ACADEMIC REGULATIONS,
COURSE STRUCTURE
and
DETAILED SYLLABUS
R22

B.Tech – Computer Science & Engg.,
(Data Science)

B.Tech - Regular Four Year Degree Programme
(For batches admitted from the academic year 2022 - 2023)

Holy Mary Institute of Technology & Science
Bogaram (V), Keesara (M), Medchal (Dist) - 501 301

FOREWORD

The autonomy is conferred on Holy Mary Institute of Technology & Science by UGC, based on its performance as well as future commitment and competency to impart quality education. It is a markof 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 butunder its observance.

Holy Mary Institute of Technology & Science 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 two decades 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 theGoverning 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 in 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 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

ACADEMIC REGULATIONS

B. Tech. - Regular Four Year Degree Programme
(For batches admitted from the academic year 2022-23)
&
B. Tech. - Lateral Entry Scheme
(For batches admitted from the academic year 2023-24)

For pursuing four year Under Graduate Degree Programme of study in Engineering & Technology (UGP in E&T) offered by Holy Mary Institute of Technology & Science under Autonomous status is herein referred to as HITS (Autonomous):

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2022-23 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for Holy Mary Institute of Technology & Science (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, Holy Mary Institute of Technology & Science shall be the chairman Academic Council.

1. ADMISSION

1.1. Admission into first year of four year B. Tech. degree programmes of study in Engineering

1.1.1. Eligibility:

A candidate seeking admission into the first year of four year B. Tech. degree Programmes should have:

(i) Passed either Intermediate Public Examination (I.P.E) conducted by the Board of Intermediate Education, Telangana, with Mathematics, Physics and Chemistry as optional subjects or any equivalent examination recognized by Board of Intermediate Education, Telangana or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Telangana or equivalent Diploma recognized by Board of Technical Education for admission as per guidelines defined by the Regulatory bodies of Telangana State Council for Higher Education (TSCHE) and AICTE.

(ii) Secured a rank in the EAMCET examination conducted by TSCHE for allotment of a seat by the Convener, EAMCET, for admission.

1.1.2. Admission Procedure:

Admissions are made into the first year of four year B. Tech. Degree Programmes as per the stipulations of the TSCHE.

(a) Category 'A' seats are filled by the Convener, TSEAMCET.
(b) Category 'B' seats are filled by the Management.

1.2 Admission into the second year of four year B. Tech. degree Program in Engineering

1.2.1 Eligibility:

A candidate seeking admission under lateral entry into the II year I Semester B. Tech. degree Programmes should have passed the qualifying exam (B.Sc. Mathematics or Diploma in concerned course) and based on the rank secured by the candidate at Engineering Common Entrance Test ECET (FDH) in accordance with the instructions received from the Convener, ECET and Government of Telangana.

1.2.2 Admission Procedure:

Admissions are made into the II year of four year B. Tech. degree Programmes through Convener, ECET (FDH) against the sanctioned strength in each Programmes of study as lateral entry students.

2. PROGRAMMES OFFERED

Holy Mary Institute of Technology & Science, an autonomous college affiliated to JNTUH, offers the following B.Tech Programmes of study leading to the award of B. Tech degree under the autonomous scheme.

1) B.Tech – Civil Engineering
2) B.Tech – Computer Science and Engineering
3) B.Tech – Computer Science and Engineering (Artificial Intelligence & Machine Learning)
4) B.Tech – Computer Science and Engineering (Data Science)
5) B.Tech – Computer Science and Engineering (IoT)
6) B.Tech – Electronics and Communication Engineering
7) B.Tech – Electrical & Electronics Engineering
8) B.Tech – Mechanical Engineering
9) B.Tech – Artificial Intelligence (AI) and Data Science

The medium of instructions for the entire under graduate programme in Engineering & Technology will be **English** only.

3. DURATION OF THE PROGRAMMES

3.1 Normal Duration

3.1.1 B. Tech. degree programme extends over a period of four academic years leading to the Degree of Bachelor of Technology (B.Tech.) of the Jawaharlal Nehru Technological University Hyderabad.

3.1.2 For students admitted under lateral entry scheme, B. Tech. degree programme extends over a period of three academic years leading to the Degree of Bachelor of Technology (B. Tech.) of the Jawaharlal Nehru Technological University Hyderabad.

3.2 Maximum Duration

3.2.1 The maximum period within which a student must complete a full-time academic programme is 8 years for B. Tech. If a student fails to complete the academic programme within the maximum duration as specified above, he shall forfeit the seat in B.Tech and his admission shall stand cancelled.

3.2.2 For students admitted under lateral entry scheme in B. Tech. degree programme, the maximum period within which a student must complete a full-time academic programme is 6 years. If a student fails to complete the academic programme within the maximum duration as specified above, he shall forfeit the seat in B.Tech and his admission shall stand cancelled.

3.2.3 The period is reckoned from the academic year in which the student is admitted first time into the degree Programme.

4. AWARD OF B.Tech DEGREE

A student will be declared eligible for the award of the B.Tech degree if he/she fulfils the following academic regulations:

4.1 The candidate shall pursue a course of study as specified in section 3.1 and 3.2.

4.2 The candidate shall register for **160** credits and secure **160** credits (Excluding Mandatory Courses).

5. PROGRAMME STRUCTURE

5.1 UGC/AICTE specified Definitions/ Descriptions are adopted appropriately for various terms and abbreviations used in these Academic Regulations/ Norms, which are listed below.

Semester Scheme:

Each UGP is of 4 Academic Years (8 Semesters), each year divided into two Semesters of 22 weeks (≥90 working days), each Semester having - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'under Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as denoted by UGC, and Curriculum/Course Structure as suggested by AICTE are followed.

5.1.1 The B.Tech. Programme of Holy Mary Institute of Technology & Science is Semester pattern, with 8 Semesters constituting 4 Academic Years, each Academic Year having TWO Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 16-18 Weeks duration with a minimum of 90 Instructional Days per Semester.

5.1.2 Credit Courses:

a) All Courses are to be registered by a student in a Semester to earn Credits. Credits shall be assigned to each Subject/ Course in a L: T: P: C (Lecture Periods: Tutorial Periods: Practical Periods : Credits) Structure, based on the following general pattern .

- One Credit - for One hour / Week / Semester for Theory / Lecture(L) / Tutorial)T) Courses; and
- One Credit - for Two hours/Week/Semester for Laboratory/Practical (P) Courses, Mini Project...
- Mandatory Courses Credits shall not be counted for credit requirements for award of degree. However all the mandatory courses have to be passed by the student.

5.1.3 Course Classification:

All Courses offered for the UGP are broadly classified as:

- **Basic Science Courses (BSC):** Includes Mathematics, Physics, Chemistry, Biology etc.
- **Engineering Science Courses (ESC):** Courses include Materials, Workshop, Basics of Electrical/Electronics/ Mechanical/Computer Science & Engineering, Engineering Graphics, Instrumentation, Engineering Mechanics, Instrumentation etc.
- **Humanities and Social Science including Management Courses (HSMC):** Courses include English, Communication skills, Management etc.
- **Professional Core Courses (PCC):** Relevant to the chosen specialization/branch.
- **Professional Elective Courses (PEC):** Relevant to the chosen specialization/ branch offered as electives.
- **Open Elective Courses (OEC):** Other technical and/or emerging subject areas offered in the College by the Departments of Engineering, Science and Humanities.
- **Mandatory Course:** Course work on peripheral subjects in a programme, wherein familiarity considered mandatory. To be included as non-Credit, Mandatory Courses, with only a pass in each required to qualify for the award of degree from the concerned institution.
- **Project Work:** and/or internship in industry or elsewhere, seminar.
- **MOOCS –** Massive Open Online Courses in a variety of disciplines available at both introductory and advanced levels, accessible from e-resources in India and abroad.

5.1.4 Course Nomenclature:

The Curriculum Nomenclature or Course-Structure Grouping for the each of the UGP E&T (B.Tech Degree Programme) is as listed below.

S. No	Broad Course Classification	Course Group/ Category	Course Description	Credits
1)	Foundation Courses (FnC)	BSC – Basic Sciences Courses	Includes - Mathematics, Physics and Chemistry Subjects	25
2)		ESC - Engineering Sciences Courses	Includes fundamental engineering subjects.	24
3)		HSMC – Humanities and Social Sciences including Management	Includes subjects related to Humanities, Social Sciences and Management.	12
4)	Core Courses (CoC)	PCC – Professional Core Courses	Includes core subjects related to the Parent Discipline/ Department/ Branch of Engg.	57
5)	Elective Courses (ElC)	PEC– Professional Elective Courses	Includes Elective subjects related to the Parent Discipline / Department / Branch of Engg.	18

6)		OEC – Open Elective Courses	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the Parent Discipline/ Department / Branch of Engg.	09
7)	Core Courses	Project Work	Major Project.	15
8)		Industrial Training/ Mini-Project	Industrial Training/ Internship/ Mini-Project.	
9)		Seminar	Seminar / Colloquium based on core contents related to Parent Discipline/ Department/ Branch of Engg.	
10)	Mandatory Courses (MC)	-	Mandatory Courses (non-credit)	--
Total Credits for UGP (B. Tech)Programme				**160**

- Minor variations as per AICTE / UGC guidelines

6. COURSE REGISTRATION

6.1 A 'Faculty Advisor or Counselor' shall be assigned to each student, who advises him/her about the UGP, its Course Structure and Curriculum, Choice/Option for Subjects/Courses, based on his/her competence, progress, pre-requisites and interest.

