowledge	3
16	List tagged values.	Knowledge	4
17	Explain constraints.	Understand	5
18	Illustrate how to model comment.	Apply	3
19	Illustrate how to model different views of a system .	Apply	4
20	Explain modeling of new semantics.	Understand	5
UNIT – III			
CLASS AND OBJECT DIAGRAMS			

1	Explain about class diagram.	Understand	6
2	State common properties in class diagram.	Knowledge	7
3	List out contents of class diagram.	Knowledge	7
4	Illustrate modelling of collaboration.	Apply	6
5	Discuss modelling a schema.	Understand	6
6	Explain how to forward engineer a class diagram.	Understand	6
7	Explain how to reverse engineer a class diagram.	Understand	7
8	Enumerate object diagram.	Knowledge	7
9	Tabulate common properties in object diagram.	Knowledge	6
UNIT-IV			
1	Define interactions.	Knowledge	9
2	Explain about context.	Understand	8
3	Describe about association.	Understand	8
4	Discuss about self.	Understand	8
5	Explain about global.	Understand	9
6	Discuss about local scope.	Understand	8
7	Define parameter.	Knowledge	9
8	Explain messages in uml.	Understand	8
9	Discuss about sequencing.	Understand	9
10	Discuss about procedural sequence.	Understand	9
11	Explain about flat sequence.	Understand	8
12	Discuss How to model flow of control.	Understand	8
13	Explain collaboration diagrams.	Understand	9
14	Discuss how to forward engineers sequence diagrams.	Understand	8
15	Discuss how to reverse engineer collaboration diagrams.	Understand	9
16	State new link.	Knowledge	9
17	Explain about destroyed.	Understand	9

18	Describe about transient in detail.	Knowledge	8
19	Illustrate the common properties of interaction diagrams.	Apply	9
20	Explain How to model flow of control by organization.	Understand	9
21	Discuss how to forward engineers sequence diagrams.	Understand	8
22	Discuss how to reverse engineer collaboration diagrams. State new	Understand	9
23	Explain about destroyed.	Understand	9
24	Describe about transient in detail.	Knowledge	8
25	Illustrate the common properties of interaction diagrams.	Apply	9
26	Explain How to model flow of control by organization.	Understand	9
UNIT – V			
BASIC BEHAVIORAL MODELLING – II ADVANCED BEHAVIORAL MODELLING			
1	Define Use case.	Knowledge	11
2	Interpret the relationship between Usecases and actors.	Understand	10
3	Demonstrate the need of Use case diagram.	Understand	11
4	Demonstrate an Actor.	Understand	10
5	Compare System Use case and business use case.	Understand	11
6	Explain types of requirements should not be documented in use cases.	Understand	10
7	Demonstrate the relationship between use cases and test cases.	Understand	11
8	Demonstrate an Activity Diagram.	Understand	10
9	Explain What types of requirements should not be documented in activity diagrams.	Understand	11
10	Discuss components of a activity diagram.	Understand	10

GROUP-B (LONG ANSWER QUESTIONS)

S. No.	Question	Blooms Taxonomy Level	Course Outcomes
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UNIT - I			
1	Illustrate How is generalization/specialization contrasted with more code reuse? State Liskov's substitution principle.	Apply	1
2	(a) State Why is it necessary to have a variety of diagrams in a model of a system. (b) State Which UML diagrams give a static view and which give a dynamic view of a system.	Knowledge	2
3	(a) Explain briefly runtime polymorphism illustrating a program in Java or C++. (b) Discuss the principles of modelling.	Understand	2
4	Consider a computer-based system that plays chess with a user. Which UML diagrams would be helpful in designing the system.	Apply	1
5	Explain the antisymmetric and transitive properties of aggregation.	Apply	2
6	Pick the ones that are related. Justify. i. Behavioral things, verbs ii. Structural things, nouns iii. Generalization, specialization, adjectives	Knowledge	2
UNIT-II			
1	(a) Explain any three features used in creating abstractions. (b) Enumerate the steps to model the vocabulary of a system.	Understand	2
2	Write a simple JAVA applet for printing "Hello, World!" in a web browser.	Apply	1
3	Define relationship. Explain the four adornments that apply to an association.	Apply	2
4	Enumerate the steps to model single inheritance.	Knowledge	2
5	Enumerate the steps to model using relationship.		
6	Define the following: i. System ii. Model iii. subsystem iv. Use case	Understand	2
7	Illustrate distribution of responsibilities in a system.	Apply	1
8	State modeling different levels of abstraction.	Apply	2
9	Explain the UML's behaviour diagrams.	Knowledge	2
UNIT-III			
1	Explain the following relationships with UML notation i. Using ii. Realization iii. Simple aggregation iv. Composite aggregation	Understand	4
2	Contrast interface inheritance with class inheritance.	Understand	4
3	Define modelling non software things and primitive type.	Knowledge	5
4	Enumerate modelling simple dependencies.	Understand	4
5	a) Interpret relation between interfaces, types and roles.	Understand	5

	b) Enumerate modelling new building blocks.		
6	a) Enumerate the steps to model different views of a system. b) Enumerate modelling comment's and new semantics	Knowledge	4
7	a) Enumerate the steps to model complex views. b) Enumerate modelling new properties.	Knowledge	4
8	a) Define idiom. Enumerate the steps to model structural relationships. b) Enumerate modelling seams in a system.	Knowledge	5
9	Enumerate modelling static and dynamic type.	Understand	3
10	Enumerate modelling group of elements.	Understand	4
11	Contrast simple aggregation with composite aggregation.	Understand	5
UNIT-IV			
1	Describe interaction diagrams. What are their contents and common properties.	Understand	8
2	Enumerate the steps to model flows of control by time ordering.	Knowledge	9
3	Design a sequence diagrams that specifies the flow of control involved in initiating a simple, two-party phone call.	Apply	8
4	Design a class diagram that depicts the various relationships in UML.	Apply	7
5			
6	Explain the common properties and uses of class diagrams.	Understand	6
7	Illustrate the contents in class diagrams.	Apply	7
8	Explain the use of forward engineering and reverse engineering class diagrams	Understand	7
9	Contrast object diagram with class diagram.	Understand	6
10	Enumerate the steps to model concrete instances.	Knowledge	7
UNIT-V			
1	Enumerate the steps to model prototypical instances.	Knowledge	6
2	Enumerate the steps to model object structures.	Knowledge	6
3	Enumerate the steps to forward and reverse engineer object diagram.	Knowledge	7
4	Enumerate the steps to model logical database schema.	Knowledge	7
5	Enumerate the steps to model logical database schema. Give all example class diagrams.	Knowledge	6
6	State forward engineering and reverse engineering.	Knowledge	7

GROUP-III (ANALYTICAL QUESTIONS)

S. No.	Question	Blooms Taxonomy Level	Course Outcomes
UNIT-I			
1	Illustrate out evolution of UML.	Apply	2
2	Explain Method wars.	Underst	2

		and	
3	Define a domain model.	Knowle dge	1
4	Explain the critical ability of object oriented systems.	Underst and	2
5	Explain the 3 ways to apply UML.	Underst and	2
6	Describe Unified process.	Underst and	1
7	Explain the importance of Unified process.	Underst and	2
8	Describe the iterative and evolutionary development.	Underst and	1
9	Discuss why waterfall is so failure prone.	Underst and	1
	UNIT-II		
	Define an abstract class? Mention its use. Can concrete class be a super class? If yes, give example, if no, give reason. Create a class hierarchy to organize the following drink classes: Mineral water, wine, alcoholic, non alcoholic, grape juice, soda, bears.	Apply	6
1	Categorize the following relationship into generalization, aggregation, composition and association. 1. Files contain records. 2. A drawing object is text, a geometrical object or group. Modems and keyboards are input/output devices. 4. Object classes may have several attributes. 5. Car has accelerator, break and wheels as parts. 6. Windows is composed of lot of frames. 7. An account is either type savings or type current.	Underst and	6
2	Explain any four standard constraints that apply to generalization relationships.	Underst and	7
3	Discuss the stereotype applied to generalization relationships? Give a brief.	Apply	7
4	Compare abstract and concrete operation.	Apply	7
5	Illustrate the ability to navigate from class A to class Bin UML.		
6	Explain business entity and service class.	Apply	7
7	Briefly explain the four adornments that apply to all association.	Apply	6
8	Enumerate the steps to model webs of relationships.	Underst and	6
	UNIT-III	Underst and	7
1	Prepare object diagram showing at least 10 relationships among the following object classes. Include associations and qualified associations, aggregations, generalizations, and multiplicity. You may add additional objects. Also show attributes and operations. School, playground, principal, school board, classroom, book, student, teacher, canteen,	Apply	7

	restroom, computer, desk, chair.		
2	Model the relationship between a car (that has an engine and a colour) and its owners (having a name) in a UML class diagram. A car can have several owners over time, but only one or none owner at a time. Do not forget cardinalities, role names, attributes and their types	Apply	7
3	Draw class diagram for ATM.		
4	Draw class diagram for Library Management system.	Apply	6
5	Draw object diagram for ATM.	Apply	7
6	Draw object diagram for Library Management system.	Apply	6
7	Explain composite structure diagram.	Underst and	6
8	Discuss reflexive association in class diagram.	Underst and	7
9	Design a class diagram for Document editor.	Apply	7
10	Design a class diagram for rotating machine.	Apply	7
	UNIT-IV		
1	Create a sequence diagram for the following collaboration. Use the classes and methods on the next slide. A customer wants to draw money from his bank account. He enters his card into an ATM (automated teller machine). The ATM machine prompts „Enter PIN“. The customer enters his PIN. The ATM (internally) retrieves the bank account number from the card. The ATM encrypts the PIN and the account number and sends it over to the bank. The bank verifies the encrypted Account and PIN number. If the PIN number is correct, the ATM displays „Enter amount“, draws money from the bank account and pays out the amount.	Apply	8
2	Design sequence diagram for ATM.	Apply	9
3	Design collaboration diagram for ATM.	Apply	9
4	Design sequence diagram for Library Management system.	Apply	8
5	Design collaboration diagram for Library Management system.	Apply	9
6	Compare class and sequence diagram.	Apply	8
7	Design sequence diagram for online shopping.	Apply	8
	UNIT-V		
1	Describe activity diagram for restaurant.	Knowle dge	10
2	Describe activity diagram for hotel canteen.	Knowle dge	11
3	Describe use case diagram for restaurant.	Knowle dge	10
4	Describe use case diagram for library.	Knowle dge	11
5	Describe use case diagram for company.	Knowle dge	10
6	Describe activity diagram for library.	Knowle dge	11
7	Describe activity diagram for online shopping.	Knowle dge	10

9. 13 ASSIGNMENT QUESTIONS:

S. No.	Question	Blooms Taxonomy Level	Course Outcomes
	UNIT-I		
1	Illustrate out evolution of UML.	Apply	2
2	Explain Method wars.	Understand	2
3	Define a domain model.	Knowledge	1
4	Explain the critical ability of object oriented systems.	Understand	2
5	Explain the 3 ways to apply UML.	Understand	2
6	Describe Unified process.	Understand	1
7	Explain the importance of Unified process.	Understand	2
8	Describe the iterative and evolutionary development.	Understand	1
9	Discuss why waterfall is so failure prone.	Understand	1
	UNIT-II		
1	Define an abstract class? Mention its use. Can concrete class be a super class? If yes, give example, if no, give reason. Create a class hierarchy to organize the following drink classes: Mineral water, wine, alcoholic, non alcoholic, grape juice, soda, bears.		
2	Categorize the following relationship into generalization, aggregation, composition and association. 1. Files contain records. 2. A drawing object is text, a geometrical object or group. 3. Modems and keyboards are input/output devices. 4. Object classes may have several attributes. 5. Car has accelerator, break and wheels as parts. 6. Windows is composed of lot of frames. 7. An account is either type savings or type current.		
3	Explain any four standard constraints that apply to generalization relationships.		
4	Discuss the stereotype applied to generalization relationships? Give a brief.		
5	Compare abstract and concrete operation.		
6	Illustrate the ability to navigate from class A to		

	class Bin UML.		
7	Explain business entity and service class.		
8	Briefly explain the four adornments that apply to all association.		
9	Enumerate the steps to model webs of relationships.		
	UNIT-III		
1	Prepare object diagram showing at least 10 relationships among the following object classes. Include associations and qualified associations, aggregations, generalizations, and multiplicity. You may add additional objects. Also show attributes and operations. School, playground, principal, school board, classroom, book, student, teacher, canteen, restroom, computer, desk, chair.	Apply	6
2	Model the relationship between a car (that has an engine and a colour) and its owners (having a name) in a UML class diagram. A car can have several owners over time, but only one or none owner at a time. Do not forget cardinalities, role names, attributes and their types	Apply	7
3	Draw class diagram for ATM.	Apply	7
4	Draw class diagram for Library Management system.	Apply	6
5	Draw object diagram for ATM.	Apply	7
6	Draw object diagram for Library Management system.	Apply	6
7	Explain composite structure diagram.	Understand	6
8	Discuss reflexive association in class diagram.	Understand	7
9	Design a class diagram for Document editor.	Apply	7
10	Design a class diagram for rotating machine.	Apply	7
	UNIT-IV		
1	Create a sequence diagram for the following collaboration. Use the classes and methods on the next slide. A customer wants to draw money from his bank account. He enters his card into an ATM (automated teller machine). The ATM machine prompts „Enter PIN“. The customer enters his PIN. The ATM (internally) retrieves the bank account number from the card. The ATM encrypts the PIN and the account number and sends it over to the bank. The bank verifies the	Apply	8

	encrypted Account and PIN number. If the PIN number is correct, the ATM displays „Enter amount“, draws money from the bank account and pays out the amount.		
2	Design sequence diagram for ATM.	Apply	9
3	Design collaboration diagram for ATM.	Apply	9
4	Design sequence diagram for Library Management system.	Apply	8
5	Design collaboration diagram for Library Management system.	Apply	9
6	Compare class and sequence diagram.	Apply	8
7	Design sequence diagram for online shopping.	Apply	8
UNIT-V			
1	Describe activity diagram for restaurant.	Knowledge	10
2	Describe activity diagram for hotel canteen.	Knowledge	11
3	Describe use case diagram for restaurant.	Knowledge	10
4	Describe use case diagram for library.	Knowledge	11
5	Describe use case diagram for company.	Knowledge	10
6	Describe activity diagram for library.	Knowledge	11
7	Describe activity diagram for online shopping.	Knowledge	10

GROUP- AI (SHORT ANSWER QUESTIONS)

S. No.	Question	Blooms Taxonomy Level	Course Outcomes
UNIT - I			
1	Illustrate How is generalization/specialization contrasted with more code reuse? State Liskov’s substitution principle.	Apply	1
2	(a) State Why is it necessary to have a variety of diagrams in a model of a system. (b) State Which UML diagrams give a static view and which give a dynamic view of a system.	Knowledge	2
3	(a) Explain briefly runtime polymorphism illustrating a program in Java or C++. (b) Discuss the principles of modelling.	Understand	2
4	Consider a computer-based system that plays chess with a user. Which UML diagrams would be helpful in designing the system.	Apply	1
5	Explain the antisymmetric and transitive properties of aggregation.	Apply	2
6	Pick the ones that are related. Justify. i. Behavioral things, verbs ii. Structural things, nouns iii. Generalization, specialization, adjectives	Knowledge	2
UNIT-II			

1	(a) Explain any three features used in creating abstractions. (b) Enumerate the steps to model the vocabulary of a system.	Understand	2
2	Write a simple JAVA applet for printing “Hello, World!” in a web browser.	Apply	1
3	Define relationship. Explain the four adornments that apply to an association.	Apply	2
4	Enumerate the steps to model single inheritance.	Knowledge	2
5	Enumerate the steps to model using relationship.		
6	Define the following: i. System ii. Model iii. subsystem iv. Use case	Understand	2
7	Illustrate distribution of responsibilities in a system.	Apply	1
8	State modeling different levels of abstraction.	Apply	2
9	Explain the UML’s behaviour diagrams	Knowledge	2
UNIT-III			
1	Explain the following relationships with UML notation i. Using ii. Realization iii. Simple aggregation iv. Composite aggregation	Understand	4
2	Contrast interface inheritance with class inheritance.	Understand	4
3	Define modelling non software things and primitive type.	Knowledge	5
4	Enumerate modelling simple dependencies.	Understand	4
5	a) Interpret relation between interfaces, types and roles. b) Enumerate modelling new building blocks.	Understand	5
6	a) Enumerate the steps to model different views of a system. b) Enumerate modelling comment’s and new semantics	Knowledge	4
7	a) Enumerate the steps to model complex views. b) Enumerate modelling new properties.	Knowledge	4
8	a) Define idiom. Enumerate the steps to model structural relationships. b) Enumerate modelling seams in a system.	Knowledge	5
9	Enumerate modelling static and dynamic type.	Understand	3
10	Enumerate modelling group of elements.	Understand	4
11	Contrast simple aggregation with composite aggregation.	Understand	5
UNIT-IV			
1	Describe interaction diagrams. What are their contents and common properties.	Understand	8
2	Enumerate the steps to model flows of control by time ordering.	Knowledge	9
3	Design a sequence diagrams that specifies the flow of control involved in initiating a simple, two-party phone call.	Apply	8

4	Design a class diagram that depicts the various relationships in UML.	Apply	7
5	Explain the common properties and uses of class diagrams.	Understand	6
6	Illustrate the contents in class diagrams.	Apply	7
7	Explain the use of forward engineering and reverse engineering class diagrams	Understand	7
8	Contrast object diagram with class diagram.	Understand	6
9	Enumerate the steps to model concrete instances.	Knowledge	7
UNIT-V			
1	Enumerate the steps to model prototypical instances.	Knowledge	6
2	Enumerate the steps to model object structures.	Knowledge	6
3	Enumerate the steps to forward and reverse engineer object diagram.	Knowledge	7
4	Enumerate the steps to model logical database schema.	Knowledge	7
5	Enumerate the steps to model logical database schema. Give all example class diagrams.	Knowledge	6
6	State forward engineering and reverse engineering.	Knowledge	7

GROUP - B (ANALYTICAL QUESTIONS)

S. No.	Question	Blooms Taxonomy Level	Course Outcomes
UNIT – I			
INTRODUCTION TO UML			
1.	Define UML.	Knowledge	1
2.	Explain modelling.	Understand	2
3.	Describe the history of uml.	Knowledge	2
4.	List out the method wars.	Knowledge	1
5.	State the goals of UML.	Knowledge	2
6.	Describe the importance of modelling .	Knowledge	1
7	Define the basic building blocks of uml.	Knowledge	2
8	Explain the things in uml.	Understand	2
9	Classify structural things.	Understand	1
10	Classify behavioral things in uml.	Understand	1
11	Define grouping things.	Knowledge	2
12	Define class.	Knowledge	1
13	Define class and object.	Knowledge	2

14	Define an Interface.	Knowledge	2
15	Define collaboration.	Knowledge	1
16	Describe component.	Knowledge	1
17	Explain about active class	Understand	2
18	Compare relationships.	Understand	2
19	Define Uml diagrams.	Knowledge	1
20	Explain common mechanisms in uml.	Understand	1
UNIT – II			
BASIC STRUCTURAL MODELLING ,ADVANCED STRUCTURAL MODELLING			
1.	Define classes .	Knowledge	4
2.	Explain about name .	Understand	5
3.	Describe an attribute.	Knowledge	5
4.	Define responsibilities.	Knowledge	3
5.	Define modelling vocabulary of system.	Knowledge	3
6.	Define distribution of responsibilities in a system.	K knowledge	4
7.	Define dependency.	Knowledge	4
8.	Define generalization.	Knowledge	4
9.	Explain association.	Understand	4
10.	Discuss about aggregation.	Understand	5
11.	List the simple dependencies.	Knowledge	4
12.	Demonstrate the modeling of single inheritance.	Apply	4
13.	Discuss modelling structural relationships.	Understand	5
14.	Define note.	Knowledge	5
15.	Define stereotypes.	Knowledge	3
16.	List tagged values.	Knowledge	4
17.	Explain constraints.	Understand	5
18.	Illustrate how to model comment.	Apply	3
19.	Illustrate how to model different views of a system .	Apply	4
20.	Explain modeling of new semantics.	Understand	5

UNIT – III CLASS AND OBJECT DIAGRAMS			
1	Explain about class diagram.	Understand	6
2	State common properties in class diagram.	Knowledge	7
3	List out contents of class diagram.	Knowledge	7
4	Illustrate modelling of collaboration.	Apply	6
5	Discuss modelling a schema.	Understand	6
6	Explain how to forward engineer a class diagram.	Understand	6
7	Explain how to reverse engineer a class diagram.	Understand	7
8	Enumerate object diagram.	Knowledge	7
9	Tabulate common properties in object diagram.	Knowledge	6
UNIT-IV			
1	Define interactions.	Knowledge	9
2	Explain about context.	Understand	8
3	Describe about association.	Understand	8
4	Discuss about self.	Understand	8
5	Explain about global.	Understand	9
6	Discuss about local scope.	Understand	8
7	Define parameter.	Knowledge	9
8	Explain messages in uml.	Understand	8
9	Discuss about sequencing.	Understand	9
10	Discuss about procedural sequence.	Understand	9
11	Explain about flat sequence.	Understand	8
12	Discuss How to model flow of control.	Understand	8
13	Explain collaboration diagrams.	Understand	9
14	Discuss how to forward engineers sequence diagrams.	Understand	8
15	Discuss how to reverse engineer collaboration diagrams.	Understand	9

16	State new link.	Knowledge	9
17	Explain about destroyed.	Understand	9
18	Describe about transient in detail.	Knowledge	8
19	Illustrate the common properties of interaction diagrams.	Apply	9
20	Explain How to model flow of control by organization.	Understand	9
21	Discuss how to forward engineers sequence diagrams.	Understand	8
22	Discuss how to reverse engineer collaboration diagrams. State new link	Understand	9
23	Explain about destroyed.	Understand	9
24	Describe about transient in detail.	Knowledge	8
25	Illustrate the common properties of interaction diagrams.	Apply	9
26	Explain How to model flow of control by organization.	Understand	9
UNIT – V			
BASIC BEHAVIORAL MODELLING – II ADVANCED BEHAVIORAL MODELLING			
1	Define Use case.	Knowledge	11
2	Interpret the relationship between Usecases and actors.	Understand	10
3	Demonstrate the need of Use case diagram.	Understand	11
4	Demonstrate an Actor.	Understand	10
5	Compare System Use case and business use case.	Understand	11
6	Explain types of requirements should not be documented in use cases.	Understand	10
7	Demonstrate the relationship between use cases and test cases.	Understand	11
8	Demonstrate an Activity Diagram.	Understand	10
9	Explain What types of requirements should not be documented in activity diagrams.	Understand	11

10	Discuss components of a activity diagram.	Understand	10
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10 VLSI DESIGN

10.0 COURSE DESCRIPTION FORM

Course Code	57035			
Course Title	VLSI DESIGN			
Regulation	R-13			
Course Structure	Lectures	Tutorials	Practicals	Credits
	5	1	0	6
Course Coordinator	Mr. P. Anudeep, Assistant Professor			
Team of Instructors	Mrs. T. Vijetha, Assistant Professor, Mr. J. Naga Raju, Assistant Professor			

10.1 COURSE OVERVIEW:

VLSI design course gives the knowledge about the fabrication of NMOS, PMOS, CMOS and their application in the present electronics world. The present course gives knowledge about different processes used for fabrication of an IC. The electrical properties of MOS transistor and analysis of CMOS, BiCMOS inverters is carried out. This course gives detail study on design rules, stick diagrams, logic gates, types of delays, fan-in, fan-out which effects the action of a MOS. It also gives information on data path subsystem and array subsystems, and several PLD's like PLA, PAL, CPLD and FPGA's. We also came to the CMOS testing principles system level and chip level.

