

**ACADEMIC REGULATIONS
AND
COURSE STRUCTURE**
CHOICE BASED CREDIT SYSTEM
MLR17

COMPUTER SCIENCE & ENGINEERING
Master of Technology (M.Tech)

M. Tech. - Regular Two Year Degree Program
(For batches admitted from the academic year 2017 - 2018)



MLR Institute of Technology

(Autonomous)

Laxman Reddy Avenue, Dundigal, Quthbullapur (M),
Hyderabad – 500043, Telangana State

www.mlrit.ac.in Email: director@mlrinstitutions.ac.in

FOREWORD

The autonomy is conferred on MLR Institute of Technology by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own **curriculum, examination system and monitoring mechanism**, independent of the affiliating University but under its observance.

MLR Institute of Technology is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, if not improving upon the standards and ethics for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several expertise solicited from academics, industry and research, in accordance with the vision and mission of the college to order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought, at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the college and brighter prospects of engineering graduates.

PRINCIPAL

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M. Tech. - Regular Two Year Degree Program (For batches admitted from the academic year 2017 - 18)

For pursuing two year post graduate Masters Degree Programme of study in Engineering (M.Tech) offered by MLR Institute of Technology under Autonomous status and herein referred to as MLRIT (Autonomous):

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2017-18 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for MLR Institute of Technology (Autonomous).

All the rules and regulations, specified hereafter shall be read as a whole for the purpose of interpretation as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, the Principal, MLR Institute of Technology shall be the Chairman, Academic Council.

1. ADMISSION

Admission into first year of two year M. Tech. degree Program of study in Engineering:

Eligibility:

Admission to the above programme shall be made subject to eligibility, qualification and specialization as prescribed by the University from time to time.

Admissions shall be made on the basis of merit/rank obtained by the candidates at the qualifying Entrance Test conducted by the University or on the basis of any other order of merit as approved by the University, subject to reservations as laid down by the Govt. From time to time

2. AWARD OF M. Tech. DEGREE

A student shall be declared eligible for the award of the M. Tech. Degree, if he pursues a course of study in not less than two and not more than four academic years. However, he is permitted to write the examinations for two more years after two academic years of course work, failing which he shall forfeit his seat in M. Tech. programme.

The student shall register for all 90 credits and secure all the 90 credits.

The minimum instruction days in each semester are 90.

3. COURSES OF STUDY

The following specializations are offered at present for the M. Tech. programme of study.

1. Aerospace Engineering
2. CAD/CAM
3. Computer Science and Engineering
4. Digital Systems & Computer Electronics
5. Embedded Systems
6. Thermal Engineering

4. COURSE REGISTRATION

4.1 A 'Faculty Advisor or Counselor' shall be assigned to each student, who will advise him on the Post Graduate Programme (PGP), its Course Structure and Curriculum, Choice / Option for Subjects/ Courses, based on his competence, progress, pre-requisites and interest.

4.2 Academic Section of the College invites 'Registration Forms' from students within 15 days from the commencement of class work through 'ON-LINE SUBMISSIONS', ensuring 'DATE and TIME Stamping'. The ON-LINE Registration Requests for any 'CURRENT SEMESTER' shall be completed BEFORE the commencement of SEEs (Semester End Examinations) of the 'PRECEDING SEMESTER'.

4.3 A Student can apply for ON-LINE Registration, ONLY AFTER obtaining the 'WRITTEN APPROVAL' from his Faculty Advisor, which should be submitted to the College Academic

Section through the Head of Department (a copy of it being retained with Head of Department, Faculty Advisor and the Student).

- 4.4 If the Student submits ambiguous choices or multiple options or erroneous entries - during ON-LINE Registration for the Subject(s) / Course(s) under a given/ specified Course Group/ Category as listed in the Course Structure, only the first mentioned Subject/ Course in that Category will be taken into consideration.
- 4.5 Subject/ Course Options exercised through ON-LINE Registration are final and CANNOT be changed, nor can they be inter-changed; further, alternate choices will also not be considered. However, if the Subject/ Course that has already been listed for Registration (by the Head of Department) in a Semester could not be offered due to any unforeseen or unexpected reasons, then the Student shall be allowed to have alternate choice - either for a new Subject (subject to offering of such a Subject), or for another existing Subject (subject to availability of seats), which may be considered. Such alternate arrangements will be made by the Head of Department, with due notification and time-framed schedule, within the FIRST WEEK from the commencement of Class-work for that Semester.

5. ATTENDANCE

The programmes are offered on a unit basis with each subject being considered a unit.

- 5.1 Attendance in all classes (Lectures/Laboratories etc.) is compulsory. The minimum required attendance in each theory / Laboratory etc. is 75% including the days of attendance in sports, games, NCC and NSS activities for appearing for the End Semester examination. A student shall not be permitted to appear for the Semester End Examinations (SEE) if his attendance is less than 75%.
- 5.2 Condonation of shortage of attendance in each subject up to 10% (65% and above and below 75%) in each semester shall be granted by the College Academic Committee.
- 5.3 Shortage of Attendance below 65% in each subject shall not be condoned.
- 5.4 Students whose shortage of attendance is not condoned in any subject are not eligible to write their end semester examination of that subject and their registration shall stand cancelled.
- 5.5 A prescribed fee shall be payable towards condonation of shortage of attendance.
- 5.6 A Candidate shall put in a minimum required attendance at least three (3) theory subjects in I Year I semester for promoting to I Year II Semester. In order to qualify for the award of the M.Tech. Degree, the candidate shall complete all the academic requirements of the subjects, as per the course structure.
- 5.7 A student shall not be promoted to the next semester unless he satisfies the attendance requirement of the present Semester, as applicable. They may seek readmission into that semester when offered next. If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission in to the same class.

6. EVALUATION

The performance of the candidate in each semester shall be evaluated subject-wise, with a maximum of 100 marks for theory and 100 marks for practicals, on the basis of Internal Evaluation and End Semester Examination.

- For the theory subjects 70 marks shall be awarded for the performance in the Semester End Examination and 30 marks shall be awarded for Continuous Internal Evaluation (CIE). The Continuous Internal Evaluation shall be made based on the average of the marks secured in the two Mid Term-Examinations conducted, one in the middle of the Semester and the other, immediately after the completion of Semester instructions. Each mid-term examination shall be conducted for a total duration of 120 minutes.

Sessional Examinations

- Subjective Paper shall contain three questions. Question 1 & 2 with internal choice from unit-I, question 3 & 4 with internal choice from unit-II and question 5 having a, b

questions with internal choice from first half part of unit-III for I-MID examinations. For II-MID 1 & 2 questions from unit-4, questions 3 & 4 from unit-5 and question no 5 from remaining half part of unit-3. The first mid-term examination shall be conducted for the first 50% of the syllabus, and the second mid-term examination shall be conducted for the remaining 50% of the syllabus.

- The Semester End Examination will be conducted for 70 marks examination shall be conducted for a total duration of 180 minutes. Question paper consists of Part –A and Part-B with the following.
- Part-A is a compulsory question consisting of 5 questions, one from each unit and carries 4 marks each.
- Part-B to be answered 5 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

6.1 For practical subjects, 70 marks shall be awarded for performance in the Semester End Examinations and 30 marks shall be awarded for day-to-day performance as Internal Marks.

6.2 For conducting laboratory end examinations of all PG Programmes, one internal examiner and one external examiner are to be appointed by the Principal of the College and the same to be informed to the Chief Controller of Examination in two weeks before for commencement of the lab end examinations.

6.3 There shall be two seminar presentations during I year I semester and II semester. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the department in a report form and shall make an oral presentation before the Departmental Academic Committee consisting of Head of the Department, Supervisor and two other senior faculty members of the department. For each Seminar there will be only internal evaluation of 50 marks. A candidate has to secure a minimum of 50% of marks to be declared successful. If he fails to fulfill minimum marks, he has to reappear during the supplementary examinations.

6.4 There shall be a Comprehensive Viva-Voce in II year I Semester. The Comprehensive Viva-Voce is intended to assess the students' understanding of various subjects he has studied during the M. Tech. course of study. The Head of the Department shall be associated with the conduct of the Comprehensive Viva-Voce through a Committee. The Committee consisting of Head of the Department, one senior faculty member and an external examiner. The external examiner shall be appointed by the Chief Controller of Examinations. For this, the HOD of the department shall submit a panel of 3 examiners. There are no internal marks for the Comprehensive Viva-Voce and evaluates for maximum of 100 marks. A candidate has to secure a minimum of 50% of marks to be declared successful. If he fails to fulfill minimum marks, he has to reappear during the supplementary examinations.

6.5 A candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the Semester End Examination and a minimum aggregate of 50% of the total marks in the Semester End Examination and Continuous Internal Evaluation taken together.

6.6 In case the candidate does not secure the minimum academic requirement in any subject (as specified in 6.6) he has to re appear for the Semester End Examination in that subject.

6.7 A candidate shall be given one chance to re-register for the subjects if the internal marks secured by a candidate is less than 50% and failed in that subject for maximum of two subjects and should register within four weeks of commencement of the class work. In such a case, the candidate must re-register for the subjects and secure the required minimum attendance. The candidate's attendance in the re-registered subject(s) shall be calculated separately to decide upon his eligibility for writing the Semester End Examination in those subjects. In the event of the student taking another chance, his Continuous Internal Evaluation (internal) marks and Semester End Examination marks obtained in the previous attempt stands cancelled.

6.8 In case the candidate secures less than the required attendance in any subject, he shall not be permitted to write the Semester End Examination in that subject. He shall re-register for the subject when next offered.

7. EXAMINATIONS AND ASSESSMENT - THE GRADING SYSTEM

7.1 Marks will be awarded to indicate the performance of each student in each Theory Subject, or Lab/Practicals, or Seminar, or Project, etc., based on the % marks obtained in CIE + SEE (Continuous Internal Evaluation + Semester End Examination, both taken together) as specified in Item 6 above, and a corresponding Letter Grade shall be given.