6.2 Academic Section of the College invites 'Registration Forms' from students prior (before the beginning of the Semester), ensuring 'DATE and TIME Stamping'. The Registration Requests for any 'CURRENT SEMESTER' shall be completed BEFORE the commencement of SEEs (Semester End Examinations) of the 'PRECEDING SEMESTER'.

6.3 A Student can apply for Registration, which includes approval from his faculty advisor, and then should be submitted to the College Academic Section through the Head of Department (a copy of the same being retained with Head of Department, Faculty Advisor and the Student).

6.4 A student may be permitted to register for his/her course of CHOICE with a Total of prescribed credits per Semester (permitted deviation being±12%), based on his PROGRESS and SGPA/CGPA, and completion of the 'PRE-REQUISITES' as indicated for various courses in the Department Course Structure and Syllabus contents.

6.5 Choice for 'additional Courses' must be clearly indicated, which needs the specific approval and signature of the Faculty Advisor/Counselor.

6.6 If the Student submits ambiguous choices or multiple options or erroneous (incorrect) entries during Registration for the Course(s) under a given/specified Course Group/ Category as listed in the Course Structure, only the first mentioned Course in that Category will be taken into consideration.

6.7 Dropping of Courses or changing of options may be permitted, ONLY AFTER obtaining prior approval from the Faculty Advisor, 'within 15 Days of Time' from the commencement of that Semester. Course Options exercised through Registration are final and CAN NOT be changed, and CAN NOT be inter-changed; further, alternate choices will also not be considered. However, if the 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 Head of the Department, with due notification and time-framed schedule, within the FIRST WEEK from the commencement of Class-work for that Semester.

7. COURSES TO BE OFFERED

7.1 A typical section (or class) strength for each semester shall be 60.

7.2 Courses may be offered to the Students, only if minimum of 20 students (1/3rd of the section strength) opt for it.

7.3 More than ONE TEACHER may offer the SAME SUBJECT (Lab/Practical's may be included with the corresponding Theory Subject in the same Semester) in any Semester. However, selection choice for students will be based on - 'CGPA Basis Criterion' (i.e., the first focus shall be on early Registration in that Semester, and the second focus, if needed, will be on CGPA of the student).

7.4 If more entries for Registration of a Subject come into picture, then the concerned Head of the Department shall take necessary decision, whether to offer such a Subject/Course for TWO (or multiple) SECTIONS or NOT.

7.5 OPEN ELECTIVES will be offered by a department to the students of other departments.

8. ATTENDANCE REQUIREMENTS

a. A student will be eligible to appear for the End Semester Examinations, if he acquires a minimum of 75% of attendance in aggregate of all the Subjects/Courses (excluding Mandatory or Non-Credit Courses) for that Semester.

b. Condoning of shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each Semester may be granted by the College Academic Committee on genuine and valid grounds, based on the student's representation with supporting evidence by following the govt. rules in vogue.

c. A stipulated fee shall be payable towards condoning of shortage of attendance.

d. Shortage of Attendance below 65% in aggregate shall in No case be condoned.

e. A student shall not be promoted to the next Semester unless he/she satisfies the attendance requirements of the current Semester. The student may seek readmission for the Semester when offered next. He / She shall not be allowed to register for the subjects of the Semester while he/she is in detention. A student detained due to shortage of attendance, will have to repeat that Semester when offered next. The academic regulations under which the student has been readmitted shall be applicable.

f. Students whose attendance is less than 75% are not entitled to get the scholarship / fee reimbursement in any case as per the TS Govt. Rules in force.

9. ACADEMIC REQUIREMENTS FOR PROMOTION / COMPLETION OF REGULAR B.TECH PROGRAMME COURSE STUDY.

9.1 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course, if student secures not less than 35% (14 marks out of 40 marks) in the internal examinations, not less than 35% (21 marks out of 60 marks) in the semester end examination, and a minimum of 40% (40 marks out of 100 marks) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of letter grades, this implies securing 'C' grade or above in that subject/ course.

9.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to Real-time Research Project (or) Field Based Research Project (or) Industry Oriented Mini Project (or) Internship (or) Seminar, if the student secures not less than 40% marks (i.e. 40 out of 100 allotted marks) in each of them. The student is deemed to have failed, if he (i) does not submit a report on Industry Oriented Mini Project/Internship, or (ii) not make a presentation of the same before the evaluation committee as per schedule, or (iii) secures less than 40% marks in Real-time Research Project (or) Field Based Research Project (or) Industry Oriented Mini Project (or) Internship evaluations**.**

9.3 A Student will not be promoted from I Year to II Year, unless he/she fulfills the Attendance and Academic Requirements and secure a Total 50% of Credits up to I Year II Semester from all the relevant regular and supplementary examinations.

9.4 A Student will not be promoted from II Year to III Year, unless he/she fulfills the Attendance and Academic Requirements and secure a Total 60% of Credits up to II Year II Semester from all the relevant regular and supplementary examinations.

9.5 A Student will not be promoted from III Year to IV Year, unless he/she fulfills the attendance and Academic Requirements and secure a Total 60% of Credits up to III Year II Semester, from all the regular and supplementary examinations.

9.6 After securing the necessary 160 Credits as specified for the successful completion of the entire UGP, resulting in 160 Credits for UGP performance evaluation, i.e., the performance of the Student in these 160 Credits shall alone be taken into account for the calculation of the final CGPA.

If a Student registers for some more 'extra courses' (in the parent Department or other Departments/Branches of Engg.) other than those listed courses Totaling to 160 Credits as specified in the Course Structure of his/her Department, the performances in those 'extra courses' (although evaluated and graded using the same procedure as that of the required 160 Credits) will not be taken into account while calculating the SGPA and CGPA. For such 'extra courses' registered, % marks and Letter Grade alone will be indicated in the Grade Card, as a performance measure, subject to completion of the Attendance and Academic Requirements as stated in items 8 and 9.1-9.5.

9.7 Students who fail to earn minimum of 160 Credits as per the Course Structure, and as indicated above, within 8 Academic Years from the Date of Commencement of their I Year shall forfeit their seats in B.Tech Programme and their admissions shall stand cancelled. **There is NO exemption of credits in any case.**

When a Student is detained due to shortage of attendance/lack of credits in any Semester, he may be re-admitted into that Semester, as and when offered. However the regulations at the time of admissions hold good.

10. EVALUATION - DISTRIBUTION AND WEIGHTAGE OF MARKS

10.1 The performance of a student in each Semester shall be evaluated Course-wise (irrespective of Credits assigned) with a maximum of 100 marks for Theory. The B.Tech Project Work (Major Project) will be evaluated for 100 marks in Phase-I and 100 Marks in Phase-II.

10.2 For all Theory Courses as mentioned above, the distribution shall be 40 marks for CIE, and 60 marks for the SEE.

10.3 Continuous Internal Evaluation:

In CIE, for theory subjects, during a semester, there shall be two mid-term examinations. Mid-Term examination for 30 marks, consist of two parts.

i) Part – A for 10 marks,
- ✓ Part - A: Objective/quiz paper for 10 marks. (The objective/ quiz paper is set with multiple choice, fill-in the blanks and match the following type of questions for a total of 10 marks.)

ii) Part – B for 20 marks with a total duration of 2 hours as follows:
- ✓ Part - B : Descriptive paper for 20 marks (The descriptive paper shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 5 marks.)

iii) **The remaining 10 marks of Continuous Internal Evaluation are distributed as**
a) Assignment for 5 marks (Average of 2 Assignments each for 5 marks)
b) Subject Viva-Voce/PPT/Poster Presentation/ Case Study on a topic in the concerned subject for 5 marks.

10.4 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.

10.4.1 Five (5) marks are allocated for assignments (as specified by the subject teacher concerned). The first assignment should be submitted before the conduct of the first mid-term examination, and the second assignment should be submitted before the conduct of the second mid-term examination. The average of the two assignments shall be taken as the final marks for assignment (for 5 marks).