10.2 PREREQUISITES:

Level	Credits	Periods / Week	Prerequisites
UG	4	5	Electronic Devices and circuits, Switching Theory and Logic Design.

10.3 MARKS DISTRIBUTIONS:

Session Marks (25M)	University End Exam Marks	Total Marks
Continuous Assessment Tests (Midterm tests): There shall be 2 midterm examinations. Each midterm examination consists of one objective paper, one subjective paper and four assignments. The objective paper is for 10 marks and subjective paper is for 10 marks, with duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for subjective paper). Objective paper is set for 20 bits of – multiple choice questions, fill-in the blanks, 10 marks. Subjective paper contains of 4 full questions (one from each unit) of which, the student has to answer 2 questions, each question carrying 5 marks. First midterm examination shall be conducted for 2.5 units of syllabus and second midterm examination shall be conducted for another 2.5	75	100

units. 5 marks are allocated for Assignments. First two assignments should be submitted before the conduct of the first mid, and the second two assignments should be submitted before the conduct of the second mid. The total marks secured by the student in each midterm examination are evaluated for 25 marks, and the average of the two midterm examinations shall be taken as the final marks secured by each candidate.		
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10.4 EVALUATION SCHEME:

S. No	Component	Duration	Marks
1	I Mid Examination	1 hour and 20 min	20
2	I Assignment		5
3	II Mid Examination	1 hour and 20 min	20
4	II Assignment		5
MID Examination marks to be considered as average of above 2 MID's			
5	External Examination	3 hours	75
Total			75

COURSE OBJECTIVES:

This course makes the students aware of the internal structure and manufacturing of a Transistor. And also the various levels involved in the chip designing and its manufacturing process. And design various gates, adders, Multipliers, Memories, using stick diagrams, layouts.

10.5 COURSE OUTCOMES:

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

1. Have the ability to synthesize static and dynamic logic cells based on knowledge of MOS device physics, modeling, and circuit topologies .
2. Be capable of designing and implementing combinational and sequential CMOS digital circuits and optimize them with respect to different constraints, such as area, delay, power, or reliability.
3. Be capable of implementing a complete design verification process using computerautomated tools for layout, extraction, simulation, and timing analysis.
4. Design and verify a prototype silicon integrated circuit suitable for fabrication using the μm CMOS process.
5. Have the ability to synthesize static and dynamic logic cells based on knowledge of MOS device physics, modeling, and circuit topologies

10.6 HOW PROGRAM OUTCOMES ARE ASSESSED:

	Program Outcomes	Level	Proficiency assessed by
a	Describe ability to synthesize static and dynamic logic cells based on knowledge of MOS device physics, modeling, and circuit topologies.	II	Assignments
b	Assess the capability of designing and implementing combinational and sequential CMOS digital circuits and optimize them with respect to different constraints, such as area, delay, power, or reliability.	IV	Tutorial
c	Assess the capability of implementing a complete design verification process using computer- automated tools for layout, extraction, simulation, and timing analysis	IV	Tutorial
d	Design and verify a prototype silicon integrated circuit suitable for fabrication using the μm CMOS process	III	Seminars

N=None S=Supportive H=Highly Related

10.7 JNTUH SYLLABUS:

UNIT I

INTRODUCTION : Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallisation, Encapsulation, Probe testing, Integrated Resistors and Capacitors

UNIT II

BASIC ELECTRICAL PROPERTIES : Basic Electrical Properties of MOS and BiCMOS Circuits: I_{ds} - V_{ds} relationships, MOS transistor threshold V_{th} ; Pass transistor, NMOS Inverter, Various V_{th} Voltage, g_m , g_{ds} , figure of merit pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT III

VLSI CIRCUIT DESIGN PROCESSES : VLSI Design Flow, MOS m CMOS Design rules for ∞ Layers, Stick Diagrams, Design Rules and Layout, 2 wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT IV

GATE LEVEL DESIGN : Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Sheet Resistance - Delays, $|R_S|$ and its concept to MOS, Area Capacitance Units, Calculations – Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers

UNIT V

DATAPATH SUBSYSTEM : Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters.

UNIT VI

ARRAY SUBSYSTEMS : SRAM, DRAM ,ROM , Serial access memories, content addressable memory

UNIT VII

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN : PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach.

UNIT VIII

CMOS TESTING : CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chiplevel Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

TEXTBOOKS : 1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, PHI, 2005 Edition.

VLSI Design- K.Lal Kishore, VSV Prabhakar. I.K.International 2009

CMOS VLSI Design A circuits and systems perspective, Neil H. E .Weste, David Hariris, Ayan Banerjee, 2009.

REFERENCES :

1. CMOs Logic Circuit Design, – John P. Uyemura, Springer 2007.
2. Modern VLSI Design – Wayne Wolf, Pearson Education, 3rd Edition, 1997
3. VLSI Design A.Albert Raj, Latha PHI 2008.
4. Introduction to VLSI, Mead & Convey, BS Publications 2010.

10.8 COURSE PLAN:

At the end of the course, the students are able to achieve the following Course Learning Outcomes.

Lecture	UNIT	Course learning	Topics to be covered	Book
1	I	Discuss and memorize the IC generations, importance of VLSI	Introduction to IC Technology – MOS, PMOS	T1
2-3 3		Describe fabrication of NMOS	NMOS technology	T1
4-5		Describe fabrication of CMOS	CMOS technologies	T1
6-7		Describe fabrication of Bi CMOS	Bi CMOS technologies	T1
8		Outline ion implantation, diffusion	Diffusion, Ion implantation, Metallization	T1
9		Describe Encapsulation, Probe testing,	Encapsulation, Probe testing, Integrated Resistors	T1

10-11	II	Identify the threshold voltage concept and Basic Electrical Properties	Basic Electrical Properties of MOS and Bi-CMOS Circuits	T1
12-13		Depending on V_{GS} I_{ds} - V_{ds} relations are derived	I_{ds} - V_{ds} relationships, MOS transistor threshold Voltage	T1
14		Illustrate about the pass	g_m , g_{ds} , figure of merit w_0 ,	T1
15		Illustrate various pull up	Various pull-ups,	
16-17		Identify why we are preferring CMOS	CMOS Inverter analysis and design, Bi-CMOS Inverters	T1
18	III	Describe the design flow	Design Flow, MOS Layers	T1
19-20		Discuss stick diagram representation	Stick Diagrams, Design	T1
21-22		and illustrate the concept of stick	2 um CMOS Design rules for wires, Contacts and	T1
23-24		Discuss the construction of study layout rules for different processes and to learn how to draw layouts.	Layout Diagrams for NMOS and CMOS Inverters and Gates	T1
25		Discuss and memorize the scaling and effects of	Scaling of MOS circuits	T1
26-27	IV	Analyse gate design by	Logic Gates and Other	T1
28-30		Illustrate gate design and distinguish between CMOS and nMOS logic.	Alternate gate circuits, Time Delays	T1
31-32		Discuss driving large Capacitive	Driving large Capacitive Loads, Wiring Capacitances	T1
33		Describe about Fan-in and fan-out, Choice of layers	Fan-in and fan-out, Choice of layers	T1
34-36	V	Design Shifters, Adders	Subsystem Design, Shifters, Adders	T3
37-38		design ALUs, Multipliers, Parity	ALUs, Multipliers, Parity generators	T3
39-41		design Comparators, Zero/One Detectors, Counters	Comparators, Zero/One Detectors, Counters	T3

42-44	VI	design memories SRAM, DRAM, ROM	SRAM, DRAM, ROM	T3
45-48		Design of serial access memories, content addressable	Serial access memories, content addressable memory	T3
49-52	VII	Design of PLAs, FPGAs, CPLDs	PLAs, FPGAs, CPLDs	R4
53		Advantages of Programmable Array Logic	Standard Cells, Programmable Array Logic	R4
54-55	VIII	Illustrate parameters influencing low power	Design Approach, parameters influencing low	R4
56-57		Demonstrate the need for testing.	CMOS Testing, Need for testing, Test Principles	T3
58-60		To illustrate the different test techniques To acquaint with the	Design Strategies for test, Chip level Test Techniques	T3
61-63		To Discuss with the system level testing techniques.	System-level Test Techniques, Layout Design for improved Testability	T3

10.9.MAPPING COURSE OUTCOMES LEADING TO ACHIEVEMENT OF PROGRAM OUTCOMES:

CourseOutcome s	ProgramOutcomes												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	✓				✓			✓					✓
2		✓	✓		✓								
3	✓				✓			✓					
4					✓	✓					✓	✓	
5	✓				✓		✓						

10.10.MAPPING COURSE OUTCOMES LEADING TO ACHIEVEMENT OF PROGRAM OUTCOMES:

CourseOutcome s	ProgramOutcomes												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	✓				✓			✓					

2		✓	✓		✓							
3	✓				✓		✓					
4					✓	✓				✓	✓	
5	✓				✓		✓					

10.11 OBJECTIVE QUESTIONS:

UNIT-1

1. Which of the material used as gate []
a). photoresistive b). polysilicon c). metal d). glass
2. The ----- of the VLSI chip ranges from pre-assembly wafer preparation to fabrication techniques for the packages that provide electrical connections and mechanical and environmental protection []
a). placement b). Floorplanning c). Packaging d). None
3. ----- is the electrical consideration for VLSI packages []
a) low ground resistance . b) short signal leads c) minimum power supply spiking d) All
4. A MOS transistor which has conducting channel region at zero gate bias is called []
a) Depletion mode b) Enhancement mode c) Saturated mode d) Non- saturated mode
5. If packing density area and performance are the constraints, power dissipation is not a constraint, the technology you prefer []
a).BJT b) CMOS c). NMOS d). PMOS
6. The speed of the CMOS logic is less, when compared to other technologies due to []
a) High noise immunity b) High input capacitance c) High driven current d) All
7. A sink current is obtained under which condition. []
a.)Logic high input b) Logic low input c) Logic high output d) Logic low output
8. Which logic family has highest speed of operation []
a) TTL b) DTL c) ECL d) All the above
9. The partial current flowing through p and n channels is called []
a) Voltage spikes b) current spikes c) both a and b d) none of the above
10. ----- is the non-saturated digital logic family []
a) TTL b) ECL c) MOS d) RTL
11. Which logic family has very good noise immunity? []
a) RTC b) DTL c) TTL d) ECL
12. The differentiator resistance is _____
13. The differentiator capacitance is _____
14. The fabrication of CMOS is done by _____
15. Diffusion process is carried out in a _____
16. Ion implantation is performed at _____ temperature
17. The ions in ion implementation process are accelerated _____
18. Ion implantation is other technique is _____
19. Abbreviation of CMOS is _____
20. Aluminum is used for metallization of most IC because _____

UNIT-2

1. The body effect will be _____ if the substrate is DC

2. The equation of G_m is _____
3. The output conductance G_{ds} is _____
4. The polarities of voltage and current in PMOS circuits _____
5. The polarities of voltage and current in NMOS circuits _____
6. Charge moves from _____ to _____ when V_{ds} is applied
7. I_{ds} is dependent on _____ and _____
8. When voltage is applied on the gate of a MOS transistor channel between source and drain _____
9. Electron transit time is denoted by _____
10. The equation for velocity V is _____
11. In a NMOS Inverter the depletion mode transistor _____
12. The depletion mode transistor is called _____ in NMOS inverter
13. The enhancement mode transistor is called _____ in NMOS inverter
14. Slope of the transistor characteristic determines the _____
15. When V_{in} _____ the P.D threshold voltage current
16. The equation for I_{ds} in saturation mode is _____
17. The equation for I_{ds} in non-saturation mode is _____
18. The condition in saturated region is _____
19. The condition in non-saturated region is _____
20. In CMOS inverter the pull up transistor is _____

UNIT-3

1. MOS circuits are formed from the following basic layers _____
2. The layers of the MOS circuits are isolated from each other by _____
3. When Polysilicon and thinox regions cross each other forms _____
4. Green colour is used in Stick diagrams in NMOS design for _____
5. Red colour is used in stick diagrams in NMOS design for _____
6. Blue colour is used in stick diagrams in NMOS design for _____
7. Brown colour is used in stick diagrams in NMOS design for _____
8. In $2\mu\text{M}$ CMOS design rules for Bi cmos buried n-sub collector is _____
9. In $2\mu\text{M}$ CMOS design rules for Bi cmos p-base the colour is _____
10. Scaling means to _____ the feature size and to achieve _____ p-circuitry chip
11. $1/\beta$ is used as scaling factor _____
12. Gate area A_g is scaled by _____
13. gate capacitance per Unit area is scaled by _____
14. Gate capacitance C_g is given by the equation _____
15. Parastic capacitance is proportional to _____
16. The intrinsic and extrinsic delay of submicron logic circuits []
17. What is the color code of metal-I ? []
18. What is the colour code of n-diffusion? []
19. What is the colour code of p-well? []
20. ----- is required to connect two metal lines

UNIT-4

1. Switch logic is based on _____
2. Gate logic is based on _____
3. The sheet resistance R_s is _____
4. Area capacitance is given by _____
5. Permittivity of frees space _____

6. Standard unit of capacitance is denoted by _____
7. Sheet resistance is _____
8. Unit of sheet resistance is _____
9. Typical value of R_s for n-channel transistor for $5\mu\text{m}$ technology _____
10. For $2\mu\text{m}$ technology R_s is _____
11. For p-transistor channel R_s for $5\mu\text{m}$ is _____
12. For $5\mu\text{m}$ technology _____
13. For $2\mu\text{m}$ technology _____
14. For $1.2\mu\text{m}$ technology _____
15. Inter layers capacitance is highly dependent on _____
16. The no. of gates that can be connected at the input is _____
17. Fan-out is the no. of inputs that the gate can drive with out worst case is _____
18. The ability of an output to charge or discharge stray capacitance the input is

19. While considering choice of layers Vdd and Vss should be _____
20. The value of gate capacitance for CMOS inverter is _____

UNIT-5

1. For the 4X4 bit barrel shifter, the regularity factor is given by
a. 8 b . 4 c . 2 d 16
2. The level of any particular design can be measured by
a. SNR b .Ratio of amplitudes c. regularity d. quality
3. In tackling the design of system the more significant property is
a. logical operations b . test ability c . topological properties d .nature of architecture
4. Any bit shifted out at one end of data word will be shifted in at the other end of the word is called
a. end-around b. end-off c. end-less d. end-on
5. In the VLSI design the data and control signals of a shift register flow in
a. horizontally and vertically b. vertically and horizontally c. both horizontally d .both vertically
6. The subsystem design is classified as
a. first level b. top level c. bottom level d. leaf-cell level
7. The larger system design must be partition into a sub systems design such that
a. minimum interdependence and inter conection b.complexity of interconnection
c.maximum interdependence d. arbitrarily chosen
8. To simplify the subsystem design, we generally used the
a. interdependence b. complex interconnections c. regular structures d. standard cells
9. System design is generally in the manner of
a. down-top b. top-down c. bottom level only d. top level only
10. Structured design begins with the concept of
a. hierarchy b. down-top design c. bottom level design d. complex function design
11. Any general purpose n-bit shifter should be able to shift incoming data by up to number of places are
a. n b. $2n$ c. $n-1$ d. $2n-1$
12. For a four bit word, a one-bit shift right is equivalent to a
a. two bit shift left b. three-bit shift left c. one bit shift left d. four-bit shift left

13. The type of switch used in shifters is
 a. line switch b. transistor type switch c. crossbar switch d. gate switch
14. The representation of basic cell used in multiplier is = latch GFA = gated full adder
 P_i = partial product sum in , P = partial product sum out , C_i = carry in, C = carry out
 d = line required for two's complement operation
15. The carry chain in adder is consist with
 a. cross-bar switch b. transmission gate c. bus interconnection d. pass transistors
16. VLSI design of adder element basically requires
 a. EX-OR gate, Not and OR gates b. multiplexers, inverter circuit and communication paths
 c. multiplexers, EX-OR and NAND gates d. inverter circuits and communication paths
17. The heart of the ALU is
 a. Register b. adder c. control bus d. I/O port
18. Carry line in adder must be buffered after or before each adder element because
 a. slow response of series pass transistors b. slow response of parallel line
 The linked image cannot be displayed. The file may have been moved, renamed, or deleted. Verify that the link points to the correct file and location.
 c. fast response of parallel pass transistors d. fast response of series line
19. The ALU logical functions can be obtained by a suitable switching of the
 a. carry line between adder elements b. sum line between adder elements
 b. carry line between shifter & buffer
 c. sum line between shifter & buffer
20. To fast an arithmetic operations, the multipliers and dividers is to use architecture of
 a. parallel b. serial c. pipelined d. switched

UNIT-6

1. Proper placement of memory elements makes maximum use of the
 a. available clock period b. cost of area c. power dissipation d. parasitics
2. A design that requires high density memory is usually
 a. a single chip b. on chip c. partitioned into several chips d. DRAMS
3. Random access memory at the chip level is classed as memory that has
 a. an access time dependent of the physical location of the data
 b. an access time independent of the physical location of the data
 c. reading or writing of a particular datum with address
 d. examines a data word and compares this data with internally stored data
4. The following memory examines data word and compares this data with internally stored data
 a. serial access memory b. random access memory
 b. content addressable memory
 c. shift registers memory
5. The main characteristics of on chip memory is
 a. small and slow
 b. large and slow
 c. small and faster
 d. large and faster

-
6. DRAM has a
 - a. smaller layout and uses large power
 - b. smaller layout and uses less power
 - c. more power and slower
 - d. more power and faster
 7. SRAM has a
 - a. faster, more power and larger
 - b. slower, more power and larger
 - c. faster, less power and smaller
 - d. faster less power and larger
 8. On chip memory is comes under the category of
 - a. high density memory
 - b. medium density memory
 - c. low density memory
 - d. large density memory
 9. On chip memory usually in the order of
 - a. 10k bytes
 - b. 50k bytes
 - c. 1k bytes
 - d. 100 k bytes
 10. The simplest and safest way to use memory in a system is to treat it as a
 - a. sequential component
 - b. combinational component
 - c. decoders
 - d. NOR gates
 11. Serial access memory at the chip level is classed as memory that has
 - a. shift registers
 - b. counters
 - c. accesstime is independent of location of data
 - d. internally stored data is used
 12. The PLA provides a systematic and regular way of implementing multiple output functions of n variables in
 - a. POS form
 - b. SOP form
 - c. complex form
 - d. simple form
 13. V (input variables) \times P (product terms) PLA is to maintain generality within the constraints of its dimensions then for
 - a. AND gate have n inputs and output OR gate must have P inputs
 - b. AND gate have P inputs and output OR gate must have n inputs
 - c. Both AND gate and OR gate have n inputs
 - d. both AND and or gates have P inputs
 14. A MOS PLA is realized by using the gate of
 - a. AND
 - b. OR
-