7.2 As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades (UGC Guidelines) and corresponding percentage of marks shall be followed:

% of Marks Secured (Class Intervals)	Letter Grade (UGC Guidelines)	Grade Points
90% and above ($\geq 90\%$, $\leq 100\%$)	O (Outstanding)	10
Below 90% but not less than 80% ($\geq 80\%$, $< 90\%$)	A ⁺ (Excellent)	9
Below 80% but not less than 70% ($\geq 70\%$, $< 80\%$)	A (Very Good)	8
Below 70% but not less than 60% ($\geq 60\%$, $< 70\%$)	B ⁺ (Good)	7
Below 60% but not less than 50% ($\geq 50\%$, $< 60\%$)	B (above Average)	6
Below 50% but not less than 40% ($\geq 40\%$, $< 50\%$)	C (Average)	5
Below 40% ($< 40\%$)	F (FAIL)	0
Absent	AB	0

7.3 A student obtaining F Grade in any Subject shall be considered 'failed' and is required to reappear as 'Supplementary Candidate' in the Semester End Examination (SEE), as and when offered. In such cases, his Internal Marks (CIE Marks) in those Subjects will remain the same as those he obtained earlier.

7.4 A student not appeared for examination then 'AB' Grade will be allocated in any Subject shall be considered 'failed' and will be required to reappear as 'Supplementary Candidate' in the Semester End Examination (SEE), as and when offered.

7.5 A Letter Grade does not imply any specific Marks percentage and it will be the range of marks percentage.

7.6 In general, a student shall not be permitted to repeat any Subject/ Course (s) only for the sake of 'Grade Improvement' or 'SGPA / CGPA Improvement'.

7.7 A student earns Grade Point (GP) in each Subject/ Course, on the basis of the Letter Grade obtained by him in that Subject/ Course. The corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Subject / Course.

$$\text{Credit Points (CP)} = \text{Grade Point (GP)} \times \text{Credits} \dots \text{For a Course}$$

7.8 The Student passes the Subject/ Course only when he gets GP ≥ 6 (B Grade or above).

7.9 A student earns Grade Point (GP) in each Subject/ Course, on the basis of the Letter Grade obtained by him in that Subject/Course (excluding Mandatory non-credit Courses). Then the corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Subject/Course.

$$\text{Credit Points (CP)} = \text{Grade Point (GP)} \times \text{Credits} \dots \text{For a Course}$$

7.10 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (Σ CP) secured from ALL Subjects/ Courses registered in a Semester, by

the Total Number of Credits registered during that Semester. SGPA is rounded off to TWO Decimal Places. SGPA is thus computed as

$$\text{SGPA} = \{ \sum_{i=1}^N C_i G_i \} / \{ \sum_{i=1}^N C_i \} \dots \text{ For each Semester,}$$

where 'i' is the Subject indicator index (takes into account all Subjects in a Semester), 'N' is the no. of Subjects 'REGISTERED' for the Semester (as specifically required and listed under the Course Structure of the parent Department), C_i is the no. of Credits allotted to that ix Subject, and G_i represents the Grade Points (GP) corresponding to the Letter Grade awarded for that ith Subject.

Illustration of Computation of SGPA

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course1	3	A	8	3 x 8 = 24
Course2	4	B+	7	4 x 7 = 28
Course3	3	B	6	3 x 6 = 18
Course4	3	O	10	3 x 10 = 30
Course5	3	C	5	3 x 5 = 15
Course6	4	B	6	4 x 6 = 24

Thus, **SGPA = 139/20 = 6.95**

7.11 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over all Semesters considered for registration. The CGPA is the ratio of the Total Credit Points secured by a student in ALL registered Courses in ALL Semesters, and the Total Number of Credits registered in ALL the Semesters. CGPA is rounded off to TWO Decimal Places. CGPA is thus computed from the I Year Second Semester onwards, at the end of each Semester, as per the formula

$$\text{CGPA} = \{ \sum_{j=1}^M C_j G_j \} / \{ \sum_{j=1}^M C_j \} \dots \text{ for all S Semesters registered}$$

(i.e., up to and inclusive of S Semesters, $S \geq 2$)

where 'M' is the TOTAL no. of Subjects (as specifically required and listed under the Course Structure of the parent Department) the Student has 'REGISTERED' from the 1st Semester onwards upto and inclusive of the Semester S (obviously $M > N$), 'j' is the Subject indicator index (takes into account all Subjects from 1 to S Semesters), C_j is the no. of Credits allotted to the jth Subject, and G_j represents the Grade Points (GP) corresponding to the Letter Grade awarded for that jth Subject. After registration and completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

For CGPA Computation

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6
Credits : 20 SGPA : 6.9	Credits : 22 SGPA : 7.8	Credits : 25 SGPA : 5.6	Credits : 26 SGPA : 6.0	Credits : 26 SGPA : 6.3	Credits : 25 SGPA : 8.0

$$\text{Thus, CGPA} = \frac{20 \times 6.9 + 22 \times 7.8 + 25 \times 5.6 + 26 \times 6.0 + 26 \times 6.3 + 25 \times 8.0}{144} = 6.73$$

144

7.12 For Calculations listed in Item 7.6 – 7.10, performance in failed Subjects/ Courses (securing F Grade) will also be taken into account, and the Credits of such Subjects/ Courses will also be included in the multiplications and summations.

8. EVALUATION OF PROJECT/DISSERTATION WORK

Every candidate shall be required to submit a thesis or dissertation on a topic approved by the Project Review Committee.

8.1 A Project Review Committee (PRC) shall be constituted with Head of the Department as Chairperson, Project Supervisor and one senior faculty member of the Departments offering the M. Tech. programme.

- 8.2 Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects, both theory and practical.
- 8.3 After satisfying 8.2, a candidate has to submit, in consultation with his Project Supervisor, the title, objective and plan of action of his project work to the PRC for approval. Only after obtaining the approval of the PRC the student can initiate the Project work.
- 8.4 If a candidate wishes to change his supervisor or topic of the project, he can do so with the approval of the PRC. However, the PRC shall examine whether or not the change of topic/supervisor leads to a major change of his initial plans of project proposal. If yes, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.
- 8.5 A candidate shall submit his project status report in two stages at least with a gap of 3 months between them.
- 8.6 The work on the project shall be initiated at the beginning of the II year and the duration of the project is two semesters. A candidate is permitted to submit Project Thesis only after successful completion of all theory and practical courses with the approval of PRC not earlier than 40 weeks from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of thesis to the Head of the Department and make an oral presentation before the PRC.
- 8.7 After approval from the PRC, the soft copy of the thesis should be submitted to the Examination Branch for ANTI-PLAGIARISM for the quality check and the plagiarism report should be included in the final thesis. If the copied information is less than 30%, then only thesis will be accepted for submission.
- 8.8 Three copies of the Project Thesis certified by the supervisor shall be submitted to the College.
- 8.9 For Project work Review I in II Year I Sem. there is an internal marks of 50, the evaluation should be done by the PRC for 25 marks and Supervisor will evaluate for 25 marks. The Supervisor and PRC will examine the Problem Definition, Objectives, Scope of Work and Literature Survey in the same domain. A candidate has to secure a minimum of 50% of marks to be declared successful for Project Phase-I. If he fails to fulfill minimum marks, he has to reappear during the supplementary examination.
- 8.10 For Project Phase-II in II Year II Sem. there is an internal marks of 50, the evaluation should be done by the PRC for 25 marks and Supervisor will evaluate for 25 marks. The PRC will examine the overall progress of the Project Work and decide the Project is eligible for final submission or not. A candidate has to secure a minimum of 50% of marks to be declared successful for Project Work Review II. If he fails to fulfill minimum marks, he has to reappear during the supplementary examination.
- 8.11 For Project Evaluation (Viva Voce) in II Year II Sem. there is an external marks of 150 and the same evaluated by the External examiner appointed by the Chief Controller of Examinations. The candidate has to secure minimum of 50% marks in Project Dissertation.
- 8.12 If he fails to fulfill as specified in 8.11, he will reappear for the Viva-Voce examination only after three months. In the reappeared examination also, fails to fulfill, he will not be eligible for the award of the degree.
- 8.13 The thesis shall be adjudicated by one examiner selected by the Chief Controller of Examinations. For this, the HOD of the Department shall submit a panel of 3 examiners, eminent in that field, with the help of the guide concerned and Head of the Department.
- 8.14 If the report of the examiner is not favorable, the candidate shall revise and resubmit the Thesis. If the report of the examiner is unfavorable again, the thesis shall be

summarily rejected.

- 8.15 If the report of the examiner is favorable, Project dissertation shall be conducted by a board consisting of the Supervisor, Head of the Department and the external examiner who adjudicated the Thesis.
- 8.16 The Head of the Department shall coordinate and make arrangements for the conduct of Project dissertation.

9. AWARD OF DEGREE AND CLASS

9.1 A Student who registers for all the specified Subjects/ Courses as listed in the Course Structure, satisfies all the Course Requirements, and passes the examinations prescribed in the entire PG Programme (PGP), and secures the required number of 90 Credits (with CGPA ≥ 6.0), shall be declared to have 'QUALIFIED' for the award of the M.Tech. Degree in the chosen Branch of Engineering and Technology with specialization as he admitted.

9.2 Award of Class

After a student has satisfied the requirements prescribed for the completion of the programme and is eligible for the award of M. Tech. Degree, he shall be placed in one of the following three classes based on the CGPA:

Class Awarded	Grade to be Secured
First Class with Distinction	CGPA ≥ 8.00
First Class	≥ 7.00 to < 8.00 CGPA
Second Class	≥ 6.00 to < 7.00 CGPA

9.3 A student with final CGPA (at the end of the PGP) < 6.00 will not be eligible for the Award of Degree.

10. WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the college or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be with held in such cases.