Subject Viva-Voce/PPT/Poster Presentation/ Case Study on a topic in the concerned subject for 5 marks before II Mid-Term examination.

10.4.2 The Student, in each subject, shall have to earn 35% of marks (i.e. 14 marks out of 40 marks) in CIE, 35% of marks (i.e. 21 marks out of 60) in SEE and Overall 40%of marks (i.e. 40 marks out of 100 marks) both CIE and SEE marks put together.

The student is eligible to write Semester End Examination of the concerned subject, if the student scores ≥ 35% (14 marks) of 40 Continuous Internal Examination (CIE) marks.

In case, the student appears for Semester End Examination (SEE) of the concerned Subject but not scored minimum 35% of CIE marks (14 marks out of 40 internal marks), his performance in that subject in SEE shall stand cancelled inspite of appearing the SEE.
There is NO Computer Based Test (CBT) for R22 regulations.

10.5 Practical Examination Evaluation:

10.5.1 For practical subjects there shall be a Continuous Internal Evaluation (CIE) during the semester for 40 marks and 60 marks for semester end examination. Out of the 40 marks for internal evaluation:

1. A write-up on day-to-day experiment in the laboratory (in terms of aim, components/procedure, expected outcome) which shall be evaluated for 10 marks.
2. **10 marks for viva-voce (**or) tutorial (or) case study (or) application (or) poster Presentation of the course concerned.
3. Internal practical examination conducted by the laboratory teacher concerned shall be evaluated for 10 marks.
4. The remaining 10 marks are for Laboratory Project, which consists of the Design (or) Software / Hardware Model Presentation (or) App Development (or) Prototype Presentation submission which shall be evaluated after completion of laboratory course and before semester end practical examination.

The Semester End Examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the cluster / other colleges which will be decided by the examination branch of the institution.
In the Semester End Examination held for 3 hours, total 60 marks are divided and allocated as shown below:

1. 10 marks for write-up
2. 15 for experiment/program
3. 15 for evaluation of results
4. 10 marks for presentation on another experiment/program in the same laboratory course
5. 10 marks for viva-voce on concerned laboratory course.

10.5.2 The Student, in each subject, shall have to earn **35% of marks** (i.e. 14 marks out of 40 marks) in CIE, **35% of marks** (i.e. 21 marks out of 60) in SEE and Overall 40% of marks (i.e. **40 marks out of 100 marks**) both CIE and SEE marks put together.

The student is eligible to write Semester End Examination of the concerned subject, if the student scores ≥ 35% (14 marks) of **40 Continuous Internal Examination (CIE) marks.**

In case, the student appears for Semester End Examination (SEE) of the concerned Subject but not scored minimum **35% of CIE marks** (14 marks out of 40 internal marks), his performance in that subject in SEE shall stand cancelled inspite of appearing the SEE.

10.6 The evaluation of courses having ONLY internal marks in I-Year I Semester and II Year II Semester is as follows:

10.6.1 I Year I Semester course (ex., Elements of CE/ME/EEE/ECE/CSE): The internal evaluation is for 50 marks and it shall take place during I Mid-Term examination and II Mid-Term examination. The average marks of two Mid-Term examinations are the final for 50 marks. Student shall have to earn 40%, i.e 20 marks out of 50 marks from average of the two examinations. There shall be NO external evaluation. The student is deemed to have failed, if he (i) is absent as per schedule, or (ii) secures less than 40% marks in this course.

10.6.2 II Year II Semester Real-Time (or) Field-based Research Project course: The internal evaluation is for 50 marks and it shall take place during I Mid-Term examination and II Mid-Term examination. The average marks of two Mid-Term examinations are the final for 50 marks. Student shall have to earn 40%, i.e 20 marks out of 50 marks from average of the two examinations. There shall be NO external evaluation. The student is deemed to have failed, if he (i) does not submit a report on the Project, or (ii) does not make a presentation of the same before the internal committee as per schedule, or (ii) secures less than 40% marks in this course.

10.7 **Open Elective Course:** The students have to choose three Open Electives (OE-I, II & III) from the list of Open Electives given by other departments. However, the student can opt for an Open Elective subject offered by his own (parent) department, if the student has not registered and not studied that subject under any category (Professional Core, Professional Electives, Mandatory Courses etc.) offered by parent department in any semester. Open Elective subjects already studied should not repeat/should not match with any category (Professional Core, Professional Electives, Mandatory Courses etc.) of subjects even in the forthcoming semesters.

10.8 **Professional Electives:** The students have to choose Five Professional Electives (PE-I to V/VI) from the list of professional electives given.

10.9 There shall be Industry training (or) Internship (or) Industry oriented Mini-project (or) Skill Development Courses (or) Paper presentation in reputed journal (or) Industry Oriented Mini Project in collaboration with an industry of their specialization. Students shall register for this immediately after II-Year II Semester Examinations and pursue it during summer vacation/semester break & during III Year without effecting regular course work. Internship at reputed organization (or) Skill development courses (or) Paper presentation in reputed journal (or) Industry Oriented Mini Project shall be submitted in a report form and presented before the committee in III-year II semester before end semester examination. It shall be evaluated for 100 external marks. The committee consists of an External Examiner, Head of the Department, Supervisor of the Industry Oriented Mini Project (or) Internship etc, Internal Supervisor and a Senior Faculty Member of the Department. There shall be NO internal marks for Industry Training (or) Internship (or) Mini-Project (or) Skill Development Courses (or) Paper Presentation in reputed journal (or) Industry Oriented Mini Project.

10.10

a) UG project work shall be carried out in two stages: Project Stage – I during IV Year I Semester, Project Stage – II during IV Year II Semester. Each stage will be evaluated for 100 marks. Student has to submit project work report at the end of each semester. First report includes project work carried out in IV Year I semester and second report includes project work carried out in IV Year I & II Semesters. SEE for both project stages shall be completed before the commencement of SEE Theory examinations.

b) For Project Stage – I, the departmental committee consisting of Head of the Department, project supervisor and a senior faculty member shall evaluate the project work and project supervisor shall evaluate for 100 marks. The student is deemed to have failed, if he (i) does not submit a report on Project Stage - I or does not make a presentation of the same before the evaluation committee as per schedule, or (ii) secures less than 40% marks in the total of the CIE.
A student who has failed may reappear once for the above evaluation, when it is scheduled again; if he fails in such 'one reappearance' evaluation also, he has to reappear for the same in the next subsequent semester, as and when it is scheduled.

c) For Project Stage – II, the external examiner shall evaluate the project work for 60 marks and the project supervisor shall evaluate it for 40 marks. The topics for industrial oriented mini project and Project Stage – I shall be different from one another. The student is deemed to have failed, if he (i) does not submit a report on Project Stage - II, or does not make a presentation of the same before the external examiner as per schedule, or (ii) secures less than 40% marks in the sum total of the CIE and SEE taken together.
For conducting viva-voce of project stage – II, Chief Controller of Examinations selects an external examiner from the list of experts in the relevant branch submitted by the department HODs of the College.
A student who has failed may reappear once for the above evaluation, when it is scheduled again; if student fails in such 'one reappearance' evaluation also, he has to reappear for the same in the next subsequent semester, as and when it is scheduled.

10.11 **Semester End Examination:**

a) Question paper contains 2 Parts (Part-A and Part-B) having the questions distributed equally among all units.

b) The distribution of marks for i) PART-A for 10 marks ii) PART-B for 50 marks. Pattern of the question paper is as follows:

PART–A

Consists of one question which is compulsory. The question consists of ten sub-questions two from each unit and carries1 mark each.

PART-B

Consists of 5 questions carrying 10 marks each. Each of these questions is from one unit and may contain sub questions. Each question there will be an "either" "or" choice (that means there will be two questions from each unit and the student should answer any one question).

10.12 For Mandatory Non-Credit Courses offered in a Semester, The internal evaluation is for 100 marks and it shall take place during I Mid-Term examination and II Mid-Term examination. The average marks of two Mid-Term examinations are the final for 100 marks and has secured not less than 40% marks in the CIE, then the student is **PASS** and will be qualified for the award of the degree. No marks or Letter Grade shall be allotted for these courses/activities. However, for non-credit courses '**Satisfactory'** or "**Unsatisfactory'** shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

10.13 A student shall be given only one time chance to re-register for a maximum of two Subjects in a semester:

- If the internal marks secured by a student in the Continuous Internal Evaluation marks for 40 (Sum of average of two mid-term examinations consisting of Objective & descriptive parts, Average of two Assignments & Subject Vivavoce/PPT/ Poster presentation/ Case Study on a topic in the concerned subject) are less than 35% and failed in those subjects.
- A student must re-register for the failed subject(s) for 40 marks within four weeks of commencement of the classwork in next academic year. Also, the student has to earn 35% of total internal marks (14 out of 40 marks including Mid-Term examinations, Assignment& Subject Viva-voce/PPT/ Poster presentation/ Case Study on a topic in the concerned subject).
- In the event of the student taking this chance, his Continuous Internal Evaluation marks for 40 and Semester End Examination marks for 60 obtained in the previous attempt stand cancelled.