-
- c. AND-OR
d. NOR
15. A CMOS PLA is realized by
- pseudo nmos NOR gate
 - CMOS NOR gate
 - pseudo nmos NAND gate
 - CMOS NAND gate
16. The mapping of irregular combinational logic functions into regular structures is provided by the
- FPGA
 - CPCD
 - standard cells
 - PLA
17. The general arrangement of PLA is
- AND/OR structure
 - OR/AND structure
 - NAND/NOR structure
 - EX-OR/OR structure
18. V XP X Z PLA represents as
- V-no.of input variables
P-no.of output functions
Z-no.of gates
 - V-no.of gates
P-no.of OR gates
Z- no.of AND gates
 - V-no.of input variables
P-no.of product terms
Z-no.of output functions
 - V-no.of gates
P-no.of AND gates
Z-no.of output functions
19. To realize any finite state machine requirements, the PLA along with
- NOR gate is used
 - feed back links is used
 - NAND gate is used
 - NOT gate is used
20. To reduce the PLA dimensions, the simplification must be done on a
- individual output basis
 - multi-output basis
 - individual product term
 - individual input basis

UNIT-7

- The advantage of pre-charge evaluate logic is _____ .
 - Standard cells can be placed _____ on silicon chip.
 - DRAM is widely used because _____
-

4. Pre designed logic cells are known as _____
5. Standard cell areas in CBIC area _____
6. Power busses are also known as _____
7. Inter connections are _____ in FPGA.
8. Device sizes in gate array are _____.
9. The small squares on the edge of the cell are raised for _____
10. Connecting data path element to form a data path results in _____ and _____ layout than using standard cells
11. Cross talk results from _____
12. Silicon circuitry is connected to outside world by _____
13. LUT is used in _____
14. In full custom ASIC design all the layers are _____
15. FPGA is a _____
16. PAL and PLA are known as _____
17. The output of a physical design is _____
18. IN a PLA _____ are programmable
19. The size of an IC is generally measured by _____
20. CLB are used In _____

UNIT-8

1. The example of physical defect is _____
2. _____ technology is not used in FPGA.
3. The important design points about SOC are _____.
4. Design quality of chip is measured on _____
5. The example of electrical fault is _____
6. In a post silicon validation testing is done on _____
7. In structured gate array _____ is customized?
8. The objectives of floor planning are _____
9. Some VLSI test procedures used are _____
10. To increase observability techniques used are _____
11. Typical manufacturing defects in IC fabrication are _____
12. Logical faults generated by electrical faults are _____
13. _____ is no used for testing of combinational logic.
14. Timing failure resulting from delay faults arises due to _____
15. The disadvantage of the scan based techniques are _____
16. Boundary scan techniques used for _____
17. The scan based technique _____ is race and hazard free.
18. Signature analysis is used In _____
19. BIST techniques suffers from _____
20. In a BIST technique ORA and PSBRG uses _____

10. 12 TUTORIAL QUESTIONS:

Sl.No.	Questions	Blooms Taxonomy	Course Outcome
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		Level	
UNIT-I			
1	Explain the Ion - lithography process	Understand	b
2	Describe the constructional features and performance characteristics of (a) Pseudo-n MOS Logic (b) Clocked CMOS Logic.	Knowledge	d
3	Explain BICMOS fabrication process in an N well.	Understand	b
4	Describe the two commonly used methods for obtaining integrated capacitor	Knowledge	d
5	Explain the formation of the inversion layer in P-channel Enhancement MOSFET.	Understand	b

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-II			
1	Explain different forms of pull ups used as load, in CMOS and in enhancement & depletion modes of NMOS.	Understand	b
2	Explain various regions of CMOS inverter transfer characteristics.	Understand	b
3	Sketch an nMOS transistor model indicating all parameters.	Apply	a
4	Deduce an equation for I_{ds} of an n-channel enhancement MOSFET operating in saturation region	Analyze	c
5	Explain the possibility of using a CMOS inverter as an amplifier.	Understand	b
Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-III			
1	Design a stick diagram and layout for two input CMOS NAND gate indicating all the regions & layers of transistor	Create	c
2	Design a stick diagram and layout for the NMOS logic shown $Y = (A + B)C$.	Create	c
3	Define stick diagram? Draw the stick diagram and layout for a CMOS inverter.	Knowledge	d
4	State effects of scaling on V_t ?	Knowledge	d

5	Design a stick diagram for the CMOS logic shown below $Y = (A + B + C)$	Create	c
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Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
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UNIT-IV

1	Discuss in detail semi-custom layout styles.	Understand	b
2	Explain clocked CMOS logic, domino logic and n-p CMOS logic.	Understand	b
3	Calculate the rise time and fall time of the CMOS inverter (W/L) _n = 6 and (W/L) _p =8, K' n =150μ A/V ² , V _{tn} =0.7V,K' _p = 62 μ A/V ² , V _{tp} =-0.85V , V _{DD} =3.3V. Total out-put capacitance =150 fF.	Apply	a
4	Design a layout diagram for the PMOS logic shown below $Y = (AB) + (CD)$	Create	c
5	Explain with suitable examples how design the layout of a gate to maximize performance and minimize area.	Understand	b

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
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UNIT-V

1	Explain briefly the CMOS system design based on the data path operators, memory elements, control structures and I/O cells with suitable examples.	Understand	b
2	Explain about Automatic test vector generation.	Understand	b
3	Explain how fault simulation is done and explain fault models with the help of examples.	Understand	b
4	Sketch top level schematic and a floor plan for 16 × 16 Booth recoded multiplier and explain its operation	Apply	a
5	Explain the CMOS system design based on the data path operators with a Suitable example.	Understand	b

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
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**UNIT-VI
Tutorials**

Short Answer Questions			
1	Explain the SRAM.	Understand	b
2	Explain about the content addressable memories.	Understand	b
3	Explain the serial access memories	Understand	b
4	Explain the DRAM	Understand	b
5	Explain about the PROM	Understand	b

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VII			
1	Explain the FPGA chip architecture.	Understand	b
2	Explain the AND/NOR representation of PLA	Understand	b
3	Explain the Antifuse Structure for programming the PAL device.	Understand	b
4	Sketch a diagram for two input XOR using PLA and explain its operation with the help of truth table.	Apply	a
5	Design JK flip flop using PROM.	Create	c

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VIII			
1	Explain the gate level and function level of testing.	Understand	b
2	Explain what is sequential fault grading? Explain how it is analyzed.	Understand	b
3	Explain the block diagram of D/A converter suitable for VLSI Analog Circuit	Understand	b
4	Explain how a parallel scan is used for data path test.	Understand	b
5	Explain how an improved layout can be reduced faults in CMOS circuits.	Understand	b

10.13 ASSIGNMENT QUESTIONS:

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-I			
1	Describe the two commonly used methods for	Understand	b

	obtaining integrated capacitor.		
2	Explain in detail, all the steps involved in electron lithography process.	Understand	b
3	Explain Moore's law? Explain its relevance with respect to evolution of IC Technology.	Understand	b
4	State the size of silicon wafer used for manufacturing state-of-the-art VLSI ICs?	Knowledge	d
5	Describe minimum feature size of current commercial VLSI devices?	Knowledge	d

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-II			
1	Explain various regions of CMOS inverter transfer characteristics	Understand	b
2	Calculate the shift in the transfer characteristic curve when β_n/β_p ratio is varied from 1/1 to 10/1 for a CMOS inverter.	Understand	b
3	Explain nMOS inverter and latch up in CMOS circuits?	Understand	b
4	Explain various components of the model of nMOS transistor circuit with sketches	Analyze	c
5	Compare the relative merits of three different forms of pull up for an inverter Circuits. What is the best choice for realization in (a) NMOS technology (b) CMOS technology	Understand	b
Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-III			
1	Define stick diagram? Draw the stick diagram and layout for a CMOS Inverter.	Knowledge	d
2	State the effects of scaling on V_t ?	Knowledge	d
3	State design rules? Why is metal- metal spacing larger than poly -poly spacing.	Knowledge	d
4	Sketch the stick diagram and mask layout for a CMOS	Apply	a

	two input NOR gate and Stick diagram of two input NAND gate.		
5	Sketch the stick diagram and a translated mask layout for nMOS inverter circuit.	Apply	a

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-IV			
1	Calculate the rise time and fall time of the CMOS inverter (W/L) _n = 6 and (W/L) _p = 8, K' _n = 150 μ A/V ² , V _{tn} = 0.7V, K' _p = 62 μ A/V ² , V _{tp} = -0.85V, V _{DD} = 3.3V. Total out-put capacitance = 150 fF.	Apply	a
2	Explain the concept of sheet resistance and apply it to compute the ON resistance (V _{DD} to GND) of an NMOS inverter having pull up to pull down ratio of 4:1, If n channel resistance is R _{sn} = 104 per square.	Analyze	c
3	Calculate the gate capacitance value of 5 μm technology minimum size transistor With gate to channel capacitance value is 4 × 10 ⁻⁴ pF/μm ² .	Analyze	c
4	Describe three sources of wiring capacitances. Explain the effect of wiring capacitance on the performance of a VLSI circuit.	Understand	b
5	Define and explain the following: i. Sheet resistance concept applied to MOS transistors and inverters. ii. Standard unit of capacitance.	Knowledge	d
Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-IV			

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-V			
Assignments			
Short Answer Questions			
1	Explain the CMOS system design based on the data path operators with a suitable example.	Analyze	c
2	Explain the basic Memory- chip architecture.	Analyze	c

3	Explain the CMOS system design based on the data path operators with a suitable example.	Analyze	c
4	Explain the basic Memory- chip architecture.	Analyze	c
5	Compare the different types of CMOS subsystem Multipliers.	Analyze	c

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VI			
1	Explain the function of 4:1 Mux in PAL CMOS device with the help of I/O structure.	Analyze	c
2	Explain how the pass transistors are used to connect wire segments for the purpose of FPGA programming.	Analyze	c
3	Explain the methods of programming of PAL CMOS device.	Analyze	c
4	Explain the architecture of an FPGA.	Analyze	c
5	State the characteristics of 22V10 PAL CMOS device and draw its I/O structure.	Knowledge	d

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VII			
1	Write a VHDL Program for a divide-by-3 counter with suitable state diagram.	Create	a
2	Compare all available design verification tools.	Analyze	c
3	State the different types of operators used in VHDL? Give some examples using this.	Knowledge	d
4	Compare the Circuit-level, Logic-level, switch-level and Timing simulations.	Analyze	c
5	State the different data types available in VHDL and how they are indicated?	Knowledge	d

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VIII			
1	Sketch the basic structure of parallel scan and explain	Apply	a

	how it reduces the long scan chains.		
2	Sketch the state diagram of TAP Controller and explain how it provides the control signals for test data and instruction register.	Apply	a
3	Sketch the basic structure of parallel scan and explain how it reduces the long scan chains.	Apply	a
4	Sketch the state diagram of TAP Controller and explain how it provides the control signals for test data and instruction register.	Apply	a
5	Compare functionality test and manufacturing test.	Analyze	c

11 WIRELESS NETWORKS AND MOBILE COMPUTING

11.0 COURSE DESCRIPTION:

Course Code	57081			
Course Title	Wireless networks and mobile computing			
Course Structure	Lectures	Tutorials	Practicals	Credits
	L58	-	-	4
Course Coordinator	M.Jhansi			
Team of Instructors	M.Jhansi			

11.1 COURSE OVERVIEW:

This course will provide in-depth knowledge, and a critical understanding of mobile computing from different viewpoints: infrastructures, principles and theories, technologies, and applications in different domains. The course will provide a complete overview of the mobile computing subject area, including the latest research.

11.2 PREREQUISITES:

Level	Credits	Periods/Weeks	Prerequisites
UG	4	4	Computer Networks and Data Communication

11.3 MARKS DISTRIBUTIONS:

Session Marks (25M)	University End Exam Marks	Total Marks
Continuous Assessment Tests (Midterm tests): There shall be 2 midterm examinations. Each midterm examination consists of one objective paper, one subjective paper and four assignments. The objective paper is for 10 marks and subjective paper is for 10 marks, with duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for subjective paper). Objective paper is set for 20 bits of – multiple choice questions, fill-in the blanks, 10 marks. Subjective paper contains of 4 full questions (one from each unit) of which, the student has to answer 2 questions, each question carrying 5 marks. First midterm examination shall be conducted for 2.5 units of syllabus and second midterm examination shall be conducted for another 2.5 units. 5 marks are allocated for Assignments. First two assignments should be submitted before the	75	100

conduct of the first mid, and the second two assignments should be submitted before the conduct of the second mid. The total marks secured by the student in each midterm examination are evaluated for 25 marks, and the average of the two midterm examinations shall be taken as the final marks secured by each candidate.		
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11.4 EVALUATION SCHEME:

S. No	Component	Duration	Marks
1	I Mid Examination	1 hour and 20 min	20
2	I Assignment		5
3	II Mid Examination	1 hour and 20 min	20
4	II Assignment		5
MID Examination marks to be considered as average of above 2 MID's			
5	External Examination	3 hours	75
Total			75

COURSE OBJECTIVES:

- i. **Identify** the major concepts of mobile computing from different viewpoints infrastructures, principles and theories.
- ii. **Discuss** the different computing areas
- iii. **Extend** the knowledge of WLAN, IEEE versions, MANET etc.
- iv. **Demonstrate** the opportunities to delve into more specific technology application domains
- v. **Illustrate** the various uses of mobile computing
- vi. **Construct** wireless areas where it is applicable to different technologies

11.5 COURSE OUTCOMES:

When a student completes this course, she/he should have:

1. Understand the compiler construction tools and Describes the Functionality of each stage of compilation process
2. Able to construct Grammars for Natural Languages and find the Syntactical Errors/Semantic errors during the compilations using parsing techniques
3. Understand the different representations of intermediate code.
4. Able to construct new compiler for new languages.
5. Able to participate in GATE, PGECET and other competitive examinations

11.6 HOW PROGRAM OUTCOMES ARE ASSESSED:

	Program Outcomes	Level	Proficiency assessed by
--	------------------	-------	-------------------------

a	An ability to apply knowledge of computing, mathematical foundations, algorithmic principles, and computer science and engineering theory in the modeling and design of computer-based systems to real-world problems (fundamental engineering analysis skills)	H	Assignments Midterm and University examinations
b	An ability to design and conduct experiments, as well as to analyze and interpret data (information retrieval skills)	H	Assignments Midterm and University examinations
c	An ability to design , implement, and evaluate a computer-based system, process, component, or program to meet desired needs, within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability, and sustainability (Creative Skills)	S	Assignments Midterm and University examinations
d	An ability to function effectively on multi-disciplinary teams (team work)	N	--
e	An ability to analyze a problem, identify, formulate and use the appropriate computing and engineering requirements for obtaining its solution (engineering problem solving skills)	H	Assignments Midterm and University examinations
f	An understanding of professional, ethical, legal, security and social issues and responsibilities (professional integrity)	N	--
g	An ability to communicate effectively both in writing and orally (speaking / writing skills)	N	--
h	The broad education necessary to analyze the local and global impact of computing and engineering solutions on individuals, organizations, and society (engineering impact assessment skills)	N	--
i	Recognition of the need for, and an ability to engage in continuing professional development and life-long learning (continuing education awareness)	H	Assignments Midterm and University examinations
j	A Knowledge of contemporary issues (social awareness)	N	--
k	An ability to use current techniques, skills, and tools necessary for computing and engineering practice (practical engineering analysis skills)	N	--

l	An ability to apply design and development principles in the construction of software and hardware systems of varying complexity (software hardware interface)	S	Assignments Midterm and University examinations
m	An ability to recognize the importance of professional development by pursuing postgraduate studies or face competitive examinations that offer challenging and rewarding careers in computing (successful career and immediate employment).	N	--

N=None S=Supportive H=Highly Related

11.7 JNTUH SYLLABUS

Unit – I

Introduction to Network Technologies and cellular Communications : HIPERLAN : Protocol Architecture, Physical Layer, Channel Access Control Sub-Layer, MAC Sub-Layer, Information Bases and Networking.

WLAN : Infrared Vs Radio Transmission, Infrastructure and Ad Hoc Networks, IEEE 802.11, Bluetooth : User Scenarios, Physical Layer, MAC layer, Networking, Security, Link Management.

GSM : Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services. Mobile Computing (MC) : Introduction to MC, novel applications, limitations, and architecture.

Unit – II

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA. MAC protocols for GSM, Wireless LAN (IEEE802.11). Collision Avoidance (MACA, MACAW) Protocols.

Unit – III

Mobile IP Network Layer : IP and Mobile IP Network Layers, packet delivery and Handover Management, Location Management, Registration, tunneling and encapsulation, Route optimization, DHCP.

Unit – IV

Mobile Transport Layer : Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other transport Layer Protocols for Mobile Networks.

Unit – V

Database Issues : Database Hoarding & caching Techniques, client-server computing with adaptation, Transactional models, query processing, Data recovery Process, and QOS quality of service issues.

Unit - VI

Data Dissemination and Synchronization: Communications asymmetry, classification of Data delivery mechanisms, Data Dissemination Broadcast models, Selective Tuning and Indexing methods. Digital Audio and Video Broadcasting(DAB&DVB), Data Synchronization - introduction, Software and Protocols.

Unit – VII

Mobile Ad hoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing algorithms, Algorithms such as DSR, AODV, DSDV, etc., Mobile Agents, Service Discovery.

Unit - VIII

Protocols and Platforms for Mobile Computing WAP, Bluetooth, XML, J2ME, JavaCard, PalmOS, Windows CE, Symbian OS, Linux for Mobile Devices.

Text books:

T1:Rajkamal (2007), Mobile Computing, 2nd edition, Oxford University Press, USA.

T2:Jochen Schiller (2004), Mobile Communications, 2nd edition, Low price edition, Pearson Education, New Delhi.

References:

R1:Stojmenovic, Cacute (2002), Handbook of Wireless Networks and Mobile Computing, John Wiley, New York.

R2:Hansmann, Merk, Nicklous, Stober(2003), Principles of Mobile Computing, 2nd edition, Springer, New York.

11.8 COURSE PLAN:

At the end of the course, the students are able to achieve the following Course Learning Outcomes.

Lecture No.	Course Learning Outcomes	Topics to be covered	Reference
L1	State the applications of the wireless communication.	Introduction to Network Technologies and Cellular Communications http://nptel.ac.in/courses/117102062/4 http://nptel.ac.in/courses/106105081/22	T1, T2
L5	Distinguish the wireless LAN	Infrared vs. radio transmission, infrastructure and ad hoc networks, IEEE 802.11. http://www.nptel.ac.in/courses/106105080/pdf/M5L7.pdf	T2
L10	Extrapolate about GSM services, protocols, security	Global System for Mobile Communications (GSM): Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services. http://nptel.ac.in/courses/117102062/37	T1,T2
L16	Discover various layers that include in data transferring and mobile networking	Protocol architecture, physical layer, channel access control sub-layer, MAC sub-layer, information bases and networking. http://nptel.ac.in/courses/106105082/26	T1
L17	Devise about	Sequence Division Multiple Access	T1

	Space Division Multiple Access for allocating spaces to the users	http://nptel.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Digi%20Comm/pdf-m-7/m7138.pdf	
L18	Devise Frequency Division Multiple Access	Frequency Division Multiple Access http://nptel.ac.in/courses/117102062/3	T1
L19, L20	Contrast Time Division multiple Access, Code Division Multiple Access	Time Division Multiple Access, Code Division Multiple Access http://www.nptel.ac.in/courses/117102062/3	T1
L23, L24, L25, L26	Discuss about Mobile Network layer	Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP). http://nptel.ac.in/courses/106105081/29 http://nptel.ac.in/courses/106105081/33	T1
L27, L28, L29	Determine the Mobile Transport layer	Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP. www.cse.iitb.ac.in/~cs653/lecture/06-mobile-TCP.ppt	T1
L30, L31, L32, L33, L34, L35	Differentiate the knowledge of Database hoarding between different computing environments	Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues. http://nptel.ac.in/courses/108102045/37	T1
L42-L45	Illustrate Mobile-Adhoc Networks	Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs www.it.iitb.ac.in/~sri/talks/manet.ppt	T1

	Environment		
L48	Summarize the wireless Application Protocol	Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers) http://nptel.ac.in/video.php?subjectId=117102062	T1
L53	Generalize Java 2 Micro Edition	Java 2 Micro Edition No nptel link	T1

11.9

11.9 MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES:

	Program Outcomes												
	a	b	c	d	e	f	g	h	i	j	k	l	m
I	S												
II				H									
III						S							
IV										H			
V					H								
VI								H					

S= Supportive H=Highly Relative

11.10 MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES:

	Program Outcomes												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	S												
2				H									
3							S						
4						H							
5					H								

S= Supportive H=Highly Relative

11.11 OBJECTIVE QUESTIONS

UNIT-I

1. Which area of the world first deployed cellular services for commercial use?

- a. Scandinavia b. Central America c. Western Africa d. Central Asia

Answer:A

2. Modulation refers to _____.

- a. the distance between the uplink and downlink frequencies
- b. the separation between adjacent carrier frequencies
- c. the process of changing the characteristics of a carrier frequency

d. the number of cycles per unit of time

Answer:C

3. What is the basic service unit of cellular telephony?

a. location area b. cell c. PLMN service area d. MSC/VLR service area

Answer:B

4. _____ mode is used for installing network.

a. Fixed & wired. b. Mobile & wired. c. Fixed & wireless. d. Mobile & wireless.

Answer: C

5. _____ is a trunked radio system.

a. TETRA. b GSM. c. UMTS. d. WLAN.

Answer: A

6. _____ is the lowest layer in a communication system.

a. Datalink layer. b. Physical layer. c. Network layer. d. Transport layer.

Answer: B

7. Each transmitter in cellular systems is called a _____.

a. base station. b. radio station. c. cell station. d. mobile station.

Answer: A

8. To reduce interference even further, _____ can be used.

a. satellites. b. GPRS. c. GSM. d. sectorized antennas.