11. TRANSITORY REGULATIONS

- 11.1 If any candidate is detained due to shortage of attendance in one or more subjects, they are eligible for re-registration to maximum of two earlier or equivalent subjects at a time as and when offered.
- 11.2 The candidate who fails in any subject will be given two chances to pass the same subject; otherwise, he has to identify an equivalent subject as per MLR17 Academic Regulations.

12. GENERAL

- 12.1 **Credit:** A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.
- 12.2 **Credit Point:** It is the product of grade point and number of credits for a course.
- 12.3 Wherever the words "he", "him", "his", occur in the regulations, they include "she", "her".
- 12.4 The academic regulation should be read as a whole for the purpose of any interpretation.
- 12.5 In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

- 12.6 The University may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College.

**MALPRACTICES RULES
DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN
EXAMINATIONS**

S. No	Nature of Malpractices/Improper conduct	Punishment
1 (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the Principal.
3	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.

4	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6	Refuses to obey the orders of the Addl. Controller of examinations / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the addl. Controller of examinations or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the addl. Controller of examinations, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

8	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the principal for further action to award suitable punishment.	

COURSE STRUCTURE

COMPUTER SCIENCE & ENGINEERING

I M.Tech I Semester								
Course Code	Course Title	Periods per Week			Credits	Scheme of Examination Maximum Marks		
		L	T	P		Internal (CIE)	External (SEE)	Total
B25801	Advanced Database Engineering	4	-	-	4	30	70	100
B25802	Advanced Data Structures & Algorithms	4	-	-	4	30	70	100
B25803	Advanced Operating Systems	4	-	-	4	30	70	100
	Core Elective - 1	4	-	-	4	30	70	100
	Core Elective - 2	4	-	-	4	30	70	100
	Open Elective-1	4	-	-	4	30	70	100
B25804	Data Structures and Algorithms Lab	-	-	4	2	30	70	100
B25805	Seminar-1	-	-	4	2	50	-	50
TOTAL		24		8	28	260	490	750

I M.Tech II Semester								
Course Code	Course Title	Periods per Week			Credits	Scheme of Examination Maximum Marks		
		L	T	P		Internal (CIE)	External (SEE)	Total
B25812	Web Services and Service Oriented Architecture	4	-	-	4	30	70	100
B25813	Advanced Computer Networks	4	-	-	4	30	70	100
B25814	Cloud Computing	4	-	-	4	30	70	100
	Core Elective – 3	4	-	-	4	30	70	100
	Core Elective – 4	4	-	-	4	30	70	100
	Open Elective - 2	4	-	-	4	30	70	100
B25815	Web Services Lab	-	-	4	2	30	70	100
B25816	Seminar-II	-	-	4	2	50	-	50
TOTAL		24		8	28	260	490	750

II M.Tech I Semester								
Code	Course Title	Periods per Week			Credits	Scheme of Examination Maximum Marks		
		L	T	P		Internal (CIE)	External (SEE)	Total
B25823	Comprehensive Viva-Voce	-	-	-	4	-	100	100
B25824	Project Phase-I	-	-	-	12	50	-	50
TOTAL		-	-	-	16	50	100	150

II M.Tech II Semester								
Course Code	Course Title	Periods per Week			Credits	Scheme of Examination Maximum Marks		
		L	T	P		Internal (CIE)	External (SEE)	Total
B25826	Project Phase –II & Dissertation	-	-	-	18	50	150	200
TOTAL					18	50	150	200

OPEN ELECTIVES			
OE1		OE2	
B25830	Internet of Things	B25833	Introduction to Web Markup Languages
B25831	Software Project Management	B25834	Adhoc & Sensor Networks
B25832	Cryptography and Network Security	B25835	Software Testing Methodologies
CORE ELECTIVE			
CE1		CE2	
B25806	Mobile Computing	B25809	Information Security
B25807	Data Warehousing and Mining	B25810	Scripting Languages
B25808	Natural Language Processing	B25811	Mobile Application Development
CE3		CE4	
B25817	Artificial Intelligence	B25820	Social Media and Web Mining
B25818	Big Data Analytics	B25821	Research Methodologies
B25819	Information Retrieval Systems	B25822	High Performance Computing

I M.TECH I SEMESTER SYLLABUS

ADVANCED DATABASE ENGINEERING

I M. Tech. - I Semester
Course Code: B25801

L T P C
4 - - 4

PREREQUISITES

A course on "Data Base Management Systems"

OBJECTIVES

1. To understand the significance of integrity constraints
2. To normalize the database schema
3. To improve the query performance
4. To gain knowledge about advanced databases and applications.

OUTCOMES

1. Will be able to design a database for an organization.
2. Will be able to construct and execute optimized queries
3. Can apply proper security policies to data
4. Can handle E-Commerce transactions
5. Can apply object oriented features to DBMS

SYLLABUS

UNIT- I

Relational Model: Constraints: update operations, transactions, and dealing with constraint violations. Relational database design algorithms, MVDs and 4NF, JD and 5NF, inclusion dependencies, other dependencies and normal forms.

UNIT- II

Query Processing & Optimization: Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions Transformation of Relational Expressions, Estimating Statistics of Expression Results, Choice of Evaluation Plans, Materialized Views, Advanced Topics in Query Optimization.

UNIT- III

Object & Object-Relational Databases: Concepts of Object databases, Object database standards, languages and design Object-relational and Extended-Relational Systems.

UNIT – IV

Security, Advanced Modeling: Database Security Enhanced data models for advanced applications – active databases, temporal databases, spatial and multimedia databases, deductive databases.

UNIT- V

Advanced Transaction Processing: Transaction-Processing Monitors, Transactional Workflows, E-Commerce, Main-Memory Databases, Real-Time Transaction Systems, Long- Duration Transactions

Case studies: PostgreSQL, IBM DB2, Oracle, Microsoft SQL server.

TEXT BOOKS:

1. Fundamentals of Database Systems, Elmasri Navrate Pearson Education, V edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, VI edition.

REFERENCES:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Introduction to Database Systems, C.J.Date Pearson Education

3. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
4. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
5. Fundamentals of Database Management Systems, M.L. Gillenson, Wiley Student Edition

ADVANCED DATA STRUCTURES AND ALGORITHMS

I M. Tech. - I Semester
Course Code: B25802

L T P C
4 - - 4

COURSE OVERVIEW

This course will focus on data structures with their performance analysis and various algorithms used in problem solving. These data structures and algorithms are implemented using Java.

COURSE OBJECTIVES

1. The fundamental design, analysis, and implementation of basic data structures.
2. Basic concepts in the specification and analysis of programs.
3. Principles for good program design, especially the uses of data abstraction.
4. Significance of algorithms in the computer field
5. Various aspects of algorithm development
6. Qualities of a good solution

COURSE OUTCOMES

At the end of the course students will be able to

1. Analyze the performance of various data structures
2. Select a suitable data structure for a given problem statement
3. Utilize the classes of Collection framework in implement various data structures

SYLLABUS

UNIT - I

Algorithms, Performance analysis - time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples.

Data structures-Linear and non linear data structures, Abstract Data Type (ADT) concept, Linear List ADT, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists. Representation of single, two dimensional arrays, sparse matrices and their representation.

UNIT - II

Stack and Queue ADTs, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion and deletion, Dequeue ADT, array and linked list representations, Priority queue ADT, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap, java.util package-ArrayList, Linked List, Vector classes, Stacks and Queues in java.util, Iterators in java.util.

UNIT - III

Searching-Linear and binary search methods, Hashing-Hash functions, Collision Resolution methods-Open Addressing, Chaining, Hashing in java.util-HashMap, HashSet, Hashtable.

Sorting -Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

UNIT - IV

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree ADT, representations, recursive and non recursive traversals, Java code for traversals, Threaded binary trees.

Graphs- Graphs terminology, Graph ADT, representations, graph traversals/search methods-dfs and bfs, Java code for graph traversals, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

UNIT - V

Search trees- Binary search tree-Binary search tree ADT, insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees -

Definition and examples only, B-Trees-definition, insertion and searching operations, Trees in java.util- TreeSet, Tree Map Classes, Tries(examples only), Comparison of Search trees.
Text compression - Huffman coding and decoding, Pattern matching-KMP algorithm.

TEXT BOOKS:

1. Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.
2. Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage Learning.
3. Data structures and Algorithm Analysis in Java, M.A.Weiss, 2nd edition, Addison-Wesley (Pearson Education).

REFERENCE BOOKS:

1. Java for Programmers, Deitel and Deitel, Pearson education.
2. Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Java: The Complete Reference, 8th editon, Herbert Schildt, TMH.
4. Data structures and Algorithms in Java, M.T.Goodrich, R.Tomassia, 3rd edition, Wiley India Edition.
5. Data structures and the Java Collection Frame work, W.J.Collins, Mc Graw Hill.
6. Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).
7. Data structures with Java, Ford and Topp, Pearson Education.
8. Data structures using Java, D.S.Malik and P.S.Nair, Cengage learning.
9. Data structures with Java, J.R.Hubbard and A.Huray, PHI Pvt. Ltd.
10. Data structures and Software Development in an Object-Oriented Domain, J.P.Tremblay

ADVANCED OPERATING SYSTEMS

I M. Tech. - I Semester
Course Code: B25803

L T P C
4 - - 4

COURSE OVERVIEW

This course will focus on data various types of operating systems used in different kinds of applications, characteristics, design issues and case studies.

COURSE OBJECTIVES

1. To understand main components of Real time Operating system and their working
2. To study the operations performed by OS as a resource manager
3. To understand the scheduling policies of DOS
4. To implement the working principles of OS
5. To study different OS and compare their features

COURSE OUTCOMES

At the end of this course students will able to

1. Identify the challenges in designing Real time operating systems
2. Compare and Select a operating system as per the requirement
3. Identify and design solution to the security challenges in operating systems

SYLLABUS

UNIT - I

Real-time operating systems: Design issues, principles and case study.