10.14 SWAYAM: College intends to encourage the students to do a minimum of one MOOC in discipline and open elective during third year. The respective departments shall give a list of **s**tandard MOOCs providers including SWAYAM whose credentials are endorsed by the BoS. In general, MOOCs providers provide the result in percentage. In such case, specified by the college shall follow the grade table mentioned in 12.2. The Credits for MOOC(s) shall be transferred same as given for the respective discipline or open electives. In case a student fails to complete the MOOCs he/she shall re-register for the same with any of the providers from the list provided by the department. The equivalence of the courses shall be established by the department committee. Still if a student fails to clear the course/s, or in case a provider fails to offer a MOOC in any semester, then in all such cases the college shall conduct the end semester examinations for the same as per the college end semester examination pattern. The syllabi for the supplementary examinations shall be same as that of MOOCs. There shall be no internal assessment however the marks obtained out of 70 shall be scaled up to 100 marks and the respective letter grade shall be allotted. The details of MOOC(s) shall be displayed in Memorandum of Grades of a student, provided he/she submits the proof of completion of it or them to the examination branch through the Coordinator/Mentor, before the end semester examination of the particular semester.

11 AWARD OF DEGREE

11.1 A student who registers for all the specified subjects/ courses as listed in the course structure and secures the required number of 160 credits (with CGPA ≥ 5.0), within 8 academic years from the date of commencement of the first academic year, shall be declared to have **'qualified'** for the award of B.Tech. degree in the branch of Engineering selected at the time of admission.

11.2 A student who qualifies for the award of the degree as listed in item 12.1 shall be placed in the following classes.

11.3 A student with final CGPA (at the end of the undergraduate programme) > 8.00, and fulfilling the following conditions - shall be placed in **'First Class with Distinction'**. However, he

(i) Should have passed all the subjects/courses in **'First Appearance'** within the first 4 academic years (or 8 sequential semesters) from the date of commencement of first year first semester.

(ii) Should not have been detained or prevented from writing the semester end examinations in any semester due to shortage of attendance or any other reason. A student not fulfilling any of the above conditions with final CGPA > 8 shall be placed in **'First Class'**.

11.4 Students with final CGPA (at the end of the undergraduate programme) ≥ 7.0 but < 8.00 shall be placed in **'First Class'**.

11.5 Students with final CGPA (at the end of the undergraduate programme) ≥ 6.00 but < 7.00, shall be placed in **'Second Class'**.

11.6 All other students who qualify for the award of the degree (as per item 12.1), with final CGPA (at the end of the undergraduate programme) ≥ 5.00 but < 6, shall be placed in **'pass class'**.

11.7 A student with final CGPA (at the end of the undergraduate programme) < 5.00 will not be eligible for the award of the degree.

12 LETTER GRADE AND GRADE POINT

12.1 Marks will be awarded to indicate the performance of each student in each Theory Subject, or Lab/Practical's, or Seminar, or Project, or Internship*/Mini-Project, Minor Course etc., based on the %marks obtained in CIE+SEE (Continuous Internal Evaluation + Semester End Examination, both taken together), and a corresponding Letter Grade shall be given.

12.2 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 (≥ 90% , ≤ 100%)	O (Outstanding)	10
Below 90% but not less than 80% (≥ 80% , < 90%)	A^+ (Excellent)	9
Below 80% but not less than 70% (≥ 70% , < 80%)	A (Very Good)	8
Below 70% but not less than 60% (≥ 60% , < 70%)	B^+ (Good)	7
Below 60% but not less than 50% (≥ 50% , < 60%)	B (Average)	6
Below 50% but not less than 40% (≥ 40% , < 50%)	C (Pass)	5
Below 40% (< 40%)	F (FAIL)	0
Absent	AB	0

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

12.4 A Letter Grade does not imply any specific % of Marks.

12.5 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'. However, he has to repeat all the Subjects/Courses pertaining to that Semester, when he is detained.

12.6 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.

Credit Points (CP) = Grade Point (GP) x Credits …. For a Course

12.7 The Student passes the Subject/Course only when he gets GP ≥ 4 (P Grade or above).

12.8 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (ΣCP) 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

$$SGPA = \{\sum_{i=1}^{N} C_i G_i\} / \{\sum_{i=1}^{N} C_i\} \ldots.$$ 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 i Subject.

Illustration of Computation of SGPA Computation

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 x10= 30
Course5	3	C	5	3 x 5 = 15
Course6	4	B	6	4 x 6 = 24

Thus, SGPA =139/20 =6.95

12.9 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

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

(i.e., up to and inclusive of S Semesters, S ≥ 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 up to 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**	**Semester 7**	**Semester 8**
Credits : 19.5 SGPA : 6.9	Credits : 20.5 SGPA : 7.8	Credits : 18.0 SGPA : 5.6	Credits : 19.0 SGPA : 6.0	Credits : 21.5 SGPA : 6.3	Credits : 21.5 SGPA : 8.0	Credits : 23 SGPA : 8.0	Credits : 17 SGPA : 8.0

Thus, **CGPA =** $\dfrac{19.5x6.9+20.5x7.8+18.0x5.6+19.0x6.0+21.5x6.3+21.5x8.0+23x8.0+17x8.0}{160}$ = 7.10

12.10 For Merit Ranking or Comparison Purposes or any other listing, ONLY the 'ROUNDED OFF' values of the CGPAs will be used.

12.11 For Calculations listed in Item 12.5–12.10, 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. However, Mandatory Courses will not be taken into consideration.

12.12 Conversion formula for the conversion of GPA into indicative percentage is

% of marks scored = (final CGPA -0.50) x 10

13 AWARD OF 2-YEAR B.TECH. DIPLOMA CERTIFICATE

13.1 A student is awarded 2-Year UG Diploma Certificate in the concerned engineering Branch on completion of all the academic requirements and earned all the 80 credits (within 4 years from the date of admission) up to B.Tech. II Year II Semester, if the student wants to exit the 4-Year B.Tech. Program and requests for the 2 -Year B.Tech. (UG) Diploma Certificate.

13.2 The student **once opted and awarded 2-Year UG Diploma Certificate, the Student will be permitted to join** in B. Tech. III Year I Semester and continue for completion of remaining years of study for 4-Year B. Tech. Degree ONLY in the next academic year along with next batch students. However, if any student wishes to continue the study after opting for exit, he/she should register for the subjects/courses in III Year I Semester before commencement of class work for that semester.

13.3 The students, who exit the 4-Year B. Tech. program after II Year of study and wish to re-join the B.Tech. Program, must submit the 2 -Year B. Tech. (UG) Diploma Certificate awarded to him, subject to the eligibility for completion of Course/Degree.

13.4 A student may be permitted to take one year break after completion of II Year II Semester or B. Tech. III Year II Semester (with university permission through the principal of the college well in advance) and can re-enter the course in **next Academic Year in the same college** and complete the course on fulfilling all the academic credentials within a stipulated duration i.e. double the duration of the course (Ex. within 8 Years for 4-Year program).

14. DECLARATION OF RESULTS

Computation of SGPA and CGPA are done using the procedure listed in 12.5 – 12.10. No SGPA/CGPA is declared, if a candidate is failed in any one of the courses of a given Semester.

15. WITH HOLDING OF RESULTS

If the student has not paid fees to College at any stage, or has pending dues against his name due to any reason what so ever, or if any case of indiscipline is pending against him, the result of such student may be withheld, and he will not be allowed to go into the next higher Semester. The Award or issue of the Degree may also be withheld in such cases.

16. REVALUATION

Students shall be permitted for revaluation after the declaration of end Semester examination results within due dates by paying prescribed fee. After revaluation if there is any betterment in the grade, then improved grade will be considered. Otherwise old grade shall be retained.

17. SUPPLEMENTARY EXAMINATIONS

Supplementary examinations for the odd Semester shall be conducted with the regular examinations of even Semester and vice versa, for those who appeared and failed or absent in regular examinations. Such candidates writing supplementary examinations may have to write sometimes one or two examinations per day.

ADVANCED SUPPLEMENTARY EXAMINATION

Advanced supplementary examinations will be conducted for IV year II Semester after announcement of regular results.

18. TRANSCRIPTS

After successful completion of prerequisite credits for the award of degree a Transcript containing performance of all academic years will be issued as a final record. Duplicate PC, CMM & Transcripts will also be issued if required after the payment of requisite fee and also as per norms in vogue.