Answer: D

9. The two directions, mobile station to base station and vice versa are separated using different frequencies, called _____.

a. frequency division simplex.

b. frequency division duplex.

c. frequency division full duplex.

d. frequency division full simplex.

Answer: B

10. RTS stands for _____.

a. Request to send. b. Request to simple. c. Reply to send. d. Reply to single.

Answer: A

11. A GSM system consists of _____ subsystems.

a. 2. b. 3. c. 4. d. 5.

Answer: B

12. Data is transmitted in small portions called _____.

a. slots. b. burst. c. frame. d. interface.

Answer: B

13. The symbol for radio interface is _____.

a. Um. b. Vm. c. Dm. d. Pm.

Answer: A

14. _____ architecture introduces two new network elements.

a. GPRS. b. GSM. c. SGSN. d. CKSN.

Answer: A

15. The technology aims at so called ad-hoc piconets is called _____.

a. bluetooth technology. b. wap technology. c ethernet technology..

d. IEEE 802.11 technology.

ANSWER: A

UNIT-2

1. _____ is used for allocating a separated space to users in wireless networks.
A. SDMA. B. FDMA. C. TDMA. D. CDMA.

Answer:A

2. TDMA stands for _____.

A. Time division multiple access. B. Time divide multiple access.
C. Time division mode access. D. Time division multiple account.

Answer: A

3. In which year GSM was founded?

A. 1982. B. 1981. C. 1992. D. 1980.

Answer: A

4. The successor of SMS is _____.

A. NMS. B. FMS. C. PMS. D. EMS.

Answer: D

5. The two basic settings for WLANs are _____.

A. infrastructure based. B. adhoc based.
C. infrared based. D. infrastructure and adhoc based.

Answer: D

6. Which of the following is a disadvantage of WLAN?

A. Flexibility. B. Design.
C. Robustness. D. Proprietary solutions.

ANSWER: D

7. Why does GSM use TDMA, as opposed to CDMA?

I. When GSM was planned, CDMA was not approved as a multiple access system.

II. TDMA is better than CDMA.

III. CDMA is not really needed in Europe.

IV. CDMA is too expensive to implement.

A. I and III B. I only C. II and III D. I and IV

ANSWER:A

8. In cellular networks, simultaneous users over the same channel is achieved by :

I. Digital Technology.

II. Frequency re-use.

III. CDMA and TDMA.

IV. Using VLRs in each area and the HLR in the network switching centre.

A. I and II B. I and III C. II and III D. IV only

ANSWER:C

9. GSM is the digital standard for Europe; What do the letters GSM currently mean?

A. Global Special Mobile B. Greater System's Mobile

C. Global Systems for Mobile Communications D. none of the above

ANSWER:C

10. Why is a digital network preferred over an analogue one?

A. It is newer B. It is smaller

C. It has lower power consumption D. It has higher capacity for the same bandwidth

ANSWER:D

UNIT-3

1. _____ IP address is used to map the same logical computer name.

- A. Digital.
- B. Dynamic.
- C. Destination.
- D. Dependent.

ANSWER: B

2. The node will acts as a server, to achieve mobile IP's _____.

- A. management.
- B. direction.
- C. motivation.
- D. link.

ANSWER: C

3. Mobile IP has to be integrated into existing _____.

- A. OS.
- B. MAC.
- C. physical layer.
- D. datalink layer.

ANSWER: A

4. Mobile IP has to remain _____ with all lower layers.

- A. visible.
- B. closed.
- C. open.
- D. compatible.

ANSWER: D

5. Mobility should remain _____ for higher layers.

- A. visible.
- B. closed.
- C. open.
- D. invisible.

ANSWER: D

6. DHCP is based on _____ model.

- A. client/server.
- B. TCP.
- C. IP.
- D. RFC.

ANSWER: A

7. Which of the following Network Technology is used to handle the Multimedia on the Internet?

(A) RTP (B) ZigBee (C) FireWire (D)All

ANSWER: A

8. Which of the following IP addresses used for mobile node []

(A)Care-of address (B) Home address (C) Both A&B (D) None

ANSWER: C

9. Which of the following Wireless devices offering IP connectivity []

(A) PDA (B)handhelds (C) Both A&B (D)None

ANSWER: C

10. Where is the target for the tunneled packets from the mobile node? Home agent? []

(A)home address (B)care-of address (C)Both A&B (D) None

ANSWER: B

UNIT-IV

1. In which approach, cache content information of the client is not maintained by the server []

- A) Stateful approach B) Stateless approach
C) Stateful synchronous D) Stateful asynchronous

ANSWER: B

2. In which state specifies the particular record is valid only for respective Mobile device and no other device can access it. []

- A) modified state B) shared state C) exclusive state D) Invalidated state

ANSWER: C

3. At which of the following, the server has no information regarding the present state of data records. []

- (A) Synchronous (B) Asynchronous (C) stateful (D) stateless

ANSWER: D

4. A _____ is the smallest logical unit of single broadcast []

- (A) data (B) unit (C) Bucket (D) All

ANSWER: C

5. Optimized TCP protocol for mobile hosts []

- (A) Snoop TCP (B) I-TCP (C) Both A&B (D) None

ANSWER: B

6. _____-TCP uses standard TCP over the wireless link

- (A) Snoop TCP (B) Indirect-TCP (C) Both A&B (D) None

ANSWER: B

7. Packets are _____ between the SGSN and the mobile node

- A) Tunneled (B) TunnedTCP (C) Both A&B (D) None

ANSWER: A

8. Selecting Tuning methods for _____ broadcast are not directly applicable for non-flat broadcast

- []
(A) Flat (B) skewed (C) segment (D) None

ANSWER: A

9. Which of the following communication is a special case of broadcasting which corresponds to unidirectional []

- (A) Unicast (B) multicast (C) bidirectional (D) multidirectional

ANSWER: A

10. The advantage of hoarding is that there is no access _____

- (A) data rate (B) latency (C) transmission (D) None

ANSWER: B

UNIT-V

1. In which property in the database, that all transactions are executed independently without any interference of other

- A) Atomicity B) Consistency C) Isolation D) Durability

ANSWER: C

2. At which of the following, the server has no information regarding the present state of data records. []

- (A) Synchronous (B) Asynchronous (C) stateful (D) stateless

ANSWER: D

3. The non-flat broadcast program without _____ is also used as a reference []
(A) segment (B) tuning (C) index (D) All

ANSWER: C

4. Which of the following means to the coming back to needed state from a failure? []
(A) Recovery (B) issues (C) roll back (D) storage back

ANSWER: A

5. Which of the following indexing scheme splits a sorted list of objects into equal-sized segments, and provides indexes to navigate through the segments []
(A) Flexible (B) tree-based (C) (1,m) (D) None

ANSWER: A

6. Databases store data in a particular _____ manner
A) Digital (B) Logical (C) index (D) All

ANSWER: B

7. Difficult to ensure Quality of Service (QoS) is the Limitation of _____ []
(A) heterogeneity of fragmented networks (B) Frequent Disconnections
(C) Communication Bandwidth (D) All

ANSWER: C

8. Which of the following Architecture recommend the databases residing at the remote servers and the copies of these databases are cached at the client tiers? []
(A) One-tier computing (B) Two-tier computing (C) Three-tier computing (D) None

ANSWER: B

9. An uplink request sent by the client is called as _____ []
(A) Roll back process (B) Query (C) Retrieval (D) Contextual service

ANSWER: B

10. The process of isolating data from outside interference is one of the main advantages of _____ []
(A) Query (B) data base management system (C) transaction (D) Roll back

ANSWER: C

11. The advantage of hoarding is that there is no access _____ [b]
(A) data rate (B) latency (C) transmission (D) None

12. Which of the following communication is a special case of broadcasting which corresponds to unidirectional

[a]

(A) Unicast (B) multicast (C) bidirectional (D) multidirectional

13. In which approach, cache content information of the client is not maintained by the server [b]
A) Stateful approach B) Stateless approach

C) Stateful synchronous D) Stateful asynchronous

14. The following requires no external definition for the business logic to function [a]
(A) Explicit (B) Dummy (C) External (D) Implicit

15. Train schedules in a railway time table is an example for [b]

(A) Data entropy (B) Data caching (C) Data mining (D) Data delivery

16. The following of the cached data in the database ensuring that even when the device is in disconnected

mode, the data required from the database is available for computing [a]

(A) Hoarded (B) Triggered (C) Toggled (D) Treamble

17. _____ due to expiry or modification of record at the database [d]

- (A) Validation (B) Modification (C) Replication (D) Invalidation
18. The transaction between the API and the database uses an explicitly defined [b]
(A) Procedure (B) Query (C) Algorithm (D) sorting
19. The mobile device is not always _____ to the server [a]
(A) connected (B) Dummies (C) Stateful (D) Invalid
20. The server advertises the following _____ [a]
(A) Invalidation mechanism (B) modifies the cache records
(C) Memory capacity (D) Time speed

UNIT-6

1. Optimal push scheduling is used to []
A) Minimize access latency B) Maximize access latency
C) To access latency D) Active access latency
ANSWER: A
2. In which mechanism user makes an explicit request for the data []
A) Push-based B) Pull-based C) Hybrid D) None
ANSWER: B
3. Which of the following protocol can allow for substantially better message delivery ratios in scientific community []
A) Replication-based B) forwarding-based C) Rule-based D) All
ANSWER: A
4. Flat board is a _____ based scheduling method. []
A) Data scheduling B) push C) pull D) in query
ANSWER: B
5. The optimal scheduling types are a _____ based mechanisms []
A) pull B) push C) hybrid D) none of these
ANSWER: B
6. Which of the following mechanisms function such that the user-devices receive the data records sent by the server on demand []
A) push-based B) hybrid-based C) pull-based D) All
ANSWER: C
7. Which of the following is a mobile OS developed by Nokia, based on Debian Linux []
A) Maemo B) WebOS C) Bada D) LiMo
ANSWER: A
8. Data dissemination means transmission of records from a _____ []
A) Client B) Server C) both D) All
ANSWER: B
9. The _____ applications must not maintain low QoS when it has abundant resources
A) Client B) Server C) MC D) All []
ANSWER: C
10. Data synchronization is defined as the process of maintaining the availability of data from _____ and maintaining consistency []
A) Source B) Destination C) Both D) None
ANSWER: B
11. Digital audio and video broadcasting ----- []

- A)uses one of the broadcast disk models B) uses flat-disk broadcast model
C) does not use any of the broadcast disk models D) uses multilevel disk model.

ANSWER: C

12. Communication asymmetry arises due to ----- []

- A) Wireless transmission being asymmetric in nature as a result of transmission errors
B) small screen sizes and low power battery operation
C) devices having limited power, uplink bandwidth, and memory
D) limited power, uplink bandwidth and access latency.

ANSWER: C

13. ----- is a process for synchronizing received bits of an item with the bits transmitted from a server or set of

computing systems. []

- A) Tuning B) broadcasting C) Selection D) Skewing

ANSWER: A

14. ----- is a disk in which there is contiguous placement of records by repeating records several times and

number of repetitions is as per their priorities for pushing or as per number of subscribers of a given record.

[]

- A) Multi Disk B) Flat Disk C) Selection Disk D) Skewed Disk

ANSWER: D

15. Mobile TV is an example of -----broadcasting []

- A) multi directional B) Unidirectional unicast mode C) Multicast mode D) None

ANSWER: B

16. Push mode is also known as ----- []

- A) Publish-Subscribe B) Subscribe- Subscribe C) Stock service D) None

ANSWER: A

17. server faces frequent interruptions and queues of requests at the server may cause congestion incase of sudden

rise in demand for certain records is a disadvantage of which mechanism []

- A) Push based B) Pull based C) Hybrid D) None

ANSWER: A

18. Bits in the record are positioned from 00 to 3600 in which broadcast model []

- A) Flat disk B) Multi-disk C) Circular disk D) Skewed disk

ANSWER: C

19. -----hold a group of data records []

- A) Directory B) Device C) Disk D) None

ANSWER: A

20. -----means that data can be interpreted only if the file is read from beginning to end []

- A) Database records B) Flat files C) Device specific D) None

ANSWER: B

UNIT-7

1. In MANETS, the number of routers may []

- A) Increase only B) Decrease only
C) Increase or Decrease D) No routers

ANSWER: B

2. The process of deletion of link shown by routing table or route-cache is called []
(A) Destination (B) link reversal (C) direct reversal (D) None

ANSWER: B

3. AODV is a reactive _____
(A) Proactive measure (B) Protocol (C) Session (D) None

ANSWER: B

4. A _____ is the smallest logical unit of single broadcast []
(A) data (B) unit (C) Bucket (D) All

ANSWER: C

5. Which of the following indexing scheme splits a sorted list of objects into equal-sized segments, and provides indexes to navigate through the segments []

(A) Flexible (B) tree-based (C) (1,m) (D) None

ANSWER: A

6. Expand DMS _____
(A) Dynamic Memory System (B) Discovery and Management system (C) Dick Management System (D) none

ANSWER: B

7. Servlet is a program running on a _____ which has a life cycle
(A) Web Server (B) tree-based (C) Web Client (D) None

ANSWER: A

8. Middleware services that _____ the handset to the MMS server and then deliver the MMS services to the users.

(A) InterDependent (B) Inter Connect (C) Complex (D) None

ANSWER: B

9. Routing protocols that never replicate a message are considered _____-based
(A) Forwarding (B) Securing (C) Complex (D) None

ANSWER: A

10. Self-_____ means establishing and modifying the route information for the connections by a system on its own

(A) Forwarding (B) Securing (C) Configuring (D) None

ANSWER: B

UNIT-8

1. _____ offers source and destination port numbers used for multiplexing and demultiplexing of data respectively.

- A. WAP.
- B. WDP.
- C. WCMP.
- D. WTLS.

ANSWER: B

2. Using _____ a mobile phone can be connected to a PDA or laptop.

- A. wired.
- B. wireless piconets.
- C. wireless WAN.
- D. wireless MAN

ANSWER: B

3. _____ handles access to and interaction with mobile telephone system.

- A. WML user agent.
- B. WTA user agent.
- C. WAP gateway.
- D. WML gateway

ANSWER: B

4.Upto how many parked slaves can allow in one piconet.

- A) 100 B) 10 C) 8 D) 255

ANSWER: D

5.In XML, which parser provides high performance []

- A) SAX B) DOM C) Both D) DTD

ANSWER: A

6.Which protocol in digital audio broadcasting to support data formats used in other multimedia systems []

- A) HTTP B) MOT C) SMTP D) FTP

ANSWER: B

7.Which of the following means a standardized agreed-upon subset and an interpretation of a specification []

- (A) MIDP (B) profile (C) J2ME (D) None

ANSWER: B

8. Bluetooth comes under the following Network Technology []

- (A) VoIP (B) Personal area network (PAN) (C)Wireless personal area network (D)None

ANSWER: C

9. Which of the following means a standardized agreed-upon subset and an interpretation of a specification []

- (A) MIDP (B) profile (C) J2ME (D) None

ANSWER: B

10. Which of the following protocol can allow for substantially better message delivery ratios in scientific community []

- (A) Replication-based (B) forwarding-based (C) Rule-based (D) All

ANSWER: A

11. 12 TUTORIAL QUESTIONS:

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-I Tutorial Questions			
1	Determine number of bites/bytes in hiperlan/2 PHY mode for different modulations shown table	Evaluate [LEVEL 5]	1

	Mode	Modulation	Code rate	PHY bit rate		
	1	BPSK	1/2	6 Mbps		
	2	BPSK	3/4	9 Mbps		
	3	QPSK	1/2	12 Mbps		
	4	QPSK	3/4	18 Mbps		
	5	16QAM	9/16	27 Mbps		
	6	16QAM	3/4	36 Mbps		
	7	64QAM	3/4	54 Mbps		
2	Differentiate the phases of EY-NPMA access schema				Analyze [LEVEL 4]	1
3	Justify the different functional groups of MAC management in IEEE 802.11.				Evaluate [LEVEL 5]	2
4	Show an Experiment the <i>problem of keyless entry system</i> in infrared transmission.				Apply [LEVEL 3]	1
5	Analyze the main elements of the GSM system architecture and describe their functionalities?				Analyze [LEVEL 4]	3
UNIT-II						
Tutorial Questions						
1	Develop the terminal problems which are near and far in wireless network?				[LEVEL 6] Create	3
2	Demonstrate the dynamic host configuration protocol?				[LEVEL 3] Apply	2
3	Outline the advantages of reverse schema? How are collisions avoiding during data transmission?				[LEVEL 4] Analyze	1
4	Integrate the basic features of CDMA system. And define soft handover?				[LEVEL 6] Create	1
5	Compare the classical and slotted in ALOHA multiple access technique?				[LEVEL 5] Evaluate	2
UNIT-III						
Tutorial Questions						
1	1. Point out the general problem of mobile IP regarding security and support of quality of service?				[LEVEL 4] Analyze	1
2	2. Analyze the reverse tunneling in mobile IP?				[LEVEL 4] Analyze	3
3	3. Classify the steps required for a handover form one foreign agent to another foreign agent including layer 2 and layer 3?				[LEVEL 3] apply	2
4	4. Show the optimizations that can be done to mobile IP?				[LEVEL 3]	1

		Apply	
5	5. Analyze the basic architecture of HAWAII	Analyze [LEVEL 4]	3
UNIT-IV			
Tutorial Questions			
1	1. Compare the error rate in wired networks and mobile networks.	[LEVEL 5] Evaluate	2
2	2. Discriminate the selective retransmission and transmission oriented TCP?	[LEVEL 4] Analyze	1
3	3. Examine the applications in which packet delayed is equivalent to packet lost? Explain?	[LEVEL 4] Analyze	3
4	4. Demonstrate the modifications required in the TCP receiver to implement the selective retransmission?	[LEVEL 3] Apply	1
5	5. Justify why traditional TCP cannot use in mobile network?	[LEVEL 5] Evaluate	
UNIT-V			
Tutorial Questions			
1	Examine the internet provides quality of service or not?	[LEVEL 3] apply	3
2	Illustrate the caching invalidation mechanisms in brief?	[LEVEL 4] Analyze	2
3	Compare the power-aware computing and context – aware computing?	[LEVEL 5] Evaluate	2
4	Classify the various quality issues related to mobile database computing?	[LEVEL 3] Apply	1
5	Compare different types of broad casting mechanisms?	[LEVEL 5] Evaluate	2
UNIT-VI			
Tutorial Questions			
1	Analyze the wireless Technology applications	[LEVEL 4] analyze	3
2	Integrate the properties of MANETs and describe the various routing algorithms in details?	[LEVEL 4] Analyze	3
3	Point out the advantages and disadvantages of snooping TCP?	[LEVEL 4] Analyze	1
4	Illustrate the Transmission/ Time-out freezing approach?	[LEVEL 4] Analyze	2
5	Show the architecture of WAP with a neat diagram?	[LEVEL 4] Analyze	1
UNIT-VII			

Tutorial Questions			
1	Illustrate the Routing algorithm and Security in MANETS in brief?	[LEVEL 4] Analyze	1
2	Integrate the various routing algorithms?	[LEVEL 6] Create	2
3	Differentiate the table driven protocol and on-demand protocols?	[LEVEL 4] Analyze	1
4	Point out the properties of mobile adhoc networks?	[LEVEL 4] Analyze	3
5	Point out the challenges of wireless adhoc networks?	[LEVEL 4] Analyze	3
UNIT-VIII Tutorial Questions			
1	Point out the role of WAP forum in wireless web accessing?	[LEVEL 4] Analyze	1
2	Integrate the Bluetooth and its applications	[LEVEL 6] Create	2
3	Illustrate the caching invalidation mechanism in mobile computing in brief?	[LEVEL 4] Analyze	2
4	Analyze the Wireless application protocol (WAP) with diagram?	[LEVEL 4] Analyze	1
5	Analyze J2Me with Java?	[LEVEL 4] analyze	2

11. 13 ASSIGNMENT QUESTIONS:

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-I Assignment Questions			
1	Analyze various applications of mobile computing	[LEVEL 4] Analyze	3
2	Show the reference model of wireless and mobile networks. With the help of a neat diagram	[LEVEL 3] Apply	1
3	Design GPRS architecture reference model.	[LEVEL 6] Create	3
4	Examine the handover and services available in GSM.	[LEVEL 3]	2

		Apply	
5	Design GSM architecture reference model.	[LEVEL 6] Create	1
UNIT-II Assignment Questions			
1	Illustrate the applications of mobile computing in brief with real time example?	[LEVEL 4] Analyze	1
2	Justify can starvation is avoided in all multiple access schema in detail?	[LEVEL 5] Evaluate	3
3	Classify the different kinds of multiplexing techniques?	[LEVEL 3] Apply	2
4	Differentiate SDM and SDMA in details?	[LEVEL 4] Analyze	2
5	Compare the following terms i) SDMA ii)TDMA iii) FDMA iv) CDMA	[LEVEL 5] Evaluate	2
UNIT-III Assignment Questions			
1	Examine the data transfer from a mobile node to a fixed node and vice versa or not?	[LEVEL 3] Apply	3
2	Integrate the requirements associated with the mobile IP standard?	[LEVEL 6] Create	2
3	Show the two possibilities of location of COA.	[LEVEL 3] Apply	1
4	illustrate the Data Transfer from a mobile node to a fixed node and vice versa?	[LEVEL 4] Analyze	1
5	Specify the various types of encapsulation?	[LEVEL 6] Create	2
UNIT-IV Assignment Questions			
1	Integrate the several enhancements on TCP for mobility giving their relative advantages and disadvantages?	[LEVEL 6] Create	2
2	Illustrate the transaction oriented TCP in brief?	[LEVEL 4] Analyze	2
3	Compare the error rate in wired network and mobile networks?	[LEVEL 5] Evaluate	1
4	Examine the selective transmission improve the transmission in mobile TCP?	[LEVEL 3] apply	3
5	Compare wired network with wireless mobile networks?	[LEVEL 5] Evaluate	1
UNIT-V Assignment Questions			