UNIT - II

Distributed operating system: Design issues, features and principles of working, case study.

UNIT - III

Network operating system: Design issues, working principles and characteristic features, case study.

UNIT - IV

Kernel development: Issues and development principles, case study.

UNIT - V

Protection, privacy, access control and security issues, solutions.

TEXT BOOKS:

1. A. Silberschatz - Applied Operating System Concepts, Wiley, 2000.
2. Lubemir F Bic and Alan C. Shaw - Operating System Principles, Pearson Education, 2003.

REFERENCE BOOKS:

1. Operating Systems: Internal and Design Principles - Stallings, 6th ed., PE.
2. Modern Operating Systems, Andrew S Tanenbaum 3rd ed., PE.
3. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 7th ed.,, John Wiley
4. UNIX User Guide – Ritchie & Yates.
5. UNIX Network Programming - W.Richard Stevens ,1998, PHI.
6. The UNIX Programming Environment – Kernighan & Pike, PE.

MOBILE COMPUTING (Core Elective – I)

I M. Tech. - I Semester
Course Code: B25806

L T P C
4 - - 4

PREREQUISITES:

- # Computer Networks
- # Distributed Systems / Distributed Operating Systems

OBJECTIVES:

1. To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
2. To understand the typical mobile networking infrastructure through a popular GSM protocol
3. To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
4. To understand the database issues in mobile environments & data delivery models.
5. To understand the ad hoc networks and related concepts.
6. To understand the platforms and protocols used in mobile environment.

OUTCOMES:

1. Able to think and develop new mobile applications
2. Able to develop new ad hoc network applications and/or algorithms.
3. Able to understand & develop any existing or new protocol related to mobile environment

SYLLABUS

UNIT - I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

UNIT – II

(Wireless) Medium Access Control (MAC)

Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

Mobile Network Layer IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT – III

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

Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT - IV

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols

UNIT - V

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

Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML, J2ME, JavaCard, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices, Android.

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

DATA WAREHOUSING AND MINING (CORE ELECTIVE – I)

I M. Tech. - I Semester
Course Code: B25807

L T P C
4 - - 4

COURSE OVERVIEW:

This course helps the students to understand the overall architecture of a data warehouse and methods for data gathering and data pre-processing using OLAP tools. The different data mining models and techniques will be discussed in this course. Data mining and data warehousing applications in bioinformatics will also be explored.

COURSE OBJECTIVES:

1. To teach the basic principles, concepts and applications of data warehousing and data mining
2. To introduce the task of data mining as an important phase of knowledge recovery process
3. To familiarize Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment
4. To impart knowledge of the fundamental concepts that provide the foundation of data mining

COURSE OUTCOMES:

- After undergoing the course, Students will be able to understand
1. Design a data mart or data warehouse for any organization
 2. Develop skills to write queries using DMQL
 3. Extract knowledge using data mining techniques
 4. Adapt to new data mining tools.
 5. Explore recent trends in data mining such as web mining, spatial-temporal mining

SYLLABUS

UNIT - I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT - II

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Usage of Data Warehousing Online Analytical Processing and Mining

Data Cube Computation: Efficient Methods for simple Data Cube Computation (Full Cube, Iceberg Cube, Closed Cube and Shell Cube), Discovery Driven exploration of data cubes, Attribute-Oriented Induction for data characterization and its implementation

UNIT - III

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, The Apriori algorithm for finding frequent item sets using candidate generation, Generating association rules from frequent item sets, Mining frequent item sets without candidate generation, Mining various kinds of Association Rules, Correlation Analysis

UNIT - IV

Classification and Prediction: Description and comparison of classification and prediction, preparing data for Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule- Based Classification, Classification by Back propagation Prediction, linear and non-linear regression, evaluating accuracy of a Classifier or a Predictor

UNIT - V

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, k- means and k-medoids methods, CLARANS, Agglomerative and divisive hierarchical clustering, chameleon dynamic modelling, clustering based on density distribution function, wavelet transformation based clustering, conceptual Clustering, Constraint-Based Cluster Analysis, Outlier Analysis.

TEXT BOOKS:

1. Data Mining – Concepts and Techniques - Jiawei Han, Micheline Kamber and Jian Pei, 3rd edition, Morgan Kaufmann Publishers, ELSEVIER.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

REFERENCE BOOKS:

1. Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn Asia.
2. Insight into Data Mining, K.P.Soman, S.Diwakar, V.Ajay, PHI, 2008.
3. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition
4. The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley student edition
5. Building the Data Warehouse by William H Inmon, John Wiley & Sons Inc, 2005.
6. Data Mining Introductory and advanced topics –Margaret H Dunham, Pearson education
7. Data Mining Techniques – Arun K Pujari, 2nd edition, Universities Press.
8. Data Mining, V.Pudi and P.Radha Krishna, Oxford University Press.
9. Data Mining: Methods and Techniques, A.B.M Shawkat Ali and S.A.Wasimi, Cengage Learning.
10. Data Warehouse 2.0, The Architecture for the next generation of Data Warehousing, W.H.Inmon, D.Strauss, G.Neushloss, Elsevier, Distributed by SPD.

NATURAL LANGUAGE PROCESSING (CORE ELECTIVE – I)

I M. Tech. - I Semester
Course Code: B25808

L T P C
4 - - 4

PREREQUISITES:

data structures, finite automata and probability theory

OBJECTIVES:

1. Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.

OUTCOMES:

1. Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
2. Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
3. Able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.
4. Able to design, implement, and analyze NLP algorithms
5. Able to design different language modeling Techniques.

SYLLABUS

UNIT I

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models
Finding the Structure of Documents
Introduction, Methods, Complexity of the Approaches, Performances of the Approaches

UNIT II

Syntax: Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution in Parsing, Multilingual Issues

UNIT III

Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms, Word Sense Recourse, Systems, Software.

UNIT IV

Predicate-Argument Structure, Meaning Representation Recourse, Systems, Software.

UNIT V

Language Modeling: Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Crosslingual Language Modeling

TEXT BOOKS:

1. Multilingual natural Language Processing Applications : From Theory to Practice – Daniel M. Bikel and Imed Zitouni, Pearson Publication

REFERENCE:

1. Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, Pearson Publications

INFORMATION SECURITY (Core Elective– II)

I M. Tech. - I Semester
Course Code: B25809

L T P C
4 - - 4

PREREQUISITES

A Course on “Computer Networks and a course on Mathematics

OBJECTIVES

1. To understand the fundamentals of Cryptography
2. To understand various key distribution and management schemes
3. To understand how to deploy encryption techniques to secure data in transit across data networks
4. To apply algorithms used for secure transactions in real world applications

OUTCOMES

1. Demonstrate the knowledge of cryptography, network security concepts and applications.
2. Ability to apply security principles in system design.

SYLLABUS

UNIT I

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security.

Classical Encryption Techniques, DES, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operation, Blowfish, Placement of Encryption Function, Traffic Confidentiality, key Distribution, Random Number Generation.

UNIT II

Public key Cryptography Principles, RSA algorithm, Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Cryptography.

Message authentication and Hash Functions, Authentication Requirements and Functions, Message Authentication, Hash Functions and MACs Hash and MAC Algorithms SHA-512, HMAC.

UNIT III

Digital Signatures, Authentication Protocols, Digital signature Standard, Authentication Applications, Kerberos, X.509 Directory Authentication Service. Email Security: Pretty Good Privacy (PGP) and S/MIME.

UNIT IV

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT V

Intruders, Viruses and Worms Intruders, Viruses and related threats Firewalls: Firewall Design Principles, Trusted Systems, Intrusion Detection Systems.

TEXT BOOKS:

1. Cryptography and Network Security (principles and approaches) by William Stallings Pearson Education, 4th Edition.

REFERENCE BOOKS:

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Principles of Information Security, Whitman, Thomson.

SCRIPTING LANGUAGES (Core Elective – II)

I M. Tech. - I Semester
Course Code: B25810

L T P C
4 - - 4

PREREQUISITES

A course on “Computer Programming and Data Structures”

A course on “Object Oriented Programming Concepts”

OBJECTIVES

1. This course provides an introduction to the script programming paradigm
2. Introduces scripting languages such as Perl, PHP and Python.
3. Learning TCL

OUTCOMES

1. Comprehend the differences between typical scripting languages and application programming languages. Acquire programming skills using scripting languages.
2. Gain knowledge of the strengths and weakness of Perl, PHP, TCL and Python; and select an appropriate language for solving a given problem
3. Ability to design web pages using advanced features of PHP.

SYLLABUS

UNIT – I

Introduction to PERL and Scripting: Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT – II

Advanced perl: Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security issues.

UNIT – III

PHP Basics: PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures. Function, Creating a Function, Function Libraries, Arrays, Strings and Regular Expressions. PHP and Web Forms, Files, PHP Authentication and Methodologies - Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

UNIT - IV

TCL: TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL- eval, source, exec and up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl- Tk.

UNIT – V

Python: Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling.

Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

TEXT BOOKS:

1. The World of Scripting Languages , David Barron, Wiley Publications.
2. Beginning PHP and MySQL , 3rd Edition , Jason Gilmore,Apress Publications (Dream tech.).
3. Python Web Programming, Steve Holden and David Beazley ,New Riders Publications.

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development ,Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming,Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Perl by Example,E.Quigley, Pearson Education.
8. Programming Perl,Larry Wall,T.Christiansen and J.Orwant, O'Reilly, SPD.
9. Tcl and the Tk Tool kit,Ousterhout, Pearson Education.
10. PHP and MySQL by Example,E.Quigley,Prentice Hall(Pearson).
11. Perl Power,J.P.Flynt,Cengage Learning.
12. PHP Programming solutions,V.Vaswani,TMH.