19. RULES OF DISCIPLINE

19.1 Any attempt by any student to influence the teachers, Examiners, faculty and staff of controller of Examination for undue favors in the exams, and bribing them either for marks or attendance will be treated as malpractice cases and the student can be debarred from the college.

19.2 When the student absents himself, he is treated as to have appeared and obtained zero marks in that course(s) and grading is done accordingly.

19.3 When the performance of the student in any subject(s) is cancelled as a punishment for indiscipline, he is awarded zero marks in that subject(s).

19.4 When the student's answer book is confiscated for any kind of attempted or suspected malpractice the decision of the Examiner is final.

20. MALPRACTICE PREVENTION COMMITTEE

A malpractice prevention committee shall be constituted to examine and punish the students who involve in malpractice / indiscipline in examinations. The committee shall consist of:

a) Controller of examinations - Chairman
b) Addl. Controller of examinations.- Member Convener
c) Subject expert - member
d) Head of the department of which the student belongs to. - Member
e) The invigilator concerned - member

The committee shall conduct the meeting after taking explanation of the student and punishment will be awarded by following the malpractice rules meticulously.

Any action on the part of candidate at the examination like trying to get undue advantage in the performance at examinations or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the Staff who are in charge of conducting examinations, valuing examination papers and preparing / keeping records of documents relating to the examinations, in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and will be recommended for appropriate punishment after thorough enquiry.

21. TRANSITORY REGULATIONS

A. For students detained due to shortage of attendance:

1. A Student who has been detained in I year of R18/R21 Regulations due to lack of attendance, shall be permitted to join I year I Semester of R22 Regulations and he is required to complete the study of B.Tech. programme within the stipulated period of eight academic years from the date of first admission in I Year.
2. A student who has been detained in any semester of II, III and IV years of R18/R21 regulations for want of attendance, shall be permitted to join the corresponding semester of R22 Regulations and is required to complete the study of B.Tech. within the stipulated period of eight academic years from the date of first admission in I Year. The R22 Academic Regulations under which a student has been readmitted shall be applicable to that student from that semester. See rule (C) for further Transitory Regulations.

B. For students detained due to shortage of credits:

3. A student of R18/R21 Regulations who has been detained due to lack of credits, shall be promoted to the next semester of R22 Regulations only after acquiring the required number of credits as per the corresponding regulations of his/her first admission. The total credits required are 160 including both R18/R21 & R22 regulations. The student is required to complete the study of B.Tech within the stipulated period of eight academic years from the year of first admission. The R22 Academic Regulations are applicable to a student from the year of readmission. See rule (C) for further Transitory Regulations.

C. For readmitted students in R22 Regulations:

4. A student who has failed in any subject under any regulation has to pass those subjects in the same regulations.
5. The maximum credits that a student acquires for the award of degree, shall be the sum of the total number of credits secured in all the regulations of his/her study including R22 Regulations. **There is NO exemption of credits in any case.**

6. If a student is readmitted to R22 Regulations and has any subject with 80% of syllabus common with his/her previous regulations, that particular subject in R22 Regulations will be substituted by another subject to be suggested by the University.

Note: If a student readmitted to R22 Regulations and has not studied any subjects/topics in his/her earlier regulations of study which is prerequisite for further subjects in R22 Regulations, the College Principals concerned shall conduct remedial classes to cover those subjects/topics for the benefit of the students.

22. STUDENT TRANSFERS

22.1 There shall be no branch transfers after the completion of admission process.

22.2 There shall be no transfers from one college/stream to another within the constituent colleges and units of Jawaharlal Nehru Technological University Hyderabad.

22.3 The students seeking transfer to colleges affiliated to JNTUH from various other Universities/institutions have to pass the failed subjects which are equivalent to the subjects of HITS, and also pass the subjects of HITS which the students have not studied at the earlier institution. Further, though the students have passed some of the subjects at the earlier institutions, if the same subjects are prescribed in different semesters of HITS, the students have to study those subjects in HITS in spite of the fact that those subjects are repeated.

22.4 The transferred students from other Universities/Institutions to JNTUH affiliated colleges who are on rolls are to be provided one chance to write the CBT (for internal marks) in the **equivalent subject(s)** as per the clearance letter issued by the University.

22.5 The college has to provide one chance to write the internal examinations in the **equivalent subject(s)** to the students transferred from other universities/institutions to HITS who are on rolls, as per the clearance (equivalence) letter issued by the University.

23. AMENDMENTS TO REGULATIONS

The Academic Council of Holy Mary Institute of Technology & Science reserves the right to revise, amend, or change the regulations, scheme of examinations, and / or syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

There shall be no Branch transfers after the completion of Admission Process. Transfer of student is permitted subjected to the rules and regulations of TSCHE (TE Department) and JNTUH in vogue.

The College shall have its own Annual Graduation Day for the award of Degrees issued by the College/University.

Institute will award Medals to the outstanding students who complete the entire course in the first attempt within the stipulated time.

i) Where the words “he”, “him”, “his”, occur in the write-up of regulations, they include “she”, “her”.

ii) Where the words “Subject” or “Subjects”, occur in these regulations, they also imply “Course” or “Courses”.

iii) The Academic Regulations should be read as a whole, for the purpose of any interpretation.

iv) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman of the Academic Council is final.

Academic Regulations for B. Tech. (Lateral Entry Scheme) (Effective for the students getting admitted into II year from the Academic Year 2023-2024 on wards)

1. ELIGIBILITY FOR THE AWARD OF B.TECH DEGREE (LES)

i. The LES students after securing admission shall pursue a course of study for not less than three academic years and not more than six academic years.

ii. The Students have to acquire 120 credits from II to IV year of B.Tech Programme (Regular) for the award of the degree.

iii. Students, who fail to fulfill the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.

iv. The same attendance regulations are to be adopted as that of B. Tech. (Regular)

2. PROMOTION RULE:

A Student will not be promoted from II Year to III Year, unless he/she fulfills the Attendance and Academic Requirements and (i) secure a Total of 60% Credits up to III Year II Semester, from all the regular and supplementary examinations.

A Student will not be promoted from III Year to IV Year, unless he/she fulfills the Attendance and Academic Requirements and (i) secure a Total of 60% Credits up to III Year II Semester, from all the regular and supplementary examinations.

3. AWARD OF DEGREE:

After the student has satisfied the requirements prescribed for the completion of the programme and is eligible for the award of B. Tech. Degree, he/she shall be placed in one of the following four classes: The marks obtained for 120 credits will be considered for the calculation of CGPA.

All other regulations as applicable for B. Tech. Four-year degree programme (Regular) will hold good for B.Tech (Lateral Entry Scheme).

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

Dept. of Computer Science Engineering (Data Science)

I B.Tech.- I-Semester									
Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A2MA201BS	Linear Algebra and Calculus	BSC	3	1	-	4	40	60	100
A2CH102BS	Engineering Chemistry	BSC	3	1	-	4	40	60	100
A2CS106ES	Programming for Problem Solving	ESC	3	0	0	3	40	60	100
A2EE107ES	Basic Electrical Engineering	ESC	2	0	0	2	40	60	100
A2ME108ES	Engineering Graphics	ESC	1	0	4	3	40	60	100
A2CS101ES	Elements Computer Science and Engineering	ESC	-	-	2	1	50	-	50
A2CH110BS	Engineering Chemistry Lab	BSC	-	-	2	1	40	60	100
A2CS114ES	Programming for Problem Solving Lab	ESC	-	-	2	1	40	60	100
A2EE115ES	Basic Electrical Engineering Lab	ESC	-	-	2	1	40	60	100
Total			**12**	**2**	**12**	**20**	**370**	**480**	**850**
Mandatory Course (Non-Credit)									
A2CS101MC	Technical Seminar-I / Social Innovation	MC	-	-	2	-	100	-	100

I B.Tech.- II-Semester									
Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A2MA201BS	Ordinary Differential Equations and Advanced Calculus	BSC	3	1	-	4	40	60	100
A2AP204BS	Applied Physics	BSC	3	1	-	4	40	60	100
A2ME216ES	Workshop Manufacturing Practice	ESC	0	1	3	2.5	40	60	100
A2EN205HS	English for Skill Enhancement	HSMC	2	-	-	2	40	60	100
A2EC201ES	Electronic Devices and Circuits	ESC	2	0	0	2	40	60	100
A2CS202ES	Applied Python Programming Laboratory	ESC	0	1	2	2	40	60	100
A2EN213HS	English Language Communication Skills Lab	HSMC	-	-	2	1	40	60	100
A2AP212BS	Applied Physics Lab	BSC	-	-	3	1.5	40	60	100
A2EC212ES	IT Workshop	ESC	-	-	2	1	40	60	100
Total			**10**	**4**	**12**	**20**	**360**	**540**	**900**
Mandatory Course (Non-Credit)									
A2CS202MC	Technical Seminar-II / Engineering Exploration	MC	-	-	2	-	100	-	100