1	Integrate the various quality issues related to mobile database computing?	[LEVEL 6] Create	1
2	Illustrate the Hoarding techniques in brief?	[LEVEL 4] Analyze	2
3	Demonstrate the data catching architecture and mobile cache maintenance?	[LEVEL 3] Apply	2
4	Illustrate the four-tier architecture. And how do multimedia database serve a mobile device in client-server architecture?	[LEVEL 4] Analyze	2
5	Compare different hoarding and caching techniques?	[LEVEL 5] Evaluate	2
UNIT-VI Assignment Questions			
1	Illustrate the pull-based , push-base and hybrid data dissemination methods in brief?	[LEVEL 4] Analyze	2
2	Analyze the selective index technique with an example?	[LEVEL4] Analyze	2
3	Specify the classification of new data delivery mechanisms?	[LEVEL 6] Create	3
4	Compare the retransmission and fast recovery mechanism?	[LEVEL 5] Evaluate	1
5	Analyze different broadcast models with an example?	[LEVEL4] Analyze	3
UNIT-VII Assignment Questions			
1	Integrate the security and networking issues in blue tooth technology?	[LEVEL 6] Create	1
2	Illustrate the security issues and solutions for MANETs in brief?	[LEVEL 4] Analyze	2
3	Point out the properties of MANETS?	[LEVEL 4] Analyze	3
4	4) Draw the blue tooth architecture with a neat Diagram ?	[LEVEL4] Analyze	2
5	Specify the classification of Table driven Routing mechanisms in Manet?	[LEVEL 6] Create	2
UNIT-VIII Assignment Questions			
1	Compare the WAP and BLUETOOTH	[LEVEL 5] Evaluate	2
2	Integrate the features of XML? And show how XML solve the problem of HTML?	[LEVEL 6] Create	3

3	Draw the WAP architecture with neat diagram ?	[LEVEL 6] Create	1
4	Illustrate the physical layer diagram of blue tooth and its applications in brief?	[LEVEL 4] Analyze	2
5	Draw the J2ME architecture with neat diagram ?	[LEVEL 6] Create	1

12 SOFTWARE TESTING METHODOLOGIES

12.0 COURSE DESCRIPTION:

Course Name	:	Software Testing Methodologies
Course Code	:	57047
Class	:	IV B. Tech I Semester
Branch	:	Information Technology
Year	:	2015 – 2016
Course Faculty	:	Dr. T.Dharma Reddy, Professor

12.1 COURSE OVERVIEW:

This Course main objective for the student to understand about testing and how the different type of testing are used for finding bugs in applications at the end of the session can able to Know different Kinds of testing methodologies used to find bugs ,errors such as unit testing etc.and we can able to provide different flow graphs Path testing for space complexity. The course is presented to the students by using power point projections, lecture notes, subjective and objective tests, assignments, and laboratory.

12.2 PREREQUISITES:

Level	Credits	Periods/Weeks	Prerequisites
UG	4	4	

12.3 MARKS DISTRIBUTIONS:

Session Marks (25M)	University End Exam Marks	Total Marks
Continuous Assessment Tests (Midterm tests): There shall be 2 midterm examinations. Each midterm examination consists of one objective paper, one subjective paper and four assignments. The objective paper is for 10 marks and subjective paper is for 10 marks, with duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for subjective paper). Objective paper is set for 20 bits of – multiple choice questions, fill-in the blanks, 10 marks. Subjective paper	75	100

contains of 4 full questions (one from each unit) of which, the student has to answer 2 questions, each question carrying 5 marks. First midterm examination shall be conducted for 2.5 units of syllabus and second midterm examination shall be conducted for another 2.5 units. 5 marks are allocated for Assignments. First two assignments should be submitted before the conduct of the first mid, and the second two assignments should be submitted before the conduct of the second mid. The total marks secured by the student in each midterm examination are evaluated for 25 marks, and the average of the two midterm examinations shall be taken as the final marks secured by each candidate.		
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12.4 EVALUATION SCHEME:

S. No	Component	Duration	Marks
1	I Mid Examination	1 hour and 20 min	20
2	I Assignment		5
3	II Mid Examination	1 hour and 20 min	20
4	II Assignment		5
MID Examination marks to be considered as average of above 2 MID's			
5	External Examination	3 hours	75
Total			75

12.5 COURSE OBJECTIVES:

1. To understand the basic purpose of Testing and Taxonomy of Bugs.
2. To understand about Flow Graphs and Path Testing.
3. To understand applications of Various Testing
4. To choose the appropriate type Testing for a specified application.
5. To understand and analyze various flow anomaly detection.
6. To expose to testing tools such as JMeter or Win-runner.

COURSE OUTCOMES:

1. Learn about Testing and various terminology
2. Ability to identify appropriate testing methods in a application.
3. Ability to solve problems independently and think critically
4. Analyze the domain in which testing is done.
5. Understand about regular expression and its use in testing

12.6 HOW PROGRAM OUTCOMES ARE ASSESSED:

	Program Outcomes	Level	Proficiency assessed by
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a	An ability to apply knowledge of computing, mathematical foundations, algorithmic principles, and computer science and engineering theory in the modeling and design of computer-based systems to real-world problems (fundamental engineering analysis skills)	H	Assignments Midterm and University examinations
b	An ability to design and conduct experiments, as well as to analyze and interpret data (information retrieval skills)	H	Assignments Midterm and University examinations
c	An ability to design , implement, and evaluate a computer-based system, process, component, or program to meet desired needs, within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability, and sustainability (Creative Skills)	S	Assignments Midterm and University examinations
d	An ability to function effectively on multi-disciplinary teams (team work)	N	--
e	An ability to analyze a problem, identify, formulate and use the appropriate computing and engineering requirements for obtaining its solution (engineering problem solving skills)	H	Assignments Midterm and University examinations
f	An understanding of professional, ethical, legal, security and social issues and responsibilities (professional integrity)	N	--
g	An ability to communicate effectively both in writing and orally (speaking / writing skills)	N	--
h	The broad education necessary to analyze the local and global impact of computing and engineering solutions on individuals, organizations, and society (engineering impact assessment skills)	N	--
i	Recognition of the need for, and an ability to engage in continuing professional development and life-long learning (continuing education awareness)	H	Assignments Midterm and University examinations
j	A Knowledge of contemporary issues (social awareness)	N	--
k	An ability to use current techniques, skills, and tools necessary for computing and engineering practice (practical engineering analysis skills)	N	--

l	An ability to apply design and development principles in the construction of software and hardware systems of varying complexity (software hardware interface)	S	Assignments Midterm and University examinations
m	An ability to recognize the importance of professional development by pursuing postgraduate studies or face competitive examinations that offer challenging and rewarding careers in computing (successful career and immediate employment).	N	--

N=None S=Supportive H=Highly Related

12.7 SYLLABUS

UNIT-I:

Introduction : Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

UNIT-II:

Flow graphs and Path testing : Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT-III:

Transaction Flow Testing : Transaction flows, transaction flow testing techniques. Dataflow testing:-Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT-IV:

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT-V:

Paths, Path products and Regular expressions : Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

UNIT-VI:

Logic Based Testing : Overview, decision tables, path expressions, kv charts, specifications.

UNIT-VII:

State, State Graphs and Transition testing : State graphs, good & bad state graphs, state testing, Testability tips.

UNIT-VIII:

Graph Matrices and Application : Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. Usage of JMeter and Win runner tools for functional / Regression testing, creation of test script for unattended testing, synchronization of test case, Rapid testing, Performance testing of a data base application and HTTP connection for website access.

TEXT BOOKS :

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

REFERENCES:

1. The craft of software testing - Brian Marick, Pearson Education.

2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

12.8 COURSE PLAN			
Lecture No	Learning Objective	Topics to be covered	Reference
L1-L2	List out the Phases in a Tester's Mental Life	Introduction:- Purpose of testing, Dichotomies, model for testing	T1
L3- L4	Understands the consequences of bugs	model for testing, consequences of bugs	T1
L5-L6	Compare Interface, Integration and System Bugs	taxonomy of bugs	T1
L7-L8	Compare the three testing criteria or strategies	Flow graphs and Path testing:- Basics concepts of path testing, Predicates	T1
L9-L10	Analyze the Achievable Paths	Path Predicaes,Achievables Paths	T1
L11- L12	Analyze the application of path testing	sensitizing path instrumentation, application of path testing	T1
L13- L14	Understand the transaction flows structure	Transaction Flow Testing:- transaction flows,	T1
L15- L16	Recognize the various transaction flow testing techniques	transaction flow testing techniques	T1
L17- L18	Describe the transaction flow testing techniques	transaction flow testing techniques	T1
L19- L20	List out the Data Flow Model	Dataflow testing:- Basics of dataflow testing	T1
L21- L22	Describe the basic concepts of Data Flow testing	strategies in dataflow testing	T1
L23- L24	Illustrate the different strategies in dataflow testing	strategies in dataflow testing	T1
L25- L26	Discuss the application of dataflow Testing.	application of dataflow testing.	T1
L27	Describe the domains and paths	Domain Testing:- domains and paths	T1
L28	Explains the Nice & ugly domains	Nice & ugly domains	T1
L29	Illustrate Domain Bugs	domain testing	T1
L30	Demonstrate Nice & ugly domains	Nice & ugly domains	T1
L31	Discuss the domains and	domains and testability	T1

	testability		
L32	Summarize the Path Product laws	Paths, Path products and Regular expressions:- path products,	T1
L33-L34	Differentiate the Loops and Identity elements	path expression	T1
L35-L36	Examine the Reduction Procedure	reduction procedure	T1
L37-L39	Implement the flow graphs to find no. of Paths	applications	T1
L40-L41	Examine various regular expression	regular expressions	T1
L42	Explain the flow anomaly detection	flow anomaly detection	T1
L43-L44	Construct the decision tables	Logic Based Testing:- overview, decision tables, path expressions	T1
L45-L46	Describe the path expressions	path expressions	T1
L47-L48	Construct the kv charts	kv charts, specifications	T1
L49-L50	Understand the good & bad state graphs	State, State Graphs and Transition testing:- state graphs, good & bad state graphs,	T1
L51-L52	Describe the state testing	state testing, Testability tips	T1
L53-L54	Describe the matrix of graph	Graph Matrices and Application:- matrix of graph, Motivational overview, relations, power of a matrix	T1
L55-L56	Implement node reduction algorithm	node reduction algorithm	T1
L57-L58	Discuss the node reduction algorithm	node reduction algorithm	T1
L59-L60	Demonstrate the building tools	building tools (Student should be given an exposure to a tool like JMeter or Win-runner).	T1

12.9 MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES:

	Program Outcomes												
	a	b	c	d	e	f	g	h	i	j	k	l	m
I	H		H						S				
II			H						H		S		H
III	H	H			S						H		
IV		H			H								H

V	H			H	H				H				H
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S= Supportive H=Highly Relative

12.10 MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES:

	Program Outcomes												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	H	H	H						S				H
2	H				S				H				H
3		H	H		H						S		H
4		H			H				H				H
5	H		S										H

S= Supportive H=Highly Relative

12.11 OBJECTIVE QUESTIONS

UNIT-I

1. According to phase 1 of testers mental life
 - A) Testing shows software work
 - B) Testing shows software doesn't work
 - C) Testing = debugging
 - D) Testing is not an act
2. Syntax errors are
 - A) data bugs b)logic bugs C)coding bugs d)Structuired bugs
3. The first goal of testing is
 - A) Bug detection b) bug prevention c) bug correction d) to calculate the cost of bugs
4. The abbreviation of SQA is
 - A)System quality assistance b)software quality assistance
 - C) System quality assurance d) software quality assurance
5. What is the purpose of testing?
 - A) to find the errors b. To show programme has bugs c) to correct the errors
 - D) none of these
6. Functional testing is also known as?
 - A) black box b) white box c) glass box 4)open box
7. The language syntax and symantics eliminates most of the bugs this belief is known as
 - A) control bug domains b) data separation c)Solvate rest
 - D)angelic testers
8. _____ is not the consequence of bugs
 - A) serious b) extreme c)infectious d)none
9. The pesticide paradox of testing is
 - A) testing shows all bugs
 - B) complexity of software grows to the limit of managerial ability
 - C) a method to find bugs leave subtler bugs
 - D) testing does not show all bugs
10. The remedies for test bugs does not include

- A) Debugging b) Design automation c) test execution automation d) test consequences
11. Incorrect design of test cases in an example of
A) logic bugs b) data bugs c) processing bugs d) requirement bugs
12. The methods to prevent bugs other than testing are..
A) reviews b) syntax checking c) inspection d) all the above
13. The programming staff for the project schedule be _____ members
A) 10-20 b) 20-30 c) 25-45 d) 15-20
14. The process of testing entire system is
A) system testing b) complete testing c) integration testing d) software testing
15. Acceptance test is done.?
A) After accepting a system b) to know users need c) to know whether to accept a system or not
d) to know the ability of the programmer
16. Can a bug free product delivery is granted with testing _____
17. Structural testing is also known as _____
18. The final recipient of the system is known as _____
19. The levels of testing are _____
20. The most important criteria for designing interface is _____

UNIT-II

1. _____ Is a graphical representation of program's control structure
a) Flow chart b) control flow graph graph matrix d) none
2. Junction is generally denote by
a) Rectangle b) rhombus c) circle d) line
3. _____ are more preferred in process design
a) Flow charts b) algorithm c) flow graphs d) none
4. 100% statement coverage is demoted by
A) c_1 b) c_2 c) $c_1 + c_2$ d) $c_1 - c_2$
5. The path selected does not follow the rule of
a) from entry to exit b) simple c) short d) containing loops
6. Which is true in case of flow charts
a) there are fixed rules in designing b) there are no rules in designing
C) details of process block are not shown d) it ignores all process steps
7. Path segments are also known as
A) sub paths b) half paths c) sub ways d) the path parameters
8. Path testing with $c_1 + c_2$ is tool for rehosting
A) new software b) old software c) half shelf software
d) component based soft ware
9. The _____ is what we expect to happen as a result of test
A) outcome b) output c) result d) none
10. The boolean expression associated with the path is
a) predicate b) boolean path c) path expression
d) predict expression
11. The methods of instrumentation in path testing does not include
A) link markers b) link counters c) bit maps d) none of the above
12. If every combination of values of two variables cannot be independently specified then they are said to be
A) correlated b) independently c) dependent d) un correlated
13. The last step in heuristic procedure for path sencitizing is

A) examining the predicates b) use of predicates c) identify the variables d) satisfy the in equalities

14. Correct: $x=7 \dots$ if $y>0$ then

error: $x=7 \dots$ if $x+y > 0$ then

is an example of

a) Equality blindness b) assignment blindness c) self blindness

D) none of these

15. The name given to a link is known as

a) link weight b) link counter c) link marker d) none

16. A point where control flow can merge is _____

17. The rows in the control flow graph are _____

18. If all the paths in the programme are covered then it is known as _____

19. In path testing the paths should be taken in such a way to achieve _____

20. Three kinds of loops are _____

UNIT-III

1. "Absorption" can be dealt in the best way by

2. C,P in case of data object state and usage are

3. The statement that is true in case of transactional flow instrumentation is

4. _____ are assumed problematic for software designers.

5. The methods of sensitization in transaction flows include

6. FSM implementation is an example of

7. The states of data objects cannot be

8. Main ()

{

Int a=10;

Int b=10;

}

The above is the example of

9. Direct relation does not exist between processes and decisions in

10. The path segment for which every node is visited at most once is said to be

11. Every definition of every variable is covered in

12. Sequential machines consist of _____ processors

13. The normal sequence with respect to life time of a variable among the following is

14. $a=0$;

$b=a$;

The statement represents the sequence of

15. The correct sequence of transaction flow is

16. The transaction flow graph is used for _____ testing.

17. A _____ is a unit of work done.

18. The complications of transaction flows are _____ and _____

19. Transaction flows are a natural agenda for _____.

20. TCB stands for _____

UNIT-IV

1. Using $x+y \geq 10$ when the correct equation is $x + y \geq 5$ is an example of _____

2. If two distinct domains are overlapped, then they are said to be _____

3. The complex domains have generic cases of _____

4. The technique of expecting the process is true for all values in domain by checking for one random value in the same domain is _____
5. If domain boundaries differ by a constant, they are known as _____
6. Nice domain should not be _____
7. Domain testing is a form of _____
8. The point that lies between two specific points of domain is _____
9. Domains are more useful in _____ -
10. Span is defined as _____
11. The linearizing transformation which yields infinite polynomials is _____
12. A domain can be considered as a _____
13. The span of the number space if nice domains are complete
14. The compatibility of caller's range and called routine's domain is confirmed by _____
15. The example for linearizing transformation in domain testing is _____
16. In _____ boundary, the values of the boundary belong to the same domain.
17. The number of planes in which the domain exists is known as _____
18. _____ domains are incomplete or inconsistent.
19. The special case of overlapping is _____
20. COO OOI stands for _____

UNIT-V

1. aa* =
- a) a*a b) a+ c) a* d) Both (a) and (b)
2. Two successive path segment is expressed by concatenation is known as a)
3. The first steps in node reduction is
4. The weight expression of serious path of A and B in lower path count arithmetic is
5. If the probability of looping node is PL, probability of non looping operation
6. Which among the following is not a complementary operation
7. The main goal of reduction process is
8. The main step in achieving the node is
9. To remove elements from stack, the operation used is
10. If G is get operation then G + G would be
11. The path expression for the following loop would be
12. 1+ + 1 =
13. The weight expression of loops in counting the no of paths in a flow graph is
14. The equivalent link weight for the graph would be
15. The transformation for the given graph would be
16. _____ denotes the parallel set of paths.
17. Self loop can be removed by replacing it with _____ if a is the path expression of that loop.
18. The theorem that is helpful to reduce regular expression is _____.
19. Huang's theorem is generalized to cover the sequences of greater length than _____ characters.
20. _____ methods cannot detect whether a path is achievable or not.