MOBILE APPLICATION DEVELOPMENT (Core Elective – II)

I M. Tech. - I Semester
Course Code: B25811

L T P C
4 - - 4

COURSE OVERVIEW:

This course is concerned with the development of applications on mobile and wireless computing platforms. Android will be used as a basis for teaching programming techniques and design patterns related to the development of standalone applications and mobile portals to enterprise and mcommerce systems. Emphasis is placed on the processes, tools and frameworks required to develop applications for current and emerging mobile computing devices. Students will work at all stages of the software development life-cycle from inception through to implementation and testing. In doing so, students will be required to consider the impact of user characteristics, device capabilities, networking infrastructure and deployment environment, in order to develop software capable of meeting the requirements of stakeholders.

COURSE OBJECTIVES:

1. To facilitate students to understand android SDK
2. To help students to gain a basic understanding of Android application development
3. To inculcate working knowledge of Android Studio development tool

COURSE OUTCOMES:

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

1. Identify various concepts of mobile programming that make it unique from programming for other platforms,
2. Critique mobile applications on their design pros and cons,
3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
4. Program mobile applications for the Android operating system that use basic and advanced phone features, and
5. Deploy applications to the Android marketplace for distribution.

SYLLABUS

UNIT – I

Introduction to Android and Android Studio – Features of Android-Android Architecture – Structure of Android program –XML layout file -- Build and run first Android program in Emulator-Android Manifest file.

UNIT - II

Android Building Blocks: Introduction to Basic Android building blocks – Activity and Activity life cycle-Service-Intent-broadcast receiver-content provider.

UI Layouts: UI Layouts-Linear Layout-Relative layout-Table Layout-Frame Layout-Grid Layout-Example Programs.

UI Controls: Basic UI Controls-Auto Complete Text View-spinner-ListView-Image Switcher-Text Switcher- ListView with Custom Adapter-Gallery and GridView-WebView-Fragments-Example programs.

UNIT III

Android Storage Methods: Shared Preferences-SQLite-Files (XML/JSON)- Internal Storage-External Storage.

Android Media: Media Player-Video View- Audio Recording- Video Recording-camera and Gallery-Example Programs.

Android Telephony: SMS-Call-E-mail

Android Dialogs and Menus: Custom Dialog-Alert Dialog-Date Picker Dialog-Time Picker Dialog-Progress Dialog- Menu-Action Bar/Tool Bar.

Apk Development Process: How to Build Signed .apk - .apk file to play store uploading process - apk file updating process-Play store required resources.

UNIT IV

SyncTask: What is AsyncTask- Uses of AsyncTask- Example Program.

Introduction To XML: Introduction to XML-JAXP -XML Pull Parser.

Introduction To JSON: Introduction to JSON- Advantages of JSON over XML-Syntax and Structure of JSON –Different types of JSON parsers.

Google Maps: Introduction to Location based services in Android and Google Maps-Getting Google Map key-Install Google play services.

UNIT V

Web Services: Introduction to Web Service-Advantages of Web Service –Architecture of Web services- Types of Web Services- Web Service Components-SOAP Based Web Service- How to call SOAP Web service-comparison on WSDL,SOAP and UDDI- why SOAP is not preferred for Mobile applications-Disadvantages of SOAP-working with REST.

Google Cloud Messaging: Introduction to Google Cloud Messaging-How to integrate GCM service to SDK-How to get the GCM API key- GCM Architecture- GCM Components-How to Develop GCM Server Application in Java-How to GCM Client application-GCM client dependencies.

TEXT BOOKS:

1. Lauren Darcey and Shane Conder, “Android Wireless Application Development”, Pearson Education, 2nd ed. (2011)

REFERENCE BOOKS:

1. Reto Meier, “Professional Android 2 Application Development”, Wiley India Pvt Ltd
2. Mark L Murphy, “Beginning Android”, Wiley India Pvt Ltd
3. Android Application Development All in one for Dummies by Barry Burd, Edition: I

INTERNET OF THINGS (Open Elective – I)

I M. Tech. - I Semester
Course Code: B25830

L T P C
4 - - 4

COURSE OVERVIEW

To impart necessary skills and knowledge of Internet of Things and components used in developing IoT based applications.

COURSE OBJECTIVES

1. To introduce the terminology, technology and its applications
2. To introduce the concept of M2M (machine to machine) with necessary protocols
3. To introduce the Python Scripting Language which is used in many IoT devices
4. To introduce the Raspberry PI platform, that is widely used in IoT applications
5. To introduce the implementation of web based services on IoT devices

COURSE OUTCOMES

At the end of the course students will be able to

1. Identify the applications of IoT
2. Use Raspberry PI platform in designing IoT based applications
3. Create real time applications that can be used in domestic and health care applications
4. Convert things into smart things.

SYLLABUS

UNIT - I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT - II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT - III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT - IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, and reading input from pins.

UNIT - V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Web server – Web server for IoT, Cloud for IoT, Python web application framework designing a RESTful web API

TEXT BOOK:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

SOFTWARE PROJECT MANAGEMENT (Open Elective- I)

I M. Tech. - I Semester
Course Code: B25831

L T P C
4 - - 4

PREREQUISITES

Software Engineering

OBJECTIVES

1. To develop skills in software project management
2. The topics include-software economics; software development life cycle; artifacts of the process; workflows; checkpoints; project organization and responsibilities; project control and process instrumentation;

OUTCOMES

1. Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation.
2. Analyze the major and minor milestones, artifacts and metrics from management and technical perspective
3. Design and develop software products using conventional and modern principles of software project management

SYLLABUS

UNIT - I

Conventional Software Management: The waterfall model, conventional software Management performance.
Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT - II

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections. The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT - III

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

Model based software architectures: A Management perspective and technical perspective.
Work Flows of the process: Software process workflows, Iteration workflows.

UNIT - IV

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.
Iterative Process Planning: work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. **Process Automation:** Automation Building blocks, The Project Environment.

UNIT - V

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.
Tailoring the Process: Process discriminates.

Future Software Project Management: modern Project Profiles, Next generation Software

economics, modern process transitions.

Case Study: The command Center Processing and Display system- Replacement (CCPDS- R).

TEXT BOOKS:

1. Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

CRYPTOGRAPHY AND NETWORK SECURITY (Open Elective – I)

I M. Tech. - I Semester
Course Code: B25832

L T P C
4 - - 4

COURSE OVERVIEW:

This course will emphasize on principles and practice of cryptography and network security: classical systems, symmetric block ciphers (DES, AES, other contemporary symmetric ciphers), linear and differential cryptanalysis, perfect secrecy, public-key cryptography algorithms for factoring and discrete logarithms, cryptographic protocols, hash functions, authentication, key management, key exchange, signature schemes, email and web security, viruses, firewalls, digital right management, and other topics. In this course students will learn as aspects of network security and cryptography.

COURSE OBJECTIVES:

1. To provide deeper understanding into cryptography, its application to network security, threats/vulnerabilities to networks and countermeasures.
2. To explain various approaches to Encryption techniques, strengths of Traffic Confidentiality, Message Authentication Codes.
3. To familiarize Digital Signature Standard and provide solutions for their issues.
4. To familiarize with cryptographic techniques for secure (confidential) communication of two parties over an insecure (public) channel; verification of the authenticity of the source of a message.

COURSE OUTCOMES:

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

1. Identify basic security attacks and services
2. Use symmetric and asymmetric key algorithms for cryptography
3. Design a security solution for a given application
4. Analyze Key Management techniques and importance of number Theory.
5. Understanding of Authentication functions the manner in which Message Authentication Codes and Hash Functions works.
6. To examine the issues and structure of Authentication Service and Electronic Mail Security

SYLLABUS

UNIT - I

INTRODUCTION: Security trends, The OSI Security Architecture, Security Attacks, Security Services and Security Mechanisms, A model for Network security.

CLASSICAL ENCRYPTION TECHNIQUES: Symmetric Cipher Modes, Substitute Techniques, Transposition Techniques, Stenography.

UNIT - II

BLOCK CIPHER AND DATA ENCRYPTION STANDARDS: Block Cipher Principles, Data Encryption Standards, the Strength of DES, Differential and Linear Crypt Analysis, Block Cipher Design Principles.

ADVANCED ENCRYPTION STANDARDS: Evaluation Criteria for AES, the AES Cipher. MORE ON SYMMETRIC CIPHERS: Multiple Encryption, Triple DES, Block Cipher Modes of Operation, Stream Cipher and RC4.

UNIT – III

PUBLIC KEY CRYPTOGRAPHY AND RSA: Principles Public key crypto Systems, Diffie Hellman Key Exchange, the RSA algorithm, Key Management, , Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

MESSAGE AUTHENTICATION AND HASH FUNCTIONS: Authentication Requirement, Authentication Function, Message Authentication Code, Hash Function, Security of Hash Function and MACs.

HASH AND MAC ALGORITHM: Secure Hash Algorithm, Whirlpool, HMAC, CMAC.

DIGITAL SIGNATURE: Digital Signature, Authentication Protocol, Digital Signature Standard.

UNIT - IV

AUTHENTICATION APPLICATION: Kerberos, X.509 Authentication Service, Public Key Infrastructure.

EMAIL SECURITY: Pretty Good Privacy (PGP) and S/MIME.

IP SECURITY: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT - V

WEB SECURITY: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Intruders, Viruses and related threats.

FIREWALL: Firewall Design principles, Trusted Systems.

TEXT BOOKS:

1. William Stallings (2006), Cryptography and Network Security: Principles and Practice, 4th edition, Pearson Education, India.
2. William Stallings (2000), Network Security Essentials (Applications and Standards), Pearson Education, India.

REFERENCE BOOKS:

1. Charlie Kaufman (2002), Network Security: Private Communication in a Public World, 2nd edition, Prentice Hall of India, New Delhi.
2. Atul Kahate (2008), Cryptography and Network Security, 2nd edition, Tata Mc Grawhill, India.
3. Robert Bragg, Mark Rhodes (2004), Network Security: The complete reference, Tata Mc Grawhill, India.