II B.Tech.- I-Semester									
Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A2DS301ES	Digital Electronics	ESC	3	-	-	3	40	60	100
A2DS302PC	Data Structures	PCC	3	-	-	3	40	60	100
A2DS303PC	Discrete Mathematics	PCC	3	-	-	3	40	60	100
A2DS304PC	Computer Organization and Architecture	PCC	3	-	-	3	40	60	100
A2DS305PC	Object Oriented Programming through Java	PCC	3	-	-	3	40	60	100
A2DS306PC	Data Structures Lab	PCC	-	-	3	1.5	40	60	100
A2DS307PC	Object Oriented Programming through Java Lab	PCC	-	-	3	1.5	40	60	100
A2DS308PW	(Data Visualization – R Programming/Power BI	PWC	-	-	4	2	-	100	100
Total			**15**	**-**	**10**	**20**	**280**	**520**	**800**
Mandatory Course (Non-Credit)									
A2DS303MC	Environmental Studies	MC	2	-	-	-	100	-	**100**

II B.Tech.- II-Semester									
Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A2MA401BS	Computer Oriented Statistical Methods	BSC	3	1	-	4	40	60	100
A2DS402HS	Business Economics & Financial Analysis	HSMC	3	-	-	3	40	60	100
A2DS403PC	Operating Systems	PCC	3	-	-	3	40	60	100
A2DS404PC	Database Management Systems	PCC	3	-	-	3	40	60	100
A2DS405PC	Software Engineering	PCC	3	-	-	3	40	60	100
A2DS406PC	Operating Systems Lab	PCC	-	-	2	1	40	60	100
A2DS407PC	Database Management Systems Lab	PCC	-	-	2	1	40	60	100
A2DS408PW	Real-Time Research Project/Societal Related	PWC	-	-	2	1	50	-	50
A2DS409PW	Node JS/React JS/Django	PWC	-		2	1		100	100
Total			**15**	**1**	**8**	**20**	**330**	**520**	**850**
Mandatory Course (Non-Credit)									
A2DS404MC	Gender Sensitization	MC	-	-	2	-	100	-	**100**

I-YEAR (I-SEMESTER)

LINEAR ALGEBRA AND CALCULUS

I-B. Tech I-Semester **L T P C**
Course Code: A2MA201BS **3 1 0 4**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
2. Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form. Concept of Sequence and nature of the series.
3. Evaluation of surface areas and volumes of revolutions of curves and evaluation of improper integrals using Beta and Gamma functions.
4. Partial differentiation and finding maxima and minima of function of two and three variables.

COURSE OUTCOMES:

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

1. Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
2. Find the Eigen values and Eigen vectors and reduce the quadratic form to canonical form using orthogonal transformations.
3. Analyse the nature of sequence and series.
4. Solve the applications on the mean value theorems and evaluate the improper integrals using Beta and Gamma functions
5. Find the extreme values of functions of two variables with/ without constraints.

UNIT-I: MATRICES

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration Method.

UNIT-II: EIGEN VALUES AND EIGEN VECTORS

Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: SEQUENCES & SERIES

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences.
Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert's ratio test; Raabe's test; Cauchy's Integral test; Cauchy's root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

UNIT-IV: CALCULUS

Mean value theorems: Rolle's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Curvature- Radius of Curvature (Cartesian and Parametric co-ordinates) – Center of Curvature –Evolutes – Envelopes of one parameter family of curves. Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: MULTIVARIABLE CALCULUS (PARTIAL DIFFERENTIATION AND APPLICATIONS)

Definitions of Limit and continuity. Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

REFERENCE BOOKS:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

ENGINEERING CHEMISTRY

I-B.Tech I-Semester **L T P C**
Course Code: A2CH102BS **3 1 0 4**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

COURSE OUTCOMES:

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

1. Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They can learn the fundamentals and general properties of polymers and other engineering materials.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT-I: WATER AND ITS TREATMENT

Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation - Determination of F^- ion by ion- selective electrode method.

Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis.

UNIT-II: BATTERY CHEMISTRY & CORROSION

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods.

UNIT-III: POLYMERIC MATERIALS

Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene **Plastics:** Definition and characteristics-thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP). **Rubbers:** Natural rubber and its vulcanization.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications

UNIT-IV: ENERGY SOURCES

Introduction, Calorific value of fuel – HCV, LCV- Dulongs formula. Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Transesterification, advantages

UNIT-V: ELECTROMAGNETISM AND MAGNETIC PROPERTIES OF MATERIALS

Cement: Portland cement, its composition, setting and hardening.

Smart materials and their engineering applications

Shape memory materials- Poly L- Lactic acid. Thermoresponse materials- Polyacryl amides, Poly vinyl amides

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

REFERENCE BOOKS:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

PROGRAMMING FOR PROBLEM SOLVING

I-B.Tech I-Semester **L T P C**
Course Code: A2CS106ES **3 0 0 3**

COURSE OBJECTIVES

The course should enable the students to:

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of the C programming language.
- To learn the usage of structured programming approaches in solving problems

COURSE OUTCOMES:

- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in the C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.
- Searching and sorting problems.

UNIT I INTRODUCTION TO PROGRAMMING

Compilers, compiling and executing a program.

Representation of Algorithm - Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number Flowchart/Pseudocode with examples, Program design and structured programming

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOT operators

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do- while loops

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr. Command line arguments

UNIT II ARRAYS, STRINGS, STRUCTURES AND POINTERS:

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type

UNIT III PREPROCESSOR AND FILE HANDLING IN C

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

UNIT IV FUNCTION AND DYNAMIC MEMORY ALLOCATION

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

UNIT V SEARCHING AND SORTING:

Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

BASIC ELECTRICAL ENGINEERING

I-B.Tech I-Semester **L T P C**
Course Code: A2EE107ES **2 0 0 2**

COURSE OBJECTIVES

The course should enable the students to:

1. Develop fundamentals, including Ohm's law, Kirchhoff's laws and be able to solve for currents, voltages and power in electrical circuits.
2. Develop EMF equation and analyze the operation of DC Machines.
3. Analyze the working principle of Transformer.
4. Discuss the operation of AC Machines.
5. Analyze the operation of PN junction diode and rectifiers.
6. Discuss the operation and characteristics of Transistors

COURSE OUTCOMES:

Upon graduation:

1. Analyze and solve for current values in resistive circuits with independent sources.
2. Analyze the working of DC machines and solve the numerical problems
3. Analyze the working of AC electrical machines and solve the numerical problems.
4. Analyze the V-I characteristics of PN – junction diode and describe the operation Of rectifiers.
5. Analyze the different configurations of Transistors and obtain its characteristics

UNIT I D.C. CIRCUITS

D.C. Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT II A.C. CIRCUITS

A.C. Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single- phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT III

Transformers: Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT IV

Electrical Machines: Construction and working principle of dc machine, performance characteristics of dc shunt machine. Generation of rotating magnetic field, Construction and working of a three-phase induction motor, Significance of torque-slip characteristics. Single- phase induction motor, Construction and working. Construction and working of synchronous generator.

UNIT V

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

TEXT BOOKS:

1. D.P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, “Basic Electrical Engineering”, Tata McGraw Hill, 2nd Edition, 2008.

REFERENCE BOOKS:

1. P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, “Basic Electrical Engineering”, S. Chand, 2nd Edition, 2019.
2. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, “Basic Electrical and Electronics Engineering”, Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, “Basic Electrical Engineering”, 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
6. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
7. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989

ENGINEERING GRAPHICS

I-B.Tech I-Semester **L T P C**
Course Code: A2ME108ES **1 0 4 3**

COURSE OBJECTIVES

To learn

1. To provide basic concepts in engineering drawing.
2. To impart knowledge about standard principles of orthographic projection of objects.
3. To draw sectional views and pictorial views of solids.

COURSE OUTCOMES

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

1. Preparing working drawings to communicate the ideas and information.
2. Read, understand and interpret engineering drawings.

UNIT-I INTRODUCTION

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales –Plain & Diagonal

UNIT -II PROJECTIONS

Projections of Points, Lines and Planes: Principles of Orthographic Projections –Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. —Auxiliary Planes.

UNIT -III PROJECTION OF SOLIDS

Projection of Solids and Sectioned Solids:Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere

UNIT -IV DEVELOPMENT OF LATERAL SURFACES

Development of Lateral Surfaces: Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone

UNIT-V ISOMETRIC PROJECTIONS

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non-isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

Introduction to CAD: For Internal Evaluation Weightage only):
Introduction to CAD Software Package Commands. - Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package

TEXT BOOKS

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford

REFERENCE BOOKS

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING

I-B.Tech I-Semester **L T P C**
Course Code: A2CS101ES **0 0 2 1**

COURSE OBJECTIVES: To provide an overview of the subjects of computer science and engineering.