UNIT-VI

1. The decision table has a disadvantage of
2. If there are k predicates then the maximum number of predicate cases possible are
3. The proportional calculus in which there are more than two truth values is known as

4. "FORTRAN 3 WAY IF" is an example of
5. According to absorptive law , $A + B$
6. $ABC + BC + CD + AB$ can be reduced to
7. $ABCD + BCD + CD + AB$ Can be reduced to
8. The first step in reducing Boolean expression is
9. The order of grouping in KV charts should be
10. For n predicates, the number of interchanges for each combination of predicate truth values would be
11. The list of names of conditions is known as
12. The rules that are used when all the rules fail to meet the conditions are
13. If there are two immaterial cases in a table then the expansion would result in _____ columns or cases
14. Which among the following is true for predicate values
15. According to laws of Boolean algebra =
16. The logic in simplest form is _____
17. The tables translator will check for _____ of source table and default rules to be filled
18. The process whose outcome is a truth value is known as _____
19. $ABCD + ABC + AB + A$ can be reduced to _____
20. KV charts are used to analyse _____

UNIT-VII

1. The elements of the state graph doesnot include _____
2. The starting step of implementation of the state graph is _____
3. The bugs in state graphs are due to _____
4. The state where no input sequence can reach is known as _____
5. Outputs in state graphs are not dependent on _____
6. The bugs that are not caused in state graphs are _____
7. The advantage of state testing does not include _____
8. State graph represent _____
9. The state where engine is not working and vehicle is running is example of _____
10. The steps in finding number of states does not include _____
11. Contradictory and ambiguous states occurs in case of _____
12. Which among the following is not the condition of inessential finite state behavior _____
13. In a good state graph _____
14. Output and inputs in state diagram are separated by _____
15. The representation of state graph in the form of table Is known as _____
16. The computing in the finite state mission in the start state begins with _____
17. The process of converting characters into numerical is _____
18. The set of different input values is known as _____
19. The bugs that occur due to dead state are known as _____
20. The behavior of FSM is invariant under all _____

UNIT-VIII

1. The problems with pictorial representation does not include _____
2. The false arithmetic rule for binary weight is _____
3. If column of a matrix contains two or more once then it is _____
4. Equivalence of relation needs not satisfy _____
5. Partial ordering relations need not satisfy _____

6. The building tools of graph of matrices does not include _____
7. In node reduction optimization ,when nodes of degree 3 are removed then total links are _____
8. The representation of matrix in arrays is convenient because _____
9. No of nodes in state graph is equal to _____
10. In graph matrices,if the link does not exist between nodes,it is represented by _____
11. The advantage of node reduction algorithm in matrices compared to that in graphs is _____
12. Every _____ in the graph represent as single row and single column in matrices
13. If the element of principal diagonal is „1“then the corresponding node is _____
14. A relation which satisfies reflective,transilative and antisymmertric properties is _____
15. The matrix needed to identify for the partition algorithm is _____
16. In software the matrix is represented using _____
17. The node of _____ degree should be removed first in the process of node reduction of optimization
18. The automated tools used for regression testing are _____
19. The set of all paths between nodes is expressed in matrix operations as _____
20. The matrix for which is know as _____

12. 12 TUTORIAL QUESTIONS:

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-I			
1	Discuss to what extent can testing be used to validate that the program is fit for its purpose.	Understand	3
2	State and explain various dichotomies in software testing?	Understand	3
3	Explain Goals of Integration Testing?	Remember	3
4	List Phases in a Tester’s Mental Life	Knowledge	3

Sl.No	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-II			
1	Evaluate the sum of products form for the expression (ADFGHIJKL+AEFGHIJKL+BCDFGHIJKL+BCEFGHIJKL)?[Level 5]	Evaluate	
2	Compare and contrast achievable and un achievable paths?[Level 5]	Evaluate	
3	Illustrate various flow graph elements with their notations?[Level4]	Analyze	

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-III			
1	Interrupt births and mergers in transactions?[Level 5]	Evaluate	
2	Illustrate Transaction flows with their complications?[Level 4]	Apply	
3	Compute the different data object states in data flow graphs?[Level 3]	Analyze	
4	Construct the data flow graph for the following problem i. Given L,t and d,solve for Z. ii. $\cos(c) = \cos(L) \sin(t)$ iii. $\tan(M) = \cot(L) \cos(t)$ iv. $\tan(Z+F) = -\sin(L) \tan(t)$ $\tan(F) = \cos(M) \tan(M+d)$ [Level 6]	create	
Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-IV			
1	Infer the restrictions in domain testing?[Level 4]	Analyze	
2	compose Different ugly bugs?[Level 6]	Create	
3	Compare and contrast the how the ugly domains are treated by programmers and testers ?[Level 4]	Analyze	
4	Detect the domain testing for safe home system?[Level 6]	create	
5	Point out the different kinds of points in the domains?[Level 3]	apply	
Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-V			
1	Infer the rules for Arithmetic rules and looping probability of path expression?[Level 5]	Evaluate	
2	Determine the mean processing time of a routine with an example?[Level 5]	Evaluate	
3	Generate arithmetic table for PUSH/POP and GET/RETURN problem?[Level 5]	Evaluate	
4	Illustrate the problem with node by node reduction procedure?[Level 4]	Analyze	
5	Illustrate the usage of regular expression in flow	Analyze	

	anomaly detection?[Level 4]		
6	Classify the generalizations limitations and implementation of Huang's Theorem?[Level 4]	Analyze	
7	Determine applications of regular expressions?[Level 5]	Evaluate	
8	Determine the applications of node removal algorithm[Level 5]	Evaluate	

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VI			
1	Construct the function using Karnaugh Map method $F(A,B,C,D)=\Sigma (1,2,3,8,9,10,11,14)+\Sigma d(7,15)$ [Level 6]	Create	
2	Construct the following functions using karnaugh map method $F(A,B,C,D)=\pi (4,5,6,7,8,12,13).d(1,15)$ [Level 6]	Create	
3	Construct a karnaugh method to minimize $F= D+A'B'C'D'+ABCD'+A'BCD+ABD+B'CD'+A'B'C'D$ [Level 6]	Create	
4	Evaluate the given expression using a four variable k-map $F(A,B,C,D)=\Sigma(0,2,4,7,9,12,14)$ [Level 5]	Evaluate	
Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VII			
1	Propose the software implementation issues in statetesting?[level 6]	Create	
2	Relate essential and inessential finite state behavior?[Level 5]	Evaluate	
3	Elaborate a) Switches b) Flags c) Unacheivable paths[Level 6]	Create	
4	Compose guidelines for building the finite state machine into code?[Level 6]	Create	
5	Justify The behavior of the finite state machine is invariant under all encodings.[Level 5]	Evaluate	

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
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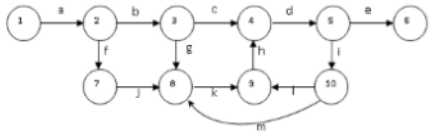
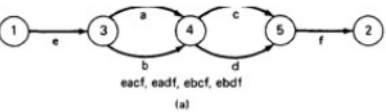
UNIT-VIII			
1	Illustrate all the steps involved in node reduction procedure with help of neat labeled diagram?[Level 4]	Analyze	
2	Compose linked list representation?[Level 4]	Analyze	
3	Relate relative merits and demerits of different matrix representation?[Level 3]	Apply	
4	Classify usage of Winrunner and Jmeter tools for functional/Regression Testing? [level 4]	Analyze	
5	Elaborate rapid test script wizard?[Level 4]	Analyze	

12. 13 ASSIGNMENT QUESTIONS:

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-I			
1	Discuss to what extent can testing be used to validate that the program is fit for its purpose.	Understand	3
2	State and explain various dichotomies in software testing?	Understand	3
3	Explain Goals of Integration Testing?	Remember	3
4	List Phases in a Tester's Mental Life	Knowledge	3

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-II			
1	Construct the controlflow graph of atm system?	Create	3
2	Compare and contrast control flow graphAnd flowcharts?	Analyze	3
3	Apply the procedure used in testing loops in path testing considering some looping construct examples.?	Apply	3
4	Evaluate the steps to be followed from path selection to predicate expression for the Boolean expression (A+BC)(D+E)	Evaluate	3
Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-III			
1	Illustrate Transaction with an example?[Level 4]	Apply	
2	Illustrate withthe help of examples How does	Apply	

	transaction flow occurs.?[Level 4]		
3	Justify the reason for the transaction flow model to be imperfect? [Level 5]	Evaluate	
4	Interpret Data flow testing?[Level 5]	Understand	
Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-IV			
1	Construct schematic representation of Domain Testing and explain?[Level 3]	Apply	
2	Interpret the domain boundary bugs for two dimensional domains?[Level 5]	Evaluate	
3	Interpret Nice & Ugly Domains?[Level 5]	Evaluate	
4	Illustrate Nice Domains with Examples, and explain in detail about nice domains?[Level 4]	Analyze	
5	Classify Specified domain and implemented domains?[Level 4]	Analyze	

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-V			
1	justify , Flow graphs are abstract representation of programs, justify, Distributive Laws Absorption Rule[Level 5]	Evaluate	
2	Convert the flow graph using reduction procedure whose links are labeled into a path expression[Level 3] 	Analyze	
3	Calculate maximum path count arithmetic the following flow graph[Level 3] 	Apply	
4	Calculate the looping probability for the path expression[Level 3]	Apply	
Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VI			
1	Illustrate how decision table is used to determine structure of	Analyze	

	program?[Level 4]		
2	Justify Whether the predicates are restricted to binary truth value or not?[Level 5]	Evaluate	
3	Classify the rules of Boolean algebra?[Level 4]	Analyze	
4	Demonstrate by means of truth tables the validity of following theorems of Boolean algebra a) Associative Laws b) Demorgans Theoroms for three variables	Apply	
Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VII			
1	Design state graphs ?[Level 6]	Create	
2	Differentiate good and bad state graphs with examples?[Level 4]	Analyze	
3	Differentiate between good state graph and bad state graph?[Level 4]	Analyze	
4	Illustrate the reasons for occurence of state bugs?[Level 4]	Analyze	
5	Compute with example how to convert a specification into a state graph.also discuss how contradictions can come about?[Level 6]	Create	
6	Evaluate a) Trasiition bugs b) Dead States c) State bugs Encoding bugs[Level 5]	Evaluate	

Sl.No	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VIII			
1	Illustrate the applications of node reduction algorithm?[Level 4]	Analyze	
2	Generate an algorithm for node reduction (general)?[Level 4]	create	
3	Classify the building tools of graph matrices?[Level 4]	Analyze	
4	Point out the advantages of array representation?[Level 5]	Analyze	

13. MOBILE APPLICATION DEVELOPMENT

13.0 COURSE DESCRIPTION:

Course Code	57080			
Course Title	MOBILE APPLICATION DEVELOPMENT			
Course Structure	Lectures	Tutorials	Practicals	Credits
	4	0	-	4
Course Coordinator	Mr Ch. Subba Reddy, Assistant Professor			

13.1 COURSE OVERVIEW:

The Java 2 Micro Edition (J2ME) provides a programming platform for a wide range of mobile and embedded devices. This course focuses on the java API'S and tools necessary for developing J2ME applications for mobile computers and telephones. it covers the necessary language features for mobile programming and focuses particularly on the Mobile Information Device Profile(MIDP) used in mobile phone application development. The course project presents students with considerable opportunity for hands-on experience, developing mobile software for realistic problem using an iterative development approach. Delegates will build a mobile application interface using J2ME, connecting via HTTP to the web tier interface of a Java application.

13.2 PREREQUISITES:

Level	Credits	Periods/Weeks	Prerequisites
UG	4	5	Core Java,SQL, Familiar with the general principles

13.3 MARKS DISTRIBUTIONS:

Session Marks (25M)	University End Exam Marks	Total Marks
Continuous Assessment Tests (Midterm tests): There shall be 2 midterm examinations. Each midterm examination consists of one objective paper, one subjective paper and four assignments. The objective paper is for 10 marks and subjective paper is for 10 marks, with duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for subjective paper). Objective paper is set for 20 bits of – multiple choice questions, fill-in the blanks, 10 marks. Subjective paper	75	100

contains of 4 full questions (one from each unit) of which, the student has to answer 2 questions, each question carrying 5 marks. First midterm examination shall be conducted for 2.5 units of syllabus and second midterm examination shall be conducted for another 2.5 units. 5 marks are allocated for Assignments. First two assignments should be submitted before the conduct of the first mid, and the second two assignments should be submitted before the conduct of the second mid. The total marks secured by the student in each midterm examination are evaluated for 25 marks, and the average of the two midterm examinations shall be taken as the final marks secured by each candidate.		
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13.4 EVALUATION SCHEME:

S. No	Component	Duration	Marks
1	I Mid Examination	1 hour and 20 min	20
2	I Assignment		5
3	II Mid Examination	1 hour and 20 min	20
4	II Assignment		5
MID Examination marks to be considered as average of above 2 MID's			
5	External Examination	3 hours	75
Total			75

13.4 COURSE OBJECTIVES:

- i. **Understand** the evolution of J2ME from standard Java.
- ii. **List** items, commands, interfaces in J2ME.
- iii. **Describe** Best practices in J2ME.
- iv. **Analyze** Record storing in data base, meta data.
- v. **Understand** how to create table ,inserting values into tables, deletion of values, and retrieving data from data base
- vi. **State** how network management is provided by HTTP generic connection framework

13.5 COURSE OUTCOMES:

- A. Able to analyze the necessity for Object Oriented Programming paradigm and over structured programming and become familiar with the fundamental concepts in OOP.
- B. Graduate will demonstrate an ability to design and develop java programs, analyze, and interpret object oriented data and report results.
- C. Graduates will demonstrate an ability to design a object oriented system, AWT components or multithreaded process as per needs and specifications.
- D. Graduates will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks like console and windows applications both for standalone and Applets programs.

E. Graduate will demonstrate skills to use latest object oriented programming language and software like java to analyze OOP problems.

F. Graduate will develop confidence for self education and ability for life-long learning needed for advanced java.

G. Graduate can participate and succeed in competitive examinations like GATE, Engineering services, exit interviews etc.

13.6 HOW PROGRAM OUTCOMES ARE ASSESSED:

	Program Outcomes	Level	Proficiency assessed by
a	An ability to apply knowledge of computing, mathematical foundations, algorithmic principles, and computer science and engineering theory in the modeling and design of computer-based systems to real-world problems (fundamental engineering analysis skills)	H	Assignments Midterm and University examinations
b	An ability to design and conduct experiments, as well as to analyze and interpret data (information retrieval skills)	H	Assignments Midterm and University examinations
c	An ability to design , implement, and evaluate a computer-based system, process, component, or program to meet desired needs, within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability, and sustainability (Creative Skills)	S	Assignments Midterm and University examinations
d	An ability to function effectively on multi-disciplinary teams (team work)	N	--
e	An ability to analyze a problem, identify, formulate and use the appropriate computing and engineering requirements for obtaining its solution (engineering problem solving skills)	H	Assignments Midterm and University examinations
f	An understanding of professional, ethical, legal, security and social issues and responsibilities (professional integrity)	N	--
g	An ability to communicate effectively both in writing and orally (speaking / writing skills)	N	--
h	The broad education necessary to analyze the local and global impact of computing and engineering solutions on individuals, organizations, and society (engineering impact assessment skills)	N	--
i	Recognition of the need for, and an ability to engage in continuing professional development and life-long learning (continuing	H	Assignments Midterm and University examinations

	education awareness)		
j	A Knowledge of contemporary issues (social awareness)	N	--
k	An ability to use current techniques, skills, and tools necessary for computing and engineering practice (practical engineering analysis skills)	N	--
l	An ability to apply design and development principles in the construction of software and hardware systems of varying complexity (software hardware interface)	S	Assignments Midterm and University examinations
m	An ability to recognize the importance of professional development by pursuing postgraduate studies or face competitive examinations that offer challenging and rewarding careers in computing (successful career and immediate employment).	N	--

N=None S=Supportive H=Highly Related

13.7 JNTUH SYLLABUS:

Unit I

J2ME Overview

Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices

Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants

Unit II

J2ME Architecture and Development Environment

J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME Wireless Toolkit

Unit III

J2ME Best Practices and Patterns:

The Reality of Working in a J2ME World, Best Practices, Commands, Items, and Event Processing, J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling

Unit IV

High-Level Display:

Screens: Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class

Low-Level Display: Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation

Unit V**Record Management System**

Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener

Unit VI

JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages, Overview of the JDBC Process, Database Connection, statement Objects, Result set, Transaction Processing, Metadata, Data Types, Exceptions

Unit VII

JDBC and Embedded SQL: Model Programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Metadata, Updating Tables, Deleting Data from a Table, Joining Tables, Calculating Data, Grouping and Ordering Data, Subqueries, VIEWS

Unit VIII**Generic Connection Framework**

The Connection, Hypertext Transfer Protocol, Communication Management Using HTTP Commands, Session Management, Transmit as a Background Process

TEXT BOOK

1. J2ME: The Complete Reference, James Keogh, Tata McGrawHill.

REFERENCE BOOKS

1. Enterprise J2ME: Developing Mobile Java Applications – Michael Juntao Yuan, Pearson Education, 2004
2. Beginning Java ME Platform, Ray Rischpater, Apress, 2009
3. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li, Jonathan B. Knudsen, Apress, 2005
4. Kicking Butt with MIDP and MSA: Creating Great Mobile Applications, 1st edition, J. Knudsen, Pearson.

13.8 COURSE PLAN:

At the end of the course, the students are able to achieve the following Course Learning Outcomes.

Unit No.	Lecture No.	Course Outcomes	Topic	Text book
1	L1	Understands introduction of J2ME	Java 2 micro edition and world of java	T1
	L2	Understands introduction of J2ME	Java 2 micro edition and world of java	T1
	L3	Learns Inside J2ME	J2ME configurations, J2ME	T1

			Profiles	
	L4	Learns Inside J2ME	J2ME configurations,J2ME Profiles	T1
	L5	Introducing J2ME in small computing devices	J2me and wireless devices and small computing technology	T1
	L6	Understands Wireless technology	Wireless technology, radio data networks, micro wave technology	T1
	L7	Learns about Wireless devices and services	Mobile Radio networks ,Messaging, Personal digital Assistants	T1
2	L8	Understands Architecture of J2ME	J2ME Architecture	T1
	L9	Analyzes run time environment of J2ME	Small computing device requirements, run time environment	T1
	L10	Introduction of Programming	MIDlet programming	T1
	L11	Learns about J2ME toolkit	Java language for J2me,J2me software development kits	T1
	L12	Understands execution of basic program	Hello world J2me style	T1
	L13	Learns executing multiple programs	Multiple MIDlets in a MIDlet suite	T1
	L14	Learns about J2ME software	J2me wireless tool kit	T1
3	L15	Understands best practices in J2ME	The reality of working in a J2me world,best practices,	T1
	L16	Learns about commands in J2ME program	Commands ,items ,event processing	T1
	L17	Understands about J2ME interfaces	J2me user interfaces,Highlevel,Low level interfaces	T1
	L18	Understands about Display class in J2ME	Display class, palm os emulator	T1

	L19	Learns about commands in J2ME	Command class, Command listener interface	T1
	L20	Learns about items in J2ME	Item class, Item state changed interface	T1
	L21	Understands about handling exceptions in J2ME	Exception handling, Exception types	T1
4	L22	Learns about High level Display interfaces in J2ME	Screen class, alert class	T1
	L23	Learns about High level Display interfaces in J2ME	Form class, item class	T1
	L24	Learns about High level Display interfaces in J2ME	List class, Text Box class, ticker class	T1
	L25	Learns about High level Display interfaces in J2ME	Low level display canvas	T1
	L26	Learns about High level Display interfaces in J2ME	User interactions ,graphics	T1
	L27	Learns about High level Display interfaces in J2ME	Clipping regions	T1
	L28	Learns doing animations in J2ME	Animations	T1
5	L29	Introduction of Record structure in J2ME	Record storage	T1
	L30	Learns writing and reading records in J2ME data base	Writing and Reading records	T1
	L31	Understands enumeration of records in data base	Record Enumeration Classes and example MIDLETS	T1
	L32	Learns sorting of records in Mobile data base	Sorting records	T1
	L33	Learns searching of multiple records in mobile database	Searching records	T1

	L34	Introduction of Record listener	Record listener Interface	T1
	L35	Introduction of Record listener	Record listener Interface	T1
6	L36	Introduction Of JDBC	The concept of JDBC	T1
	L37	Learns about different JDBC Driver types, and packages	JDBC driver types Type 1, Type 2, Type 3, Type 4, JDBC packages	T1
	L38	Understands JDBC execution process	Over view of JDBC process	T1
	L39	Learns JDBC connection process	Data base connection process	T1
	L40	Understands objects in j2me database	Statement objects ,Result set	T1
	L41	Learns transaction processing in j2me data base	Transaction processing, metadata	T1
	L42	Learns data types used in j2me data base, and exception occurs in that.	Data types ,Exceptions	T1
7	L43	Learns merging JDBC and SQL	JDBC and Embedded SQL	T1
	L44	Understands types in J2ME data base programs	Model programs, tables	T1
	L45	Learns inserting data into tables	Inserting data into tables	T1
	L46	Learns retrieving data from the tables	Selecting data from table	T1
	L47	Learns updating data in the table	Meta data, updating tables	T1
	L48	Learns deletion of data from the table	Deleting data from table	T1
	L49	Learns about joining of multiple tables	Joining tables	T1

	L50	Learns Calculation values in the data	Calculating data,MIN.MAX,COUNT,SUM ,AVG	T1
	L51	Learns Grouping and ordering data in the table	Grouping and ordering data	T1
	L52	Introduction of Sub queries, VIEWS	Sub queries, VIEWS, creating views	T1
8	L53	Introduction of Framework in J2ME connection	Generation connection framework, connection	T1
	L54	Understand HTTP	Hyper text transfer protocol	T1
	L55	Learns managing HTTP commands	Communication management using HTTP commands, POST	T1
	L56	Introduction of sessions in Http connection	Session Management	T1
	L57	Learns back ground process of J2ME framework	Transmit as a Background Process	T1

13.9 MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES:

Course Objectives	Program Outcomes												
	a	b	c	d	e	f	g	h	i	j	k	l	m
I					H					S			
II			H				S						
III				H				S					
IV					S				H				
V			H								S		
VI					S							H	

S = Supportive

H = Highly Related

13.10 MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES:

Course Objectives	Program Outcomes												
	a	b	c	d	e	f	g	h	i	j	k	l	m
I					H					S			
II			H				S						
III				H				S					
IV					S				H				
V			H								S		
VI					S						H		

S = Supportive

H = Highly Related

13.11 OBJECTIVE QUESTIONS:

UNIT-I

1 which one is used to extend the range of radio transmission[]

- (a)transmitter (b)repeater.
(c)transceiver . (d) receiver.

Ans: B

2. In radio data networks erroneous radio signal is known as []

- a) amplitude modulation b) interference c) hand-off d) frequency modulation

ans:B

3. The USSD type of messaging transmits how many characters []

- a)160 characters b) 180 characters c) 93 characters d) 120 characters

ans: b

4. PDA uses _____type of RAM []

- a) SDRAM b) DRAM c) EDO d) All

ans:d

5. what is the range of microwaves in electromagnetic spectrum []

- a)10 ^2 to 10^4 b) 10^6 to 10^8 c) 10^8 to 10^12 d)10^14 to 10^16

ans:c

6. Which of the following statements is true about Java ME []

- a)Java ME is a single specification. b)Java ME is a family of related specifications.

- c) Java ME is a platform for creating applications for the well-established desktop market.
 d) Java ME is a platform for creating server-side enterprise applications

ans: b

7. The RMI profile is meant to be used with [b]

- a) CLDC and MIDP b) CDC and Foundation c) Both A and B d) none

8. which profile is used in java wireless applications []

- a) MIDP b) Foundation profile c) Game profile d) Personal profile

ans: a

9. What is a configuration []

- a) configuration defines a set of class libraries available for a particular domain of devices.

- b) configuration defines a vertical (or specialized) set of classes.

- c) configuration defines a minimum set of class libraries for a wide range of devices.

- d) All of the above

ans: b

UNIT-II

1. What is the minimum display size to run J2ME application _____

- A) 96*54 b) 54*96 c) 73*56 d) 69*45

Ans: A

2. Group of MIDlet is called _____

- a) midlet suite b) midlet group c) midlet manager d) Application manager

3. _____ calls the methods of MIDlet

- a) application manager b) server c) client d) midlet

4. What is JAD _____

- a) java application descriptor b) manifest file c) xml file d) none

5. In J2ME architecture _____ supplies the classes and applications

- a) OEM b) JVM c) KVM d) none

6. _____ of non-volatile memory required to run MIDlet

- a) 32kb b) 64kb c) 128kb d) 256kb

7. JAD file, JAR file, manifest file saved in _____ folder

- a) bin b) src c) res d) classes

8. _____ of volatile memory is used to run JVM

- a) 16kb b) 32kb c) 64kb d) 128kb

9. _____ is used to run MIDP in small computing device.