DATA STRUCTURES AND ALGORITHMS LAB

I M. Tech. - I Semester
Course Code: B25804

L T P C
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OBJECTIVES:

1. The fundamental design, analysis, and implementation of basic data structures.
2. Basic concepts in the specification and analysis of programs.
3. Principles for good program design, especially the uses of data abstraction.

LIST OF EXPERIMENTS:

1. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods: a) Linear search b) Binary search
2. Write Java programs to implement the following using arrays and linked lists a) List ADT
3. Write Java programs to implement the following using an array. a) Stack ADT b) Queue ADT
4. Write a Java program that reads an infix expression and converts the expression to postfix form. (Use stack ADT).
5. Write a Java program to implement circular queue ADT using an array.
6. Write a Java program that uses both a stack and a queue to test whether the given string is a palindrome or not.
7. Write Java programs to implement the following using a singly linked list. a) Stack ADT b) Queue ADT
8. Write Java programs to implement the deque (double ended queue) ADT using a) Array b) Singly linked list c) Doubly linked list.
9. Write a Java program to implement priority queue ADT.
10. Write a Java program to perform the following operations:
a) Construct a binary search tree of elements.
b) Search for a key element in the above binary search tree.
c) Delete an element from the above binary search tree.
11. Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.
12. Write a Java program to implement Dijkstra's algorithm for Single source shortest path problem.
13. Write Java programs that use recursive and non-recursive functions to traverse the given binary tree in
a) Preorder b) Inorder c) Postorder.
14. Write Java programs for the implementation of bfs and dfs for a given graph.
15. Write Java programs for implementing the following sorting methods:
a) Bubble sort d) Merge sort g) Binary tree sort b) Insertion sort e) Heap sort
c) Quick sort f) Radix sort
16. Write a Java program to perform the following operations:
a) Insertion into a B-tree b) Searching in a B-tree
17. Write a Java program that implements Kruskal's algorithm to generate minimum cost spanning tree.
18. Write a Java program that implements KMP algorithm for pattern matching.

REFERENCE BOOKS:

1. Data Structures and Algorithms in java, 3rd edition, A.Drozdek, Cengage Learning.
2. Data Structures with Java, J.R.Hubbard, 2nd edition, Schaum's Outlines, TMH.
3. Data Structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education.
4. Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning.
5. Data structures, Algorithms and Applications in java, 2nd Edition, S.Sahani, Universities Press.
6. Design and Analysis of Algorithms, P.H.Dave and H.B.Dave, Pearson education.
7. Data Structures and java collections frame work, W.J.Collins, Mc Graw Hill.
8. Java: the complete reference, 7th editon, Herbert Schildt, TMH.
9. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education / Java: How to Program P.J.Deitel and H.M.Deitel , 8th edition, PHI.
10. Java Programming, D.S.Malik,Cengage Learning.
11. A Practical Guide to Data Structures and Algorithms using Java, S.Goldman&K.Goldman, Chapman & Hall/CRC, Taylor & Francis Group

I M.TECH II SEMESTER SYLLABUS

WEB SERVICES AND SERVICE ORIENTED ARCHITECTURE

I M. Tech. - II Semester
Course Code: B25812

L T P C
4 - - 4

PRE-REQUISITES:

The course assumes a reasonable comfort and background about Information Technology and Management Information Systems.

OBJECTIVES:

1. To gain understanding of the basic principles of service orientation
2. To learn service oriented analysis techniques
3. To learn technology underlying the service design
4. To learn the concepts such as SOAP, registering and discovering services.

OUTCOMES:

At the end of this course, students are expected to gain the following learning:

1. Get the foundations and concepts of service based computing
2. Advocate the importance and means of technology alignment with business
3. Understanding the basic operational model of web services,
4. Gain the knowledge of key technologies in the service oriented computing arena
5. Apply and practice the learning through a real or illustrative project/case study.

SYLLABUS

UNIT - I

Evolution and Emergence of Web Services – Evolution of distributed computing. Core distributed computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA). Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

UNIT - II

Web Service Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services. Describing Web Services – WSDL introduction, non functional service description, WSDL1.1 Vs WSDL 2.0, WSDL document, WSDL elements, WSDL binding, WSDL tools, WSDL port type, limitations of WSDL.

UNIT - III

Brief Over View of XML – XML Document structure, XML namespaces, Defining structure in XML documents, Reuse of XML schemes, Document navigation and transformation. SOAP : Simple Object Access Protocol, Inter-application communication and wire protocols, SOAP as a messaging protocol, Structure of a SOAP message, SOAP envelope, Encoding, Service Oriented Architectures, SOA revisited, Service roles in a SOA, Reliable messaging, The enterprise Service Bus, SOA Development Lifecycle, SOAP HTTP binding, SOAP communication model, Error handling in SOAP.

UNIT – IV

Registering and Discovering Services : The role of service registries, Service discovery, Universal Description, Discovery, and Integration, UDDI Architecture, UDDI Data Model, Interfaces, UDDI Implementation, UDDI with WSDL, UDDI specification, Service Addressing and Notification, Referencing and addressing Web Services, Web Services Notification.

UNIT - V

SOA and web services security considerations, Network-level security mechanisms, Application - level security topologies, XML security standards, Semantics and Web Services, The semantic interoperability problem, The role of metadata, Service metadata, Overview of .NET and J2EE, SOA and Web Service Management, Managing Distributed System, Enterprise management Framework, Standard distributed management frameworks, Web service management, Richer schema languages, WS-Metadata Exchange.

TEXT BOOKS:

1. Web Services & SOA Principles and Technology, Second Edition, Michael P. Papazoglou.
2. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.
3. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education.

REFERENCE BOOKS:

1. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.
2. Building web Services with Java, 2nd Edition, S. Graham and others, Pearson Education.
3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD.
4. McGovern, et al., "Java web Services Architecture", Morgan Kaufmann Publishers, 2005.
5. J2EE Web Services, Richard Monson-Haefel, Pearson Education.

ADVANCED COMPUTER NETWORKS

I M. Tech. - II Semester
Course Code: B25813

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COURSE OVERVIEW:

This course is to provide students with an overview of the concepts and fundamentals of advanced computer networks and management. Primary focus would be on the components used and the protocols. This course provides a broad range of understanding on the functional and performance issues in a computer network and its management.

COURSE OBJECTIVES:

1. To review the computer networking concepts
2. To impart concepts of advanced computer networking.
3. To introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4. To facilitate students in gaining expertise in some specific areas of networking such as the design and maintenance of individual networks.

COURSE OUTCOMES:

After completing this course the student must demonstrate the knowledge and ability to:

1. Apply Data Communications System and its components.
2. Identify the different types of network topologies and protocols.
3. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
4. Identify the different types of network devices and their functions within a network

SYLLABUS

UNIT I:

Review: Computer Networks and the Internet: History of Computer Networking and the Internet, Networking Devices, The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones.

Networking Models: 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal- Sized Packets Model: ATM.

UNIT II:

Network Routing Routing and its concepts: Structure of a Router, Basic Router Configuration, Building a Routing Table, Static Routing, Dynamic Routing – Distance Vector Routing Protocol (RIPv1, RIPv2, EIGRP), Link State Routing Protocols (OSPF).

UNIT III

LAN Switching: Switching and its concepts: Structure of a Switch, Basic Switch Configuration, Virtual LANs (VLANs), VLAN Trunking Protocol (VTP), Spanning Tree Protocol (STP), Inter-VLAN Routing.

UNIT IV

Wide Area Networks (WANs): Introduction to WANs, Point-to-Point Protocol (PPP) concepts, Frame Relay concepts, Dynamic Host Configuration Protocol (DHCP), Network Address Translation (NAT), IPv6.

UNIT V

Network Programming using Java: TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Remote Method Invocation (Java RMI) - Basic RMI Process, Implementation details - Client-Server Application.

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W. Ross, Fifth Edition, Pearson Education, 2012.
2. Network Fundamentals, Mark Dye, Pearson Education.

REFERENCE BOOKS:

1. Computer Networks: A Systems approach, Larry L. Peterson & Bruce S. Davie, Fifth edition, Elsevier, 2012.
2. Computer Networks: A Top-Down Approach, Behrouz A. Forouzan, Firoz Mosharaf, Tata McGraw Hill, 2012.
3. Java Network Programming, 3rd edition, E.R. Harold, SPD, O'Reilly. (Unit V)

CLOUD COMPUTING

I M. Tech. - II Semester
Course Code: B25814

L T P C
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COURSE OVERVIEW:

The course is designed to give introduction to modern distributed computing. It describes in detail, methods of accessing computing resource across the internet. The course will also explain the relevance of these forms of computing to business models for enterprises that require large amounts of computation but do not necessarily wish to purchase and maintain large amounts of specialist computing systems.

PRE-REQUISITES:

A course on "Computer Networks and Operating Systems

OBJECTIVES

1. This course provides an insight into cloud computing
2. Topics covered include- distributed system models, different cloud service models, service oriented architectures, cloud programming and software environments, resource management.

OUTCOMES

1. Ability to understand various service delivery models of a cloud computing architecture.
2. Ability to understand the ways in which the cloud can be programmed and deployed.
3. Understanding cloud service providers .

SYLLABUS

UNIT I

Computing Paradigms, High-Performance Computing, Parallel Computing. Distributed Computing. Cluster Computing. Grid Computing, Cloud Computing. Bio computing, Mobile Computing. Quantum Computing, Optical Computing. Nano computing.

UNIT II

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics...Four Cloud Deployment Models

UNIT III

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure, Managing the Cloud application, Migrating, Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers. Other Cloud Service Models

UNIT V:

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue Service, Microsoft Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM Cloud

Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjra soft Aneka Platform

TEXT BOOKS:

1. Essentials of Cloud Computing : K.Chandrasekhran , CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing , Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

ARTIFICIAL INTELLIGENCE (Core Elective – III)

I M. Tech. - II Semester
Course Code: B25817

L T P C
4 - - 4

COURSE OVERVIEW:

Artificial Intelligence (AI) technology is increasingly prevalent in our everyday lives. It has uses in a variety of industries from gaming, journalism/media, to finance, as well as in the state-of-the-art research fields from robotics, medical diagnosis, and quantum science. In this course you'll learn the basics and applications of AI, including: machine learning, probabilistic reasoning, robotics, computer vision, and natural language processing.