COURSE OUTCOMES:

1. Know the working principles of functional units of a basic Computer
2. Understand program development, the use of data structures and algorithms in problem solving.
3. Know the need and types of operating system, database systems.
4. Understand the significance of networks, internet, WWW and cyber security.
5. Understand Autonomous systems, the application of artificial intelligence

UNIT – I

Basics of a Computer – Hardware, Software, Generations of computers. Hardware - functional units, Components of CPU, Memory – hierarchy, types of memory, Input and output devices. Software – systems software, application software, packages, frameworks, IDEs.

UNIT – II

Software development – waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development – steps in program development, flowcharts, algorithms, data structures – definition, types of data structures

UNIT – III

Operating systems: Functions of operating systems, types of operating systems, Device & Resource management

Database Management Systems: Data models, RDBMS, SQL, Database Transactions, data centers, cloud services

UNIT – IV

Computer Networks: Advantages of computer networks, LAN, WAN, MAN, internet, WiFi, sensor networks, vehicular networks, 5G communication.

World Wide Web – Basics, role of HTML, CSS, XML, Tools for web designing, Social media, Online social networks.

Security – information security, cyber security, cyber laws

UNIT – V

Autonomous Systems: IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development, natural language processing, image and video processing. Cloud Basics

TEXT BOOKS:

1. Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L. Gersting University of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Springfield.

REFERENCE BOOKS:

1. “Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press.
2. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.
3. Computer Fundamentals, Anita Goel, Pearson Education India, 2010.
4. Elements of computer science, Cengage.

ENGINEERING CHEMISTRY LAB

I-B.Tech I-Semester	L	T	P	C
Course Code: A2CH110BS	0	0	2	1

COURSE OBJECTIVES

The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

- Estimation of hardness of water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
- Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory.
- Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.

COURSE OUTCOMES:

The experiments will make the student gain skills on:

- Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
- Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
- Students are able to prepare polymers like bakelite and nylon-6.
- Estimations saponification value, surface tension and viscosity of lubricant oils

LIST OF EXPERIMENTS

I. **Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method.

II. **Conductometry:** Estimation of the concentration of an acid by Conductometry.

III. **Potentiometry:** Estimation of the amount of Fe^{+2} by Potentiomentry.

IV. **pH Metry:** Determination of an acid concentration using pH meter.

V. **Preparations:**

1. Preparation of Bakelite.
2. Preparation Nylon – 6.

VI. **Lubricants:**

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.

VII. **Corrosion:** Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

VIII. **Virtual lab experiments**

1. Construction of Fuel cell and its working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.

REFERENCE BOOKS:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel's text book of practical organic chemistry 5th edition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

PROGRAMMING FOR PROBLEM SOLVING LAB

I-B.Tech I-Semester | **L T P C**
Course Code: A2CS114ES | **0 0 2 1**

COURSE OBJECTIVES: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To Write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files

COURSE OUTCOMES: The candidate is expected to be able to:

- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- correct syntax errors as reported by the compilers
- identify and correct logical errors encountered during execution
- represent and manipulate data with arrays, strings and structures
- use pointers of different types
- create, read and write to and from simple text and binary files
- modularize the code with functions so that they can be reused

Practice sessions:

a. Write a simple program that prints the results of all the operators available in C (including pre/ post increment , bitwise and/or/not , etc.). Read required operand values from standard input.
b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

Simple numeric problems:

a. Write a program for finding the max and min from the three numbers.
b. Write the program for the simple, compound interest.
c. Write a program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.
d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:
e. 5 x 1 = 5
f. 5 x 2 = 10
g. 5 x 3 = 15
h. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula s = ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
c. Write a program that finds if a given number is a prime number
d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.

e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
g. Write a C program to find the roots of a Quadratic equation.
h. Write a C program to calculate the following, where x is a fractional value.
i. 1-x/2 +x^2/4-x^3/6
j. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: 1+x+x^2+x^3+……+x^n. For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Arrays, Pointers and Functions:

a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a function to compute mean, variance, Standard Deviation, sorting of n elements in a single dimension array.
c. Write a C program that uses functions to perform the following:
d. Addition of Two Matrices
e. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be the same.
f. Write C programs that use both recursive and non-recursive functions
g. To find the factorial of a given integer.
h. To find the GCD (greatest common divisor) of two given integers.
i. To find x^n
j. Write a program for reading elements using a pointer into an array and display the values using the array.
k. Write a program for display values reverse order from an array using a pointer.
l. Write a program through a pointer variable to sum of n elements from an array.

Files:

a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
d. Write a C program that does the following:
It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function)
Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function)
The program should then read all 10 values and print them back.
e. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Strings:

a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c. Write a C program that uses functions to perform the following operations:
d. To insert a sub-string into a given main string from a given position.
e. To delete n Characters from a given position in a given string.
f. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
g. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn‘t contain ch.
h. Write a C program to count the lines, words and characters in a given text.

Sorting and Searching:

a. Write a C program that uses non recursive function to search for a Key value in a given list of integers using linear search method.
b. Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using binary search method.

c. Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
d. Write a C program that sorts the given array of integers using selection sort in descending order
e. Write a C program that sorts the given array of integers using insertion sort in ascending order
f. Write a C program that sorts a given array of names

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

BASIC ELECTRICAL ENGINEERING LAB

I-B. Tech I-Semester **L T P C**
Course Code: A2EE115ES **0 0 2 1**

COURSE OBJECTIVES:

The course should enable the students to:

- To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
- To study the transient response of various R, L and C circuits using different excitations.
- To determine the performance of different types of DC, AC machines and Transformers

COURSE OUTCOMES:

After learning the contents of this paper the student must be able to

- Verify the basic Electrical circuits through different experiments.
- Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods.
- Analyze the transient responses of R, L and C circuits for different input Conditions

LIST OF EXPERIMENTS

PART- A (compulsory)

1. Verification of KVL and KCL
2. Verification of Thevenin's and Norton's theorem
3. Transient Response of Series RL and RC circuits for DC excitation
4. Resonance in series RLC circuit
5. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
7. Performance Characteristics of a DC Shunt Motor
8. Torque-Speed Characteristics of a Three-phase Induction Motor.

PART-B (any two experiments from the given list)

1. Verification of Superposition theorem.
2. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
3. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
4. Measurement of Active and Reactive Power in a balanced Three-phase circuit
5. No-Load Characteristics of a Three-phase Alternator

TEXT BOOKS:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.

REFERENCE BOOKS:

1. P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S. Chand, 2nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

SOCIAL INNOVATION

I-B. Tech I-Semester **L T P C**
Course Code: A2DS101MC **0 0 2 0**

COURSE DESCRIPTION:

Course Overview:

Social Innovation is an open-ended course to develop social connectedness in engineering students through social awareness and social consciousness. This can be done through live field exposure along with faculty led conceptual presentations, real case reviews, self-study assignments, literature and field survey. Through this course, the students are expected to use their engineering knowledge to provide innovative solutions to existing social problems. This course also develops critical thinking ability among the students to develop sustainable solutions.

COURSE OUTCOMES:

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

1. Illustrate the factors affecting social innovation.
2. Illustrate the impact of social innovation in various sectors.
3. Adopt the ethical values in doing innovation, which leads to betterment of society.

UNIT 1

Community Study: Types and features of communities- Rural, Suburban, Urban and regional, Service based learning, Aims of community-based projects, Community visits.

UNIT 2

Social Innovation across Four Sectors: The four sectors – the non-profit sector, public sector, the private sector, the informal sector, links between and cross sectors.

UNIT 3

Stages of Social Innovation: Social organizations and enterprises, social movements, politics and government, markets, academia, philanthropy, social software and open source methods, common patterns of success and failure.

UNIT 4

Engineering Ethics: Introduction to ethics, moral values, significance of professional ethics, code of conduct for engineers, identify ethical dilemmas in different tasks of engineering, applying moral theories and codes of conduct for resolution of ethical dilemmas.

UNIT 5

Steps for Patent filing and Start-up's, poster presentation.

REFERENCE BOOKS:

1. Social Entrepreneurship for the 21st Century: Innovation Across the Non Profit, Private and PublicSectors; Georgia Levenson Keohane; Tata McGraw Hill
2. Social Enterprises: An Organizational Perspective edited; Benjamin Gidron, Yeheskel Hasenfeld; Palgrave Macmillan
3. Engineering Ethics: An Industrial Perspective; Gail Baura; Elsevier
4. Intellectual Property and Financing Strategies for Technology Startups; Gerald B. Halt, Jr., John C.Donch, Jr., Amber R. Stiles, Robert Fesnak; Springer
5. Fundamentals of Intellectual Property (English) 1st Edition (Paperback, Dr. Kalyan C. Kankanala)Publisher: Asia Law House ISBN: 9789381849514, 938184951X Edition: 1st Edition, 2012.
6. Indian Patent Law (English, Paperback, Kalyan C. Kankanala) Publisher: Oxford University Press-NewDelhi, ISBN: 9780198089705, 0198089700 Edition: 2012.