- a) application manager b) server c) client d) emulator

10. MIDlet- Version attribute describes _____

UNIT-III

1. _____ which one is the limitation of the small computing device over desktop computer.

- A. no secondary storage.

- B. Data transmission is slow.

- C. network connection is slow.

- D. above all.

2. What is best practices _____.

- A. problem solving techniques

- B. proven and design techniques to build j2me application

C..both a and b

D. none

ANSWER: B

3. What is patterns_____.

A. routines that solve common programming problems

B. proven and design techniques to build j2me application

C..both a and b

D. none

ANSWER: A

4. What is the best practice to keep application simple _____ .

A. combine the midlets

B. divide the application into parts.

C. A or B

D. none

ANSWER: B

5. What is the best practice to limit the usage of memory_____ .

A. use object data types instead of scalar types.

B. reuse the data

C.use constant data types

D. none

ANSWER: A

6. In j2me every String is terminated with _____ .

A. space.

B. null

C. 0

D. none

7. The command class constructor contains _____parameters.

(A) command type (B) command label(C) priority (D)All

ANSWER: D

8.which one is not a command types

(A)ok(B)exit (C) menu (D) help

ANSWER: C

9. In command action method contains ____parameters

(A) 1 (B)3(C) 2 (D)4

ANSWER: C

10. _____method is used to determine the color of device

(A)Boolean is color() (B)is numcolors()(C)is checkcolor() (D) None

ANSWER: C

UNIT-IV

1.In which approach, cache content information of the client is not maintained by the server []

A) Stateful approach B) Stateless approach

C) Stateful synchronous D) Stateful asynchronous

ANSWER: B

2.In which state specifies the particular record is valid only for respective Mobile device and no other device can access it. []

A) modified state B) shared state C) exclusive state D) Invalidated state

ANSWER: C

3. At which of the following, the server has no information regarding the present state of data records. []

(A) Synchronous (B) Asynchronous (C) stateful (D) stateless

ANSWER: D

4. A _____ is the smallest logical unit of single broadcast []

(A) data (B) unit (C) Bucket (D) All

ANSWER: C

5. Optimized TCP protocol for mobile hosts []

(A) Snoop TCP (B) I-TCP (C) Both A&B (D) None

ANSWER: B

6. _____-TCP uses standard TCP over the wireless link

(A) Snoop TCP (B) Indirect-TCP (C) Both A&B (D) None

ANSWER: B

7. Packets are _____ between the SGSN and the mobile node

(A) Tunneled (B) TunnedTCP (C) Both A&B (D) None

ANSWER: A

8. Selecting Tuning methods for _____ broadcast are not directly applicable for non-flat broadcast []

(A) Flat (B) skewed (C) segment (D) None

ANSWER: A

9. Which of the following communication is a special case of broadcasting which corresponds to unidirectional []

(A) Unicast (B) multicast (C) bidirectional (D) multidirectional

ANSWER: A

10. The advantage of hoarding is that there is no access _____

(A) data rate (B) latency (C) transmission (D) None

ANSWER: B

UNIT-V

1. In which property in the database, that all transactions are executed independently without any interference of other

(A) Atomicity (B) Consistency (C) Isolation (D) Durability

ANSWER: C

2. At which of the following, the server has no information regarding the present state of data records. []

(A) Synchronous (B) Asynchronous (C) stateful (D) stateless

ANSWER: D

3. The non-flat broadcast program without _____ is also used as a reference []

(A) segment (B) tuning (C) index (D) All

ANSWER: C

4. Which of the following means to the coming back to needed state from a failure? []

(A) Recovery (B) issues (C) roll back (D) storage back

ANSWER: A

5. Which of the following indexing scheme splits a sorted list of objects into equal-sized segments, and provides indexes to navigate through the segments []

(A) Flexible (B) tree-based (C) (1,m) (D) None

ANSWER: A

6. Databases store data in a particular _____ manner
A) Digital (B) Logical (C) index (D) All

ANSWER: B

7. Difficult to ensure Quality of Service (QoS) is the Limitation of _____ []
(A) heterogeneity of fragmented networks (B) Frequent Disconnections
(C) Communication Bandwidth (D) All

ANSWER: C

8. Which of the following Architecture recommend the databases residing at the remote servers and the copies of these databases are cached at the client tiers? []
(A)One-tier computing (B)Two-tier computing (C)Three-tier computing (D)None

ANSWER: B

9. An uplink request sent by the client is called as _____ []
(A) Roll back process (B) Query (C) Retrieval (D) Contextual service

ANSWER: B

10. The process of isolating data from outside interference is one of the main advantages of _____ []
(A) Query (B) data base management system (C) transaction (D) Roll back

ANSWER: C

UNIT-VI

1. Optimal push scheduling is used to []
A) Minimize access latency B) Maximize access latency
C) To access latency D) Active access latency

ANSWER: A

2. In which mechanism user makes an explicit request for the data []
A) Push-based B) Pull-based C) Hybrid D) None

ANSWER: B

3. Which of the following protocol can allow for substantially better message delivery ratios in scientific community []
(A) Replication-based (B) forwarding-based (C) Rule-based (D) All

ANSWER: A

4. Flat board is a _____ based scheduling method. []
(A) Data scheduling (B) push (C) pull (D) in query

ANSWER: B

5. The optimal scheduling types are a _____ based mechanisms []
(A) pull (B) push (C) hybrid (D) none of these

ANSWER: B

6. Which of the following mechanisms function such that the user-devices receive the data records sent by the server on demand []
(A) push-based (B) hybrid-based (C) pull-based (D) All

ANSWER: C

7. Which of the following is a mobile OS developed by Nokia, based on Debian Linux []
(A) Maemo (B) WebOS (C) Bada (D) LiMo

ANSWER: A

8. Data dissemination means transmission of records from a _____
(A) Client (B) Server (C) both (D) All

ANSWER: B

9. The _____ applications must not maintain low QoS when it has abundant resources

- (A) Client (B) Server (C) MC (D) All

ANSWER: C

10. Data synchronization is defined as the process of maintaining the availability of data from _____ and maintaining consistency

- (A) Source (B) Destination (C) Both (D) None

ANSWER: B**UNIT- VII**

1. In MANETS, the number of routers may []

- A) Increase only B) Decrease only
C) Increase or Decrease D) No routers

ANSWER: B

2. The process of deletion of link shown by routing table or route-cache is called []

- (A) Destination (B) link reversal (C) direct reversal (D) None

ANSWER: B

3. AODV is a reactive _____

- (A) Proactive measure (B) Protocol (C) Session (D) None

ANSWER: B

4. A _____ is the smallest logical unit of single broadcast []

- (A) data (B) unit (C) Bucket (D) All

ANSWER: C

5. Which of the following indexing scheme splits a sorted list of objects into equal-sized segments, and provides indexes to navigate through the segments []

- (A) Flexible (B) tree-based (C) (1,m) (D) None

ANSWER: A

6. Expand DMS _____

- (A) Dynamic Memory System (B) Discovery and Management system (C) Dick Management System (D) none

ANSWER: B

7. Servlet is a program running on a _____ which has a life cycle

- (A) Web Server (B) tree-based (C) Web Client (D) None

ANSWER: A

8. Middleware services that _____ the handset to the MMS server and then deliver the MMS services to the users.

- (A) InterDependent (B) Inter Connect (C) Complex (D) None

ANSWER: B

9. Routing protocols that never replicate a message are considered _____-based

- (A) Forwarding (B) Securing (C) Complex (D) None

ANSWER: A

10. Self-_____ means establishing and modifying the route information for the connections by a system on its own

- (A) Forwarding (B) Securing (C) Configuring (D) None

ANSWER: B**UNIT- VIII**

1. _____ offers source and destination port numbers used for multiplexing and demultiplexing of data respectively.

- A. WAP.
- B. WDP.
- C. WCMP.
- D. WTLS.

ANSWER: B

2. Using _____ a mobile phone can be connected to a PDA or laptop.

- A. wired.
- B. wireless piconets.
- C. wireless WAN.
- D. wireless MAN

ANSWER: B

3. _____ handles access to and interaction with mobile telephone system.

- A. WML user agent.
- B. WTA user agent.
- C. WAP gateway.
- D. WML gateway

ANSWER: B

4. Upto how many parked slaves can allow in one piconet.

- A) 100 B) 10 C) 8 D) 255

ANSWER: D

5. In XML, which parser provides high performance []

- A) SAX B) DOM C) Both D) DTD

ANSWER: A

6. Which protocol in digital audio broadcasting to support data formats used in other multimedia systems []

- A) HTTP B) MOT C) SMTP D) FTP

ANSWER: B

7. Which of the following means a standardized agreed-upon subset and an interpretation of a specification []

- (A) MIDP (B) profile (C) J2ME (D) None

ANSWER: B

8. Bluetooth comes under the following Network Technology []

- (A) VoIP (B) Personal area network (PAN) (C) Wireless personal area network (D) None

ANSWER: C

9. Which of the following means a standardized agreed-upon subset and an interpretation of a specification []

- (A) MIDP (B) profile (C) J2ME (D) None

ANSWER: B

10. Which of the following protocol can allow for substantially better message delivery ratios in scientific community []

- (A) Replication-based (B) forwarding-based (C) Rule-based (D) All

ANSWER: A

13. 12 TUTORIAL QUESTIONS:

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-I Tutorial Questions			
1	List the three types of RAMs of used in PDA's?	Remember	A
2	Describe the challenges facing by Mobile small computing Industry?	Understand	E
3	Illustrate the different type of messaging services offered by Cellular Telephone Companies.	Apply	C
4	Describe commonly used operating systems for smart cards?	Understand	C

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-II Tutorial Questions			
1	List the three types of RAMs of used in PDA's?	Remember	A
2	Describe the challenges facing by Mobile small computing Industry?	Understand	E
3	Illustrate the different type of messaging services offered by Cellular Telephone Companies.	Apply	C
4	Describe commonly used operating systems for smart cards?	Understand	C

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-III Tutorial Questions			
1	Differentiate the Manifest file and the Java Descriptor file	Understand	A
2	Differentiate the Java Archive file and the Java Descriptor file	Understand	A
3	Illustrate with example how to handle exceptions in J2ME?	Apply	D
4	Explain about Command Listener Interface with example?	Understand	E

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-IV Tutorial Questions			
1	Develop a program to draw outlined rectangles?	Apply	F
2	Develop a J2ME program to draw an ARC	Apply	F
3	Illustrate with example canvas class	Apply	F
4	Describe about how to create Animation in J2ME	Understand	G

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-V Tutorial Questions			
1	Develop a program to create a Record Store?	Apply	G
2	Develop a program to open a Record Store?	Apply	G
3	Develop a program to reading data from Record Store?	Apply	G
4	Develop a program to writing data to Record Store?	Apply	G

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VI Tutorial Questions			
1	Illustrate with example transaction statement?	Apply	E
2	Illustrate with example prepared statement?	Apply	E
3	Illustrate with example Result Set?	Apply	E
4	Show the process of JDBC Connection?	Apply	G

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VII Tutorial Questions			
1	Write the sample code to insert a Timestamp into a	Apply	G
2	Write a program to join two tables	Apply	F
3	Write a program to retrieve data from database	Apply	E

4	Write a program to implement Create constraints	Apply	F
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Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VIII Tutorial Questions			
1	Develop a program to implement to write to a file?	Apply	D
2	Develop a program reading to writing from a socket connection?	Apply	D
3	Explain the components of HHTP request to communicate through Socket	Understand	E
4	Explain about three methods of HTTP requests	Understand	E

13. 13 ASSIGNMENT QUESTIONS:

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-I Assignments Questions			
1	Explain the configuration of J2ME?	Understand	E
2	List J2ME profiles.	Remember	A
3	Explain the limitations of J2ME?	Understand	E
4	Differentiate CDC and CLDC Configurations in terms if their implementations.	Understand	E

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-II Assignments Questions			
1	Explain the configuration of J2ME?	Understand	E
2	List J2ME profiles.	Remember	A
3	Explain the limitations of J2ME?	Understand	E
4	Differentiate CDC and CLDC Configurations in terms if their implementations.	Understand	E

Sl.No.	Questions	Blooms	Course
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		Taxonomy Level	Outcome
UNIT-III			
Assignments Questions			
1	Describe the Best practices are proven design and programming techniques used to build J2ME systems.	Understand	C
2	Show the good practice need to be invoked by J2ME application in order to minimize the Network traffic?	Apply	C
3	Illustrate about Palm OS Emulator	Apply	C
4	Explain about the following user interfaces a. Command based Interface b. Form based interface c. Canvas based interface	Understand	C

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-IV			
Assignments Questions			
1	Explain the steps to create a Alert Dialogue box?	Understand	E
2	Differentiate between mutable image and immutable image?	Understand	E
3	Differentiate between String and String Item?	Understand	E
4	Explain about Ticker Class with example?	Understand	E

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-V			
Assignments Questions			
1	Explain about Record Store Scope?	Understand	G
2	Describe Record Listener Interface?	Understand	F
3	Define Record Store?	Remember	G
4	Explain about Data types in Record Store?	Understand	G

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VI			
Assignments Questions			
1	List different types of drivers	Remember	E

2	Explain about Type1 driver with diagram	Understand	E
3	Differentiate between Type1 and Type2 drivers	Understand	E
4	Explain about Prepared Statements	Understand	E

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VII Assignments Questions			
1	Explain the various kinds of exceptions thrown by the JDBC methods. Explain the NullPointerException using an example	Understand	G
2	Explain the rules for VIEWS	Understand	G
3	Explain about Joining two tables	Understand	G
4	Explain about creating Index	Understand	G

Sl.No.	Questions	Blooms Taxonomy Level	Course Outcome
UNIT-VIII Assignments Questions			
1	Explain session management with example?	Understand	D
2	List and explain the commonly used header fields of HTTP request header.	Understand	D
3	Explain the drawback of HTTP? Explain the solution for the drawback of HTTP.	Understand	D
4	Differentiate between HTTP GET and POST methods	Understand	D

14 HUMAN COMPUTER INTERACTION

14.0 COURSE DESCRIPTION FORM

Course Title	HUMAN COMPUTER INTERACTION			
Course Code	57083			
Regulation	R13 – JNTUH			
Course Structure	Lectures	Tutorials	Practicals	Credits
	4	1	-	4
Course Coordinator	Ms. C. Bhanu Jyothi, Assistant Professor			

14.1 COURSE OVERVIEW:

This course explains the fundamental ideas behind the object oriented approach to programming. Knowledge of java helps to create the latest innovations in programming. Like the successful computer languages that came before, java is the blend of the best elements of its rich heritage combined with the innovative concepts required by its unique environment. This course involves OOP concepts, java basics, inheritance, polymorphism, interfaces, inner classes, packages, Exception handling, multithreading, collection framework, files, JDBC and GUI components. This course is presented to students by power point projections, course handouts, lecture notes, course handouts, assignments, objective and subjective tests.

14.2. PREREQUISITES

Level	Credits	Periods / Week	Prerequisites
UG	4	5	Engineering Workshop Practice

14.3. COURSE ASSESSMENT METHODS:

Session Marks (25M)	University End Exam Marks	Total Marks
Continuous Assessment Tests (Midterm tests): There shall be 2 midterm examinations. Each midterm examination consists of one objective paper, one subjective paper and four assignments. The objective	75	100

<p>paper is for 10 marks and subjective paper is for 10 marks, with duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for subjective paper). Objective paper is set for 20 bits of – multiple choice questions, fill-in the blanks, 10 marks. Subjective paper contains of 4 full questions (one from each unit) of which, the student has to answer 2 questions, each question carrying 5 marks. First midterm examination shall be conducted for 2.5 units of syllabus and second midterm examination shall be conducted for another 2.5 units. 5 marks are allocated for Assignments. First two assignments should be submitted before the conduct of the first mid, and the second two assignments should be submitted before the conduct of the second mid. The total marks secured by the student in each midterm examination are evaluated for 25 marks, and the average of the two midterm examinations shall be taken as the final marks secured by each candidate.</p>		
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14.4. EVALUATION SCHEME:

S. No	Component	Duration	Marks
1	I Mid Examination	80 minutes	20
2	I Assignment	-	05
3	II Mid Examination	80 minutes	20
4	II Assignment	-	05
5	External Examination	3 hours	75

COURSE OBJECTIVES:

1. The human components functions.
2. The Computer components functions.
3. The Interaction between the human and computer components.
4. Paradigms
5. Interaction design basics
6. HCI in the software process
7. Design rules
8. Implementation supports
9. Evaluation techniques
10. Universal design

14.5. COURSE OUTCOMES:

1. Explain the human components functions regarding interaction with computer
2. Explain Computer components functions regarding interaction with human
3. Demonstrate Understanding of Interaction between the human and computer components.
4. Use Paradigms
5. Implement Interaction design basics
6. Use HCI in the software process
7. Apply Design rules
8. Produce Implementation supports
9. Use Evaluation techniques
10. Demonstrate Universal design
11. Demonstrate User support

14.6 HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes		Level	Proficiency assessed by
A	Graduates will demonstrate the ability to use basic knowledge in mathematics, science and engineering and apply them to solve problems specific to mechanical engineering (Fundamental engineering analysis skills).	H	Assignments, Tutorials, Exams
B	Graduates will demonstrate the ability to design and conduct experiments, interpret and analyze data, and report results (Information retrieval skills).	S	Project work
C	Graduates will demonstrate the ability to design any mathematical system or thermal that meets desired specifications and requirements (Creative skills).	S	Assignments, Tutorials, Exams
D	Graduates will demonstrate the ability to function as a coherent unit in multidisciplinary design teams, and deliver results through collaborative research (Teamwork).	S	Project work
E	Graduates will demonstrate the ability to identify, formulate and solve mechanical engineering problems of a complex kind (Engineering problem solving skills).	H	Assignments, Exams
F	Graduates will demonstrate an understanding of their professional and ethical responsibilities, and use technology for the benefit of mankind (Professional integrity).	H	Assignments, Tutorials,
G	Graduates will be able to communicate effectively in both verbal and written forms (Speaking / writing skills).	S	--
H	Graduates will have the confidence to apply engineering solutions in global and national contexts (Engineering impact assessment skills).	H	Assignments, Tutorials,
I	Graduates should be capable of self-education and	H	Assignments,

	clearly understand the value of life-long learning (Continuing education awareness).		Tutorials,
J	Graduates will develop an open mind and have an understanding of the impact of engineering on society and demonstrate awareness of contemporary issues (Social awareness).	S	--
K	Graduates will be familiar with applying software methods and modern computer tools to analyze mechanical engineering problems (Software hardware interface).	H	--
L	Graduates will have the ability to recognize the importance of professional development by pursuing post graduate studies or face competitive examinations that offer challenging and rewarding careers in Mechanical Engineering (Successful career and immediate employment).	S	Gate exam, Job interviews
M	Graduate will be able to design a system to meet desired needs within environmental, economic, political, ethical health and safety, manufacturability and management knowledge and techniques to estimate time, resources to complete project (Practical engineering analysis skills).	H	Assignments, Tutorials, Exams

N = None

S = Supportive

H = Highly Related

14.7. SYLLABUS

UNIT – I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

UNIT - II

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT - III

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business junctions.

UNIT - IV

Screen Designing : Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT - V

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

UNIT - VI

Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT - VII

Software tools – Specification methods, interface – Building Tools.

UNIT - VIII

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

REFERENCES:

1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOARD, RUSSELL BEALG, PEARSON.
2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech,
3. User Interface Design, Soren Lauesen , Pearson Education.
4. Human – Computer Interaction D. R. Olsen, Cengage Learning.
5. Human – Computer Interaction, smith – Atakan, Cengage Learning.

14.8. COURSE PLAN:

At the end of the course, the students are able to achieve the following course learning outcomes. (The course plan is meant as a guide line. There may probably be changes.)