COURSE OBJECTIVES:

1. Show knowledge of facts and concepts
2. Summarize the semester's learning
3. Carry out documented research on AI
4. Participate in class activities throughout the semester
5. Solve problems as part of a team of Present

COURSE OUTCOMES:

1. Describe the key components of the artificial intelligence (AI) field and its relation and role in Computer Science;
2. Identify and describe artificial intelligence techniques, including search heuristics, knowledge representation, automated planning and agent systems, machine learning, and probabilistic reasoning;
3. Identify and apply AI techniques to a wide range of problems, including complex problem solving via search, knowledge-base systems, machine learning, probabilistic models, agent decision making, etc.;
4. Design and implement appropriate AI solution techniques for such problems;

SYLLABUS

UNIT - I

INTRODUCTION TO ARTIFICIAL INTELLIGENCE: Problem and search- what is AI technique, criteria for success, Problem space and search - defining the problem as a state space search, production systems problem characteristics, production system characteristics.

PROBLEM SPACE AND SEARCH: Defining the problem as a state space search, production systems problem characteristics, production system characteristics.

HEURISTIC SEARCH TECHNIQUES: Generate test, Hill Climbing, BFS, Problem Reduction Constraint Satisfaction.

UNIT - II

KNOWLEDGE REPRESENTATION ISSUE: Representation and mapping, Issues in knowledge Representation.

USING PREDICATE LOGIC: Representation simple facts in logic, Representation Instance, Computable Function and Predicates, Resolution, conversion to clause form, the unification Algorithm.

REPRESENTING KNOWLEDGE USING RULES: Procedural verses Declarative knowledge, logic programming. Forward and backward, Matching, Control Knowledge.

SYMBOLIC REASONING UNDER UNCERTAINTY: Introduction to non-monotonic reasoning, Logic for non-monotonic Reasoning. Implementation Issue, Augmenting a problem solver, Implementation of DFS, Implementation of BFS.

UNIT - III

WEAK SLOT AND FILTER STRUCTURE: Semantic nets-Intersection search, representing non binary predicates, partitioned semantic nets, Frame-Frames as sets and instances, slots.

STRONG SLOT AND FILTER STRUCTURE: conceptual dependency-the dependencies of conceptual dependency, Scripts

GAME PLAYING: Overview, The mini max search Procedure, Adding alpha-beta Cutoffs.

UNIT - IV

UNDERSTANDING: what understands-the conceptual dependency of a paragraph, what makes understanding, Understanding as constraint Satisfaction-applying constraints in analysis problems, Algorithm: waltz.

NATURAL LANGUAGE PROCESSING: Introduction, Syntactic processing-grammars and parsers, top down vs. bottomup, finding one interpretation or many, ATN, Semantic Analysis-lexical processing, sentence level processing, semantic grammars, case grammars.

LEARNING: What is learning, Rote learning, Learning by taking Advice, Learning in problem solving, learning from examples.

UNIT - V

EXPERT SYSTEMS: Representing and using domain Knowledge, expert system skills, Explanation, Knowledge Acquisition.

PERCEPTION AND ACTION: Real -Time search, Perception-vision, speech recognition, Action.

TEXT BOOKS:

1. Rich knight (2002), Artificial Intelligence, 2nd edition, Tata McGraw-Hill, New Delhi.
2. Simon Haykin (1999), Neural Networks: a comprehensive Foundation, 2nd edition, Pearson Education, India.

REFERANCE BOOKS:

1. Patrick Henry Winston (2001), Artificial Intelligence, 3rd edition, Pearson Education Private Limited, India.
2. B. Yegnanarayana (2001), Artificial Neural Networks, Prentice Hall of India, New Delhi.

BIG DATA ANALYTICS (Core Elective – III)

I M. Tech. - II Semester
Course Code: B25818

L T P C
4 - - 4

PREREQUISITES

Data Mining

OBJECTIVES

1. The purpose of this course is to provide the students with the knowledge of Big data Analytics principles and techniques.
2. This course is also designed to give an exposure of the frontiers of Big data Analytics

OUTCOMES

1. Ability to explain the foundations, definitions, and challenges of Big Data and various Analytical tools.
2. Ability to program using HADOOP and Map reduce, NOSQL
3. Ability to understand importance of Big Data in Social Media and Mining.

SYLLABUS

UNIT - I

Big Data Analytics : What is big data, History of Data Management ; Structuring Big Data ; Elements of Big Data ; Big Data Analytics; Distributed and Parallel Computing for Big Data; Big Data Analytics:What is Big Data Analytics, What Big Data Analytics Isn't, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why Big Data Analytics Important; Data Science; Data Scientist; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open source Analytics Tools;

UNIT - II

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics; Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

UNIT - III

Understanding MapReduce Fundamentals and HBase : The MapReduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; Storing Data in Hadoop : Introduction of HDFS, Architecture, HDFS Files, File system types, commands, org.apache.hadoop.io package, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations-Programming with HBase; Installation, Combining HBase and HDFS;

UNIT - IV

Big Data Technology Landscape and Hadoop : NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors; HDFS (Hadoop Distributed File System), HDFS Daemons, read,write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN.

UNIT - V

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets; Mobile Analytics: Introducing Mobile Analytics; Define Mobile Analytics; Mobile Analytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools;

TEXT BOOKS

1. BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. BIG DATA, Black Book™, DreamTech Press, 2015 Edition.
3. BUSINESS ANALYTICS 5e, BY Albright |Winston

REFERENCE BOOKS:

1. Rajiv Sabherwal, Irma Becerra- Fernandez,” Business Intelligence – Practice, Technologies and Management”, John Wiley 2011.
2. Lariss T. Moss, ShakuAtre, “ Business Intelligence Roadmap”, Addison-Wesley It Service.
3. Yuli Vasiliev, “ Oracle Business Intelligence : The Condensed Guide to Analysis and Reporting”, SPD Shroff, 2012.

INFORMATION RETRIEVAL SYSTEMS (Core Elective – III)

I M. Tech. - II Semester
Course Code: B25819

L T P C
4 - - 4

COURSE OVERVIEW

This course is designed to learn about the techniques used to retrieve useful information from repositories such as the Web. The course first introduces standard concepts in information retrieval such as documents, queries, collections, and relevance. Efficient indexing, to allow for the quick identification of candidate answer documents, is considered. To find the best answers, a range of querying approaches (such as Boolean and Ranked retrieval) are studied. The course then covers a selection of application areas such as music search, document summarization, cross-lingual retrieval, and image retrieval.

Course Objective:

1. To learn the different models for information storage and retrieval
2. To learn about the various retrieval utilities
3. To understand indexing and querying in information retrieval systems
4. To expose the students to the notions of structured and semi structured data
5. To learn about web search
6. Learning Outcome:
7. At the end of the course students will be assessed to determine whether they are able to
8. store and retrieve textual documents using appropriate models
9. use the various retrieval utilities for improving search
10. do indexing and compressing documents to improve space and time efficiency
11. formulate SQL like queries for unstructured data

SYLLABUS

UNIT I

Introduction to Information Retrieval

Retrieval Strategies: Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model, Language Models

UNIT II

Retrieval Utilities: Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

UNIT III

Retrieval Utilities: Semantic networks, Parsing.

Cross-Language Information Retrieval: Introduction, Crossing the language barrier.

UNIT IV

Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection

UNIT V

Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema.

Distributed Information Retrieval: A Theoretical model of distributed retrieval, Web search.

TEXT BOOKS:

- T1. Information retrieval Algorithms and Heuristics by David Grossman and Ophir Prieder, 2nd Edition, Springer.

REFERENCE BOOKS

- R1. Information retrieval datastructures and algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education, 2007
- R2. Information storage & retrieval By Robert Korfhage-John Wiley&sons
- R3. Natural language processing and information retrieval By U.S. Tiwary, Oxford University

SOCIAL MEDIA AND WEB MINING (Core Elective – IV)

I M. Tech. - II Semester
Course Code: B25820

L T P C
4 - - 4

PREREQUISITES

Data Mining

OBJECTIVES:

1. The purpose of this course is to provide the students with knowledge of social media & web mining principles and techniques.
2. This course is also designed to give an exposure of the frontiers of social media web mining (Face book, twitter)
3. To introduce new technology for data analysis.

OUTCOMES:

1. Ability to understand social media and its data.
2. Ability to apply mining technologies on twitter, facebook, LinkedIn and Google+
3. Ability to apply web mining technologies, NLP concepts to summarize, mine data on web pages, blogs.
4. Ability to Program using “R” and the tool Twitter ‘R’

SYLLABUS

UNIT - 1

Social media mining, Fundamentals, new challenges, key concepts, Good Data vs Bad Data, understanding sentiments, Sentiment Analysis, Classification, supervised social media mining, unsupervised social media mining, human sensors under honest signals.

UNIT - 2

Recommendation in Social Media, Challenges, Classical Recommendation Algorithms, Recommendation Using Social Context, Evaluating Recommendations.

UNIT - 3

Mining Twitter: Exploring Trending Topics, Discovering What People Are Talking About, Mining Face book: Analyzing Fan Pages, Examining Friendships, Mining LinkedIn: Faceting Job Titles, Clustering Colleagues, Mining Google+: Computing Document Similarity, Extracting Collocations.

UNIT - 4

Mining Web Pages: web content mining, web structure mining, web usage mining, Natural Language Processing to Understand Human Language, Summarize Blog Posts, Mining Mailboxes, Mining GitHub, Inspecting Software Collaboration Habits, Building Interest Graphs, Mining the Semantically Marked-Up Web: Extracting Micro formats, Inference over RDF.

UNIT - 5

Getting started with R:Why R?, Quick start, The basics-Assignment and Arithmetic, Functions, Arguments and help vectors, sequences and combining vectors, creating data frames and importing files, Visualization in Rstyle and workflow, Mining Twitter with R:why Twitter data? Obtaining Twitter data, preliminary analyses.

TEXT BOOKS:

1. Mining the Social Web, 2nd Edition Data Mining Face book, Twitter, LinkedIn, Google+, GitHub, and More By Matthew A. Russell Publisher: O'Reilly Media.
2. Social Media Mining with R [Kindle Edition] NATHAN DANNEMAN RICHARD HEIMANN, 2011.

**RESEARCH METHODOLOGIES
(Core Elective – IV)**

I M. Tech. - II Semester
Course Code: B25821

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4 - - 4

PREREQUISITE

NIL

OBJECTIVE

Introduces research paper writing and publication skills

OUTCOME

Gain the sound knowledge of the following important elements:

1. Ability to distinguish research methods
2. Ability to write and publish a technical research paper.
3. Ability to review papers effectively

SYLLABUS

UNIT - I

Introduction, Technical Research Paper Writing and Publication

UNIT - II

Research Paper Search

UNIT - III

Research Ethics, Research Methods in Computer Science and Engineering, Research Methods for Software Engineering, Research Methods (deductive methods and proofs)

UNIT - IV

Paper Publishing and Reviewing, Measured-based research methods in Computer Engineering

UNIT - V

Preparation & Presentation of a scientific paper

REFERENCE:

Web Resources

1. A Computer Scientist's Guide to Writing and Publishing Technical Articles, Paul Martin, Technical Report, CS-TR-95-4, Dept of CS, Victoria University of Wellington, New Zealand, 1995.
2. Marcia Martens Pierson, Bion L. Pierson, Beginnings and Endings: Keys to Better Engineering Technical Writing, IEEE Transactions on Professional Communication (IEEE T-PC), Vol. 40, No. 4, pp 299 - 304 December 1997

HIGH PERFORMANCE COMPUTING (Core Elective – IV)

I M. Tech. - II Semester
Course Code: B25822

L T P C
4 - - 4

PREREQUISITES

Computer Organization & Architecture, Operating System Programming

OBJECTIVES

1. To Improve the system performance
2. To learn various distributed and parallel computing architecture
3. To learn different computing technologies

OUTCOMES

1. Understanding the concepts in grid computing
2. Ability to set up cluster and run parallel applications
3. Ability to understand the cluster projects and cluster OS
4. Understanding the concepts of pervasive computing & quantum computing.

SYLLABUS

UNIT - I

Grid Computing: Data & Computational Grids, Grid Architectures And Its Relations To Various Distributed Technologies. Autonomic Computing, Examples Of The Grid Computing Efforts (Ibm).

UNIT - II

Cluster Setup & Its Advantages, Performance Models & Simulations; Networking Protocols & I/O, Messaging Systems. Process Scheduling, Load Sharing And Balancing; Distributed Shared Memory, Parallel I/O.

UNIT - III

Example Cluster System – Beowulf; Cluster Operating Systems: Compas And Nanos Pervasive Computing Concepts & Scenarios; Hardware & Software; Human – Machine Interface.

UNIT - IV

Device Connectivity; Java For Pervasive Devices; Application Examples.

UNIT - V

Classical Vs Quantum Logic Gates; One, Two & Three Qubit Quantum Gates; Fredkin & Toffoli Gates; Quantum Circuits; Quantum Algorithms.

TEXT BOOK:

1. "Selected Topics In Advanced Computing" Edited By Dr. P. Padmanabham And Dr. M.B. Srinivas, 2005 Pearson Education.

REFERENCES:

1. J. Joseph & C. Fellenstien: 'Grid Computing', Pearson Education
2. J. Burkhardt et.al: 'pervasive computing' Pearson Education
3. Marivesar: 'Approaching quantum computing', pearson Education.
4. Raj kumar Buyya: 'High performance cluster computing', pearson Education.
5. Neilsen & Chung L: 'Quantum computing and Quantum Information', Cambridge University Press.
6. A networking approach to Grid Computing, Minoli, Wiley

INTRODUCTION TO WEB MARKUP LANGUAGES (Open Elective – II)

I M. Tech. - II Semester
Course Code: B25833

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COURSE OVERVIEW

This course will impart basic skills of web page development and fundamental operations of cloud computing.

COURSE OBJECTIVES

- I. To inculcate basic of web page design using HTML tags.
- II. To teach frames and div tags to partition webpage.
- III. To facilitate students in applying styles to web content
- IV. To demonstrate cloud storage using blue mix.

COURSE OUTCOMES

At the end of this course students will be able to

1. To develop static web pages using HTML tags.
2. To add styles to text and other controls using CSS
3. To create forms to collect input from web users.
4. To access blue mix cloud to upload HTML files.
5. To compare various search engines.

SYLLABUS

UNIT - I

History of Internet, World Wide Web (WWW), WWW vs. Internet. Introduction to HTML, Differences between HTML and HTML5, Structure of HTML document. Tag, Attributes, Elements.

Basic HTML Tags: Working with Text, comments, Headings, Paragraphs, line break, preformatting tags.

UNIT - II

Lists, Tables, Links, Marquee tags, Images and Multimedia audio & video tags, Frames, Frameset, div tag, iframe, Forms, attributes of forms, request methods, input types.

UNIT - III

HTML DOM: Document, Window, Navigator, Screen, History, Location objects.

Overview of CSS. Types of CSS: Inline Style sheet, embedded style sheets, External style sheets.

UNIT - IV

Background and Colour gradients in CSS, Font and Text Styles, List, Table layouts, Effects, Frames in CSS.

UNIT - V

Introduction to Cloud Computing including benefits, challenges, and risks, Cloud Computing Models including Infrastructure/Platform/Software – as-a-service, Public cloud, private cloud and hybrid clouds. Uploading files to Cloud.

TEXT BOOK

1. Text Book: HTML 5 BLACK BOOK author: Kogent Learning Solutions Inc. DREAMTECH PRESS.

REFERENCES

1. Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics Fourth Edition, Jennifer Niederst Robbins O'Reilly publications
2. Mastering cloud computing by Rajkumar Buyya

ADHOC & SENSOR NETWORKS (Open Elective – II)

I M. Tech. - II Semester
Course Code: B25834

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4 - - 4

PREREQUISITES

Computer Networks, Distributed Systems / Distributed Operating Systems / Advanced Operating Systems Mobile Computing

OBJECTIVES

1. To understand the concepts of sensor networks
2. To understand the MAC and transport protocols for adhoc networks
3. To understand the security of sensor networks
4. To understand the applications of adhoc and sensor networks

OUTCOMES

1. Understanding the state of the art research in emerging subject of ad hoc and wireless sensor networks (ASN)
2. Ability to solve the issues in real-time application development based on ASN
3. Ability to conduct further research in the ASN domain

SYLLABUS

UNIT I

Introduction to Ad Hoc Networks - Characteristics of MANETs, Applications of MANETs and Challenges of MANETs.

Routing in MANETs - Criteria for classification, Taxonomy of MANET routing algorithms, Topology-based routing algorithms-Proactive: DSDV, WRP; Reactive: DSR, AODV, TORA; Hybrid: ZRP; Position-based routing algorithms-Location Services-DREAM, Quorum-based, GLS; Forwarding Strategies: Greedy Packet, Restricted Directional Flooding- DREAM, LAR; Other routing algorithms-QoS Routing, CEDAR.

UNIT II

Data Transmission - Broadcast Storm Problem, Rebroadcasting Schemes-Simple-flooding, Probability-based Methods, Area-based Methods, Neighbour Knowledge-based: SBA, Multipoint Relaying, AHBP. Multicasting: Tree-based: AMRIS, MAODV; Mesh-based: ODMRP, CAMP; Hybrid: AMRoute, MCEDAR and Geocasting: Data-transmission Oriented-LBM; Route Creation Oriented-GeoTORA, MGR.

UNIT III

TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc Basics of Wireless, Sensors and Applications
Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer.

UNIT IV

Data Retrieval in Sensor Networks: Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

UNIT V

Security - Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

TEXT BOOKS:

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P. Aggarwal, World Scientific Publications, March 2006, ISBN – 981-256-681-3
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman)

SOFTWARE TESTING METHODOLOGIES (Open Elective – II)

I M. Tech. - II Semester
Course Code: B25835

L T P C
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PREREQUISITES

Software Engineering

OBJECTIVES

1. To provide knowledge of the concepts in software testing such as testing process, criteria, strategies, and methodologies.
2. To develop skills in software test automation and management using latest tools.

OUTCOMES

1. Ability to design and develop the best test strategies in accordance to the development models
2. Acquire skills to perform dataflow testing, domain testing, logic testing.

SYLLABUS

UNIT - I

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

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 - II

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

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

UNIT - III

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

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

UNIT - IV

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

UNIT - V

Graph Matrices and Application:- Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

TEXT BOOKS:

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

REFERENCE BOOKS:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(o'reilly)
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.

WEB SERVICES LAB

I M. Tech. - II Semester
Course Code: B25815

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OBJECTIVES:

1. To implement the technologies like WSDL, UDDI.
2. To learn how to implement and deploy web service client and server

LIST OF PROGRAMS:

1. Write a program to implement WSDL Service (Hello Service . WSDL File)
2. Write a program the service provider can be implement a single get price(), static bind() and get product operation.
3. Write a program to implement the operation can receive request and will return a response in two ways.
a) One-Way operation b) Request - Response
4. Write a program to implement to create a simple web service that converts the temperature from Fahrenheit to Celsius (using HTTP Post Protocol)
5. Write a program to implement business UDDI Registry entry
6. Write a program to implement
a) Web based service consumer
b) Windows application based web service consumer