I-YEAR (II-SEMESTER)

ORDINARY DIFFERENTIAL EQUATIONS AND ADVANCED CALCULUS

I-B.Tech II-Semester **L T P C**
Course Code: A2MA201BS **3 1 0 4**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. Methods of solving the differential equations of first order.
2. Different methods of solving the differential equations of higher order.
3. Evaluation of multiple integrals and their applications.
4. The physical quantities involved in engineering field related to vector valued functions.
5. The basic properties of vector valued functions and their applications to line, surface and volumeintegrals.

COURSE OUTCOMES:

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

1. Identify whether the given differential equation of first order is exact or not
2. Solve higher differential equation and apply the concept of differential equation to real world problems
3. Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravityfor cubes, sphere and rectangular parallelepiped
4. Evaluate the line, surface and volume integrals and converting them from one to another.
5. Apply Green, Gauss, and Stokes theorem to the integrals.

UNIT-I: FIRST ORDER ORDINARY DIFFERENTIAL EQUATION:

Exact, linear and Bernoulli's equations; Applications: Orthogonal Trajectories (in Cartesian and polar coordinates) Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equation solvable for x and Clairaut's type.

UNIT-II: ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER:

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, sin a, cos ax, polynomials in x, (x) and x (x); method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III: MULTIVARIABLE CALCULUS (INTEGRATION)

Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and(Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

UNIT-IV: VECTOR DIFFERENTIATION

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives,Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotationalvectors.

UNIT-V: VECTOR INTEGRATION

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and theirapplications.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint.

REFERENCE BOOKS:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

APPLIED PHYSICS

I-B. Tech II-Semester **L T P C**
Course Code: A2AP204BS **3 1 0 4**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. To provide an experimental foundation for the theoretical concepts introduced in the lectures.
2. To teach how to make careful experimental observations and how to think about and draw conclusions from such data
3. To help students understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments.
4. To introduce the concepts and techniques which have a wide application in experimental science but have not been introduced in the standard courses
5. To teach how to write a technical report this communicates scientific information in a clear and concise manner.

COURSE OUTCOMES:

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

1. Students will demonstrate the concepts in the quantum physics and develop skills in scientific inquiry, problem solving techniques
2. Students will have the knowledge of fundamentals of Semiconductor physics, and apply it to day to day issues.
3. The knowledge of Optoelectronics, enable the students to apply to various systems like communications, solar cell, photo cells and so on.
4. The students can design, characterization and study the properties of Lasers and fibre optics and prepare new models for various engineering applications.
5. Students will evaluate the different parameters of magnetic materials and their applications, and analyze the Electromagnetic theory.

UNIT-I: QUANTUM MECHANICS

Introduction to quantum physics, Black body radiation, Planck's law, Photoelectric effect, Compton effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, quantum operators, Particle in one dimensional box. Bloch theorem.

UNIT-II: SEMICONDUCTOR PHYSICS

Band theory of solids, Intrinsic and Extrinsic semiconductors, Effective mass of electron, density of states. Dependence of Fermi level on carrier-concentration and temperature, Carrier generation and recombination, Carrier transport: diffusion and drift, Hall effect, p- n junction diode, Zener diode and their V-I Characteristics, Bipolar Junction Transistor (BJT): Construction, Principle of operation.

UNIT-III: OPTOELECTRONICS

Radiative and non-radiative recombination mechanisms in semiconductors, LED and semiconductor lasers: Device structure, Materials, Characteristics and figures of merit, Semiconductor photo detectors: Solar cell, PIN and Avalanche and their structure, Materials, working principle and Characteristics.

UNIT-IV: LASERS AND FIBRE OPTICS

Lasers: Introduction to interaction of radiation with matter, Coherence, Characteristics of LASER, Principle and working of Laser, Einstein coefficients, Population inversion, Pumping, Types of Lasers: Ruby laser, Carbon dioxide (CO_2) laser, He-Ne laser, Applications of laser. Fibre Optics: Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres.

UNIT-V: ELECTROMAGNETISM AND MAGNETIC PROPERTIES OF MATERIALS

Laws of electrostatics, Electric current and the continuity equation, Ampere's and Faraday's laws, Maxwell's equations, Polarization, Permittivity and Dielectric constant, Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics and Piezoelectrics. Magnetisation, permeability and susceptibility, Classification of magnetic materials, Ferromagnetism and ferromagnetic domains, Hysteresis, Applications of magnetic materials.

TEXT BOOKS:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learing.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand

REFERENCE BOOKS:

2. Richard Robinett, Quantum Mechanics
3. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
4. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptha on NPTEL
5. Solid state physics by A J dekker.

WORKSHOP MANUFACTURING PRACTICE

I-B. Tech II-Semester **L T P C**
Course Code: A2ME216ES **0 1 3 2.5**

COURSE OBJECTIVES:

The course should enable the students to:

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipment and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, equipment and machines.
6. To study commonly used carpentry joints.
7. To have practical exposure to various welding and joining processes.
8. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

COURSE OUTCOMES:

By the end of the course students will be able:

1. Study and practice on machine tools and their operations
2. Practiceonmanufacturingofcomponentsusingworkshoptradesincludingpluming, fitting, carpentry, foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

LIST OF EXPERIMENTS

I. TRADES FOR EXERCISES: At least two exercises from each trade:

Experiment-1 Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
Experiment-2 Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
Experiment-3 Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
Experiment-4 Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
Experiment-5 Welding Practice – (Arc Welding & Gas Welding)
Experiment-6 House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
Experiment-7 Black Smithy – (Round to Square, Fan Hook and S-Hook)

II. TRADES FOR DEMONSTRATION & EXPOSURE:

Experiment-1 Plumbing, Machine Shop, Metal Cutting
Experiment-2 Power tools in construction and Wood Working

REFERENCE BOOKS:

1. Workshop Practice /B. L. Juneja /Cengage
2. Workshop Manual / K. Venugopal /Anuradha.
3. Work shop Manual - P. Kannaiah/ K. L. Narayana/SciTech
4. Workshop Manual / Venkat Reddy/BSP

ENGLISH FOR SKILL ENHANCEMENT

I-B. Tech II-Semester **L T P C**
Course Code: A2EN205HS **2 0 0 2**

COURSE OBJECTIVES: This course will enable the students to:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

COURSE OUTCOMES: Students will be able to:

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English.

UNIT - I

Chapter entitled '***Toasted English*' by R.K.Narayan** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing precisely – Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT - II

Chapter entitled **'Appro JRD' by Sudha Murthy** from ***"English: Language, Context and Culture" published*** by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence.

UNIT - III

Chapter entitled **'Lessons from Online Learning' by F.Haider Alvi, Deborah Hurst et al** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad. **Vocabulary**: Words Often Confused - Words from Foreign Languages and their Use in English. **Grammar:** Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.

UNIT - IV

Chapter entitled **'Art and Literature' by Abdul Kalam** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad. **Vocabulary**: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.

UNIT - V

Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad. **Vocabulary**: Technical Vocabulary and their Usage

Grammar: Common Errors in English (*Covering all the other aspects of grammar which were not covered in the previous units*)

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Note: ***Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.***

- **Note: 1**. As the syllabus of English given in AICTE *Model Curriculum-2018 for B.Tech First Year is* ***Open-ended***, besides following the prescribed textbook, it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning in the class.

- **Note**: **2**.Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents .They are advised to teach 40 percent of each topic from the syllabus in blended mode.

ELECTRONIC DEVICES AND CIRCUITS

I-B. Tech II-Semester **L T P C**
Course Code: A2EC201ES **2 0 0 2**

COURSE OBJECTIVES:

1. To introduce components such as diodes, BJTs and FETs.
2. To know the applications of devices.
3. To know the switching characteristics of devices.

COURSE OUTCOMES: Upon completion of the Course, the students will be able to:

1. Acquire the knowledge of various electronic devices and their use on real life.
2. Know the applications of various devices.
3. Acquire the knowledge about the role of special purpose devices and their applications.

UNIT - I

Diodes: Diode - Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances, V-I Characteristics, Diode as a switch- switching times.

UNIT - II

Diode Applications: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive and Inductive Filters, Clippers-Clipping at two independent levels, Clamper-Clamping Circuit Theorem, Clamping Operation, Types of Clampers.

UNIT - III

Bipolar Junction Transistor (BJT): Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch, switching times,

UNIT - IV

Junction Field Effect Transistor