Lecture	Course Learning Outcomes	Topics to be covered	Reference
1	Understand importance of user interface	Importance of user interface and its uses	T1
2-3	Explain definition, importance good design and benefits.	Importance, benefits and Definition of good design ,	T1, R2
4	Design the history of screen design	History of screen design and its uses	T1, R2
5-6	Outline the popularity of graphics and the concept of direct manipulation	Concept of direct manipulation and the popularity of graphics	T1

7	Explain graphical system of user interface.	User interface graphical system.	T1
8	Outline characteristics of user interface	Uses of user interface and its characteristics	T1
9-10	Explain the characteristics of web user interface.	Characteristics of web interface and its uses	T1, R2
11	Construct principles of user interface	Principles of user interface	T1
12	Define human considerations in design process	Design process, human consideration in design process	T1, R2
13-16	Analyze importance of human characteristics	Human characteristics importance	T1,R2
17-19	Classify human interaction speed in design process	Human interaction speed in design process, interaction with human	T1, R2
20-22	Examine understanding business junctions in design process	Business junctions in design process	T1, R2
22-24	Explain screen planning, purpose for design goals and organizing screen elements	Definition of screen planning and organizing of screen elements	T1
25-27	Define ordering of screen data and content in screen designing	Screen data, ordering of screen data and content in screen design	T1, R2
28-30	Explain screen navigation and flow	Screen navigation and flow of screen navigation	T1
31-33	Point out different types of statistical graphs in detail	Statistical graph, Different types of statistical graph	T1

34-35	Prepare the flow of screen navigation	Screen navigation and flow of it	T1
36-37	Explain about visually pleasing composition.	Visually pleasing composition	T1, R2
38-39	Prepare how to organizing screen elements	Organizing the screen elements	T1
40-41	Explain typography and different fonts and families	Typography and different font and families of it	T1, R2
42	Analyze how to retrieve the information from web	Retrieving the information for web	T1,R2
43-44	Explain Windows characteristics	Uses and Characteristics of windows	T1, R2
45	Use navigation schemes for a window	How to use scheme navigation	T1, R2
46-47	Construct the selection of devices based on a screen	Selection of device based on screen usage	T1
48	Arrange characteristics of device-based controls	Uses and characteristics of device – based control	T1
49-50	Explain the characteristics of text	Uses and characteristics of text and messages of a component	T1
51	Point out different types of icons and definition of it	Different types of icons and its usage	T1, R2
52-53	Explain how to choose right color in multimedia	Multimedia, choosing right color in multimedia	T1
54-55	Understand characteristics of interface building tools of software tools	Characteristics of interface building tools of software tools	T1

56	Explain specification methods for software tools	Uses and specifications methods for software tools	T1, R2
57	Explain about the Building blocks	Building blocks	T1
58-59	Point out the various functional keys	Functional keys, various types of functional keys	T1, R2
60	Critique in detail about speech recognition digitization	Speech recognition digitization and its uses	T1
61	Prepare more about the images and video display devices	Images display devices and speech display devices	T1, R2

14.9 MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES

Course Objectives	Program Outcomes													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
I	S										S			
II		S						S			H			
III		H		S	S							H		
IV			H					S					S	
V	S			H					S					
VI					H								H	
VII			S					S					H	

VIII	S			S			H							S
IX				H					H				H	

14.10. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES

Course Objectives	Program Outcomes													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
I	S										S			
II		S						S			H			
III		H		S	S							H		
IV			H					S					S	
V	S			H					S					
VI					H								H	
VII			S				S						H	
VIII	S			S			H							S
IX				H					H				H	

S = Supportive

H = Highly Related

14.11 OBJECTIVE QUESTIONS

UNIT-I

1. People and computer work together are satisfied in the most effective way is **Human computer interaction**.
2. The **User Interface** is the part of a computer and its software that people can understand.
3. The modified screens completed the transactions in **25**percent less time with **25**percent fewer error than those used the original screens.

4. **User Memory** was supported by providing clear and meaning full field captions and by listing commands on the screen.
5. **Input** and **output** are the two essential components required in user interface. **Ans:**
6. Developers producing almost **identical** screens for similar applications and functions for many years.
7. In terms of university and complexity the higher level of communication mode is **system language**.
8. The third and highest level of complexity is **written language**.
9. 20 extra seconds in screen usage time adds an additional **14 person year**.
10. **Good designing** minimizes the training costs due to less training time.
11. In which year MIT introduced graphics with sketch pad program? **[a]**
(a) 1963 (b) 1953 (c) 1965 (d) 1962
12. Human computer interaction is the _____ of the people and computers work together. **[b]**
(a) study, learning and design (b) study, planning and design
(c) Planning, practice and design (d) Planning, learning and design
13. In 1969 the internet, then known as ARPANET was brought on line, connecting the computers at _____ major universities. **[c]**
(a) Five (b) Two (c) Four (d) Six
14. In 1962 _____ begin. **[d]**
(a) Internet (b) Intranet (c) Extranet (d) ARPANET
15. Who proposed global network of computers? **[a]**
(a) J C R Weklider (b) JBK Welider (c) BDR Weklider (d) ABC Welider
16. User interface design is a subset of a field of study called _____. **[c]**
(a) BCI (b) DCI (c) HCI (d) GCI
17. Who proposed an alternative to the type writer? **[b]**
(a) Xerox Palo Alto Copy center (b) Xerox Palo Alto Research center
(b) Xerox Palo Alto Weklider center (d) Xerox Palo Alto Star center
18. In which year Delphi was released? **[b]**
(a) 1990 (b) 1992 (c) 1991 (d) 1995
19. Who introduced the mouse and pointers and selecting as the primary human- computer communication method? **[c]**
(a) Altus and Palto (b) Palto and star (c) Altus and star (d) None of the above
20. The first commercial version of ARPANET was _____. **[d]**
(a) Internet (b) Dellnet (c) Binet (d) Telnet

UNIT-II

1. Objective are always visible t the user, user can perform operations on objects called **actions**.
2. The graphical system interface to **reducethe** memory requirements imposed on the user.
3. Screen navigation and commands are executed through **menu bars** and **pull down**.
4. **Web interface** design is essentially the design of navigation and presentation of information.
5. The object action approach permits people to **equalizethe** visibility of the operating system.
6. The web is a **navigation** environment where people move between pages of information.
7. **Extranet** is used to access the web pages from the outside of an organization.
8. Page readability is diminished by poor developer choices is **colorsand graphics**.

-
9. **Indirect manipulations** substitutes words and text for symbols and substitutes typing for pointing.
 10. In graphics system the window handling and manipulation times are still **excessive** and **repetitive**.
 11. _____ is one of the direct manipulation characteristics. [a]
 - (a) Continuous visibility of objects and actions.
 - (b) Continuous visibility of objects and spaces.
 - (c) Discrete visibility of objects and spaces.
 - (d) Discrete visibility of objects and actions.
 12. The result of actions furthering user goals can be seen immediately means. [c]
 - (a) Immediate goals (b) Immediate actions (c) Immediate feedback (d) All the above
 13. The _____ text editors possess similar characteristics of direct manipulation. [b]
 - (a) Short screen (b) Full screen (c) Half screen (d) Side screen
 14. When the expansion of the World Wide Web has been truly amazed. [d]
 - (a) 1991 (b) 1992 (c) 1993 (d) 1990
 15. Which of the following are the objective measures of usability? [b]
 - (a) Attributes and testing (b) Flexible and attributes
 - (c) Attributes and attributes (d) Flexible and compatible
 16. The count of the organization can be known by [c]
 - (a) Extranet users (b) Internet users (c) Intranet users (d) None of the above
 17. Which of the following is not a design goal in user interface design? [d]
 - (a) Reliability (b) Difficulty (c) Compatibility (d) Scalability
 18. The screen with a mouse to locate [a]
 - (a) Objects (b) Spaces (c) Actions (d) Elements
 19. Proto typing and testing applied to product in order to _____. [c]
 - (a) Currentness (b) Easy access (c) Identify problems (d) Task knowledge
 20. Compared to web pages, response time in GUI system is _____. [d]
 - (a) Unstable (b) Reliable (c) Compatible (d) Stable

UNIT-III

1. Additional actions are performed in **compensatory activity** to compensate for system inadequacies.
2. **Mental mode** is in internal representation of a person understands.
3. Understanding of the elements through physical sensation of senses is known as **perception**.
4. **Sensory storage** is the buffer where the automatic processing of information collected from our senses takes places.
5. The capacity of the eye to resolve details called **visual activity**.
6. Requirements and user activities are described through **task analysis**.
7. **Metaphor** is a concept where one's body of knowledge is used to understand something else.
8. There is a myth that **simply designs** always know everything that user want and need.
9. Design standard is valuable to developers because they **simply design**.
10. System performances are **indirectly proportional** to disabilities.
11. The same action may have different names results in _____. [c]
 - (a) Design consistency (b) Peripheral consistency
 - (b) Design inconsistency (d) Peripheral inconsistency
12. Things that can be touched are placed in. [a]

- (a) Concrete objects (b) Discrete objects
 (b) Concrete spaces (d) Discrete spaces
13. Which type of users more attention to low level details?[b]
 (a) Experts (b) Novices (c) Good (d) Begginess
14. Which of the following is not a consideration in job consideration?[c]
 (a) Testing experience (b) Task analysis (c) Task experience (d) None of the above
15. Systems training will not be based on,[d]
 (a) User experience (b) Designer needs (c) Logical needs (d) Developer needs
16. Verbal discussion is conducted in _____.[a]
 (a) User interface prototyping (b) Graphical users interface
 (c) Human computer interface (d) None of the above
17. The designer can't really believe that any user is incapable of _____.[b]
 (a) Developing a system (b) Using a system
 (c) Understanding the configuration (d) None of the above
18. The time to acquire a target is a function of distance to size of the target. This law is known as
 _____.[c]
 (a) Ohm's law (b) Anti fit's law (c) Fit's law (d) Acuity law
19. Reading is not effected by _____.[d]
 (a) Words of the text (b) Format of the text (c) Type of the text (d) Length of the text
20. _____ is not a direct method in requirement analysis.[b]
 (a) Screen survey (b) Paper survey (c) Strength survey (d) Task survey
1. Grouping can be done by using **white, space** and **border back ground**.
 2. The **poor design** can be well explained by comparing it with a good screen.
 3. Uniformity highly enhances **visual scanning** and **user activity** in website designing which also promotes the location of user.
 4. **Stability** refers to equilibrium or stabilization where the design elements have the same weights from left to right, top to bottom.
 5. The **elements** on the screen must be clear and understand by the user of all ages.\
 6. The amount of data that passes through a communication channel is referred to as **bandwidth**.
 7. The product designed must primarily be **entertaining, enjoyable, pleasing** and **information**.
 8. Replacing elements left and right of the screen center line is called as **symmetry**.
 9. **Economy** is used sensibly and cautiously while display items to obtain the message as simple as possible.
 10. A **grid** contains no information's and carries noise that distracts the attention from the data.

UNIT – V

1. A window is presented to seek the user input or request an action to be performed is called as **single menus**.
2. **Verbal linkage** provides a listing of choices made on previous menu, on the current menu screen.
3. A cascading menu is a sub menu derived from a **high-level menu**.
4. Multiple web screen boxes that permit the displaying of multiple documents on a page are called as **frames**.

5. **Operable controls** are those that permit the entry, selection, changing, or editing of a particular value, or cause a command to be performed.
6. A window can be split into two or more separate viewing areas called **boxes**.
7. **Track ball** yields poor performance for both pointing and dragging.
8. A rectangle box into which information is typed is called as **entry field**.
9. **Balloon trip** provides the additions descriptive or status information about a screen element.
10. Proper controls will enable a person to make **needed selections, entries and changes quickly, efficiently** and with fewer mistakes.

UNIT – VI

1. A message describing an erroneous situation is presented as **critical** message.
 2. **Instructional messages** provide instructional information at the depth of detail.
 3. The symbols chosen must be visually distinguishable from other symbols is called as **discriminatively**.
 4. **Pragmatics** refers how the icon's are physically produced and depicted.
 5. Style will affect the **readability** and **comprehensibility** of the text.
 6. Is a message requires no choice to be made but only acknowledgment then it includes **O. K. button**
 7. **Non terminals** acquire values during passing for use by other parties and therefore error handling rules can be easily included.
 8. Combining mediums thoroughly test all graphics but not for **downloading**.
 9. Selective parts need to be emphasized or represented is an advantage of **drawings**.
 10. **GIF** format was developed for presenting photographs.
11. Words that can be understand better and faster are _____.[b]
(a) Positive words (b) Complete words
 12. An image that looks like what it means is _____.[d]
(a) Symbolic (b)Execupliar (c) Arbitrary (d) Resemblance
 13. A sign that was caused by the thing to which it refers is called as _____.[a]
(a) Index (b) Symbol (c) Icon (d) Message
 14. _____ messages offer a choice of options for selection.[c]
(a) Critical (b) System (c) Questions (d) Warning
 15. _____ refers to an icons physical structure.[c]
(a) Semantics (b) Pragmatics (c) Syntactic (d) style
A green deficiency is called as
 16. _____.[b]
(a) Dithering (b) Pragmatics (c) Syntactic (d) Style
 17. The blue color has meaning for health care professional as,[c]
(a) Cheer (b) Active (c) Death (d) Style
 18. Which of the following is not a classification of graphics[d]

- (a) Navigation (b) Representation (c) Explanative (d) View
 Microsoft offers a number of predefined schemes such as
19. _____.[b]
 (a) Arcks (b) Arisona (c) Avisone (d) Bruent
 The range of colors on RGB scale mid range background color for three dimensional
20. look is
 _____.[b]
 (a) 15 -160 (b) 155 – 175 (c) 165 – 175 (d) 165 - 185

UNIT – VII

1. **User action notations** are helpful in characterizing user behavior and some aspects of system responses.
2. In computer programming, **backus-naur form** is often used to describe programming languages.
3. A **menu selection tree** is an excellent selection style because of its simple structure.
4. Transition diagram has a set of **nodes** the represents system states and set of **links** between the nodes representing possible transitions.
5. The output of transaction diagram is **textual** in nature.
6. **Concurrency** and **synchronization** are represented poorly by transition diagrams.
7. **Screen-transaction diagram** draw on the paper are an excellent means to provide an overview of the system.
8. The detailed specification of complete user interfaces requires **software tools**.
9. **Applets** are small program fragments that can be downloaded from a web page and executed on the users’ machine.
10. **Modularity** is possible if nodes are included with subgraph.

UNIT – VIII

1. The repetition occurs automatically with continued depression called as **typomatic**.
2. Many people managed to use keyboard with speed of up to **15 keystrokes/sec**.
3. The lift-off-strategy in a touch screen enables users to point at **single pixels**.
4. The **track point** is a small isometric joystick embedded in laptop keyboards.
5. The **task completion rate** of voice editor is less compared to keyboard editor.
6. **Dvorak layout** reduces finger travels distances by least one order of magnitude.
7. Voice mail technology follows **speech store** and **forward** approach.
8. **Discrete = word recognition** devices recognize individual words spoken by a specific person.
9. A **helmet mounted** display consist of a small partially silvered glass mounted on a helmet that lets users see **information** even while turning their heads
10. An alternative to the google and gloves approach is **boom**.
11. Enter key, shift key, CTRL key must be larger to allow _____

14.12. TUTORIAL QUESTIONS

S. No	Question	Blooms Taxonomy Level	Course Outcome
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UNIT - I			
1	Explain what is meant by good user interface? Discuss its importance	Create	6
2	Analyze user interface and explain the importance of user interface?	Analyze	4
3	Outline the challenges of User Interface Design?	Analyze	4
4	Demonstrate the importance of User Interface Design with suitable	Apply	5
5	UID is very important element of software development. Justify?	Evaluate	5
6	Explain various types of screen design?	Create	6
UNIT – II			
1	Categorize advantages and disadvantages of graphical systems.	Evaluate	5
2	Illustrate with a suitable example how web-user interface is popular	Analyze	4
3	Demonstrate the Concept of direct manipulation?	Apply	3
4	Differentiate GUI and Web page design in detail.	Analyze	4
5	Compare contrast GUI verses Web Design?	Evaluate	5
6	Explain the general principle of Xerox STAR?	Create	6
UNIT – III			
1	Explain the design standards in detail?	Create	6
2	Does UI play any role in marketing a software product? Justify.	Evaluate	5
3	Point out the importance of human characteristics in design process	Analyze	4
4	Determine the User's tasks and needs? Explain	Evaluate	4

5	Explain how psychological physical responses will effects UI design?	Create	6
6	Infer about the speed of Human interaction.	Analyze	4

UNIT – IV

1	Explain about display/read-only screens.	Create	6
2	Is eye-navigation is important in screen design? Justify	Evaluate	5
3	Design how to present the information simply and meaningfully?	Create	6
4	Explain typography and different fonts and families?	Create	6
5	Analyze and how to retrieve the information from web?	Analyze	4
6	Prepare how to organizing screen elements	Apply	3

UNIT – V

1	Explain Windows characteristics?	Create	6
2	Design how to format on Menus? Explain	Create	6
3	Compare model and modeless in detail?	Evaluate	5
4	Point out the usage and guide lines of input devices?	Analyze	4
5	Design the text box and explain in detail about the text boxes	Create	6
6	Point out the components of website navigation?	Analyze	4
7	Explain different types of tool bars and define button?	Create	6

UNIT – VI

1	Illustrate how to choose right color in multimedia with suitable example.	Analyze	4
2	Point out different types of icons and definition of it.	Analyze	4
3	Infer about the text for Web pages.	Analyze	4
4	Generate data for choosing colors for statistical graphical screens.	Create	6

5	Differentiate advantages and disadvantages of interactive voice response.	Analyze	4
6	Design the use of text boxes and explain how to write in text box.	Create	6
7	Create a webpage and explain how to maintain the text and context for	Create	6
8	Explain the meaning of successful icon? How to choose icon images?	Create	6

UNIT – VII

1	Explain about the Building blocks	Create	6
2	Outline short notes on Technological considerations in interface design	Analyze	4
3	Criticize more about the characteristics of interface building tools.	Evaluate	5
4	Will different kinds of interface features are to be considered in choosing among user interface building tools? Justify .	Evaluate	5
5	Point out different types of pointing devices.	Analyze	4

UNIT – VIII

1	Summarize brief note on (a) Keys (b) Function keys	Create	6
2	Prepare more about the images and video display devices in detail	Apply	3
3	Critique in detail about speech recognition digitization.	Evaluate	5
4	Point out the various functional keys.	Analyze	4

14.13. ASSIGNMENT QUESTIONS

UNIT – I			
S. No.	Question	Blooms Taxonomy Level	Course Outcome
1	Illustrate the importance of good design with proper example and define HCI.	Analyze	
2	Explain the history of screen design.	Create	
3	Point out benefits of good design.	Analyze	
4	Prepare few points on chronological history of GUI.	Apply	

UNIT – II			
S. No.	Question	Blooms Taxonomy Level	Course Outcome
1	Explain the characteristics of Web interface.	Create	
2	Point out merits of graphical systems	Analyze	
3	Differentiate printed page verses Web page design	Analyze	
4	Show how manipulations are done from indirect to direct interface?	Apply	

UNIT – III			
S. No.	Question	Blooms Taxonomy Level	Course Outcome
1	Explain human considerations in design process?	Create	
2	Point out the requirement analysis of design process.	Analyze	

3	Assess how people interact with computer system	Evaluate	
4	Summarize in detail basic business functions in user interface design.	Create	

UNIT – IV			
S. No.	Question	Blooms Taxonomy Level	Course Outcome
1	Explain in detail about visually pleasing composition.	Create	
2	Prepare the flow of screen navigation and explain it.	Apply	
3	Outline the technological considerations of interface design	Analyze	
4	Point out different types of statistical graphs in detail	Analyze	

UNIT – V			
S. No.	Question	Blooms Taxonomy Level	Course Outcome
1	Explain about windows operations in brief	Create	
2	Determine the selection of proper device-based controls.	Evaluate	
3	Arrange characteristics of device-based controls?	Analyze	

UNIT – VI			
S. No.	Question	Blooms Taxonomy Level	Course Outcome
1	Design images, icons and graphics.	Analyze	

2	Prepare the possible problems of color, uses of it and definition of it.	Apply	
3	Point out the components of Multimedia	Analyze	
4	Explain the following with respect to Icons: (i)Types (ii)Characteristics (iii)Usability (iv)Choosing	Create	

UNIT –VII

S. No.	Question	Blooms Taxonomy Level	Course Outcome
1	Explain in detail about Backus-Naur Form (BNF) with examples	Create	
2	Specify the six main criteria for finding the right tool?	Create	
3	Compare and contrast various software tools of UID	Evaluate	

UNIT – VIII

S. No.	Question	Blooms Taxonomy Level	Course Outcome
1	Justify importance of functional keys for human interaction with the computer.	Create	
2	Propose any new methods of Discrete word recognition	Evaluate	
3	Explain about Direct-control pointing devices.	Create	

15. CASE TOOLS AND SOFTWARE TESTING LAB

The following experiments are required to be conducted as compulsory experiments :

S.NO	EXPERIMENT NO.	NAME OF THE EXPERIMENT
PART-A UNIFIED MODELING LANGUAGE		
1	1	Introduction of UML CLASS DIAGRAM FOR ATM
2	2	Use case diagram for ATM
3	3	Sequence diagram for ATM
4	4	Collaboration diagram for ATM
5	5	State chart diagram for ATM
6	6	Activity diagram for ATM
7	7	Component diagram
8	8	Deployment diagram for ATM
<u>PART-B-SOFTWARE TESTING</u>		
9	1	Write a programs in C language in demonstration the working of the following constructs i) do..while ii) while..do iii) if...else iv)switch v) for
10	2	—A program for written in C language for Matrix Multiplication fails introspect the causes for its failure and write down the possible reasons for its failure.
11	3	Take ATM system and study its system specifications and report various bugs.
12	4	Write the test cases for banking application

13	5	Create test plan document for library management system
14	6	Study of testing tool (e.g. winrunner)
15	7	Study of web testing tool (e.g. selenium)
16	8	Study of bug tracking tool (e.g. bugzilla)
17	9	Study of any test management tool (e.g. test director)
18	10	Study of any open source testing tool (e.g. test link)

16. MOBILE APPLICATION DEVELOPMENT LAB**16.1 LAB EXPERIMENTS**

S no	List of Programs As Per JNTU Syllabus
1	Installation of Java Wireless Toolkit (J2ME) and run sample program
2	Working with J2ME Features: lists, text boxes, buttons, radio boxes, soft buttons, graphics, etc
3	Working with Threads & High Level UI
4	Working on Drawing and Images
5	Developing Networked Applications using the Wireless Toolkit
6	Developing Authentication with a Web Server
7	Developing different Web Application using J2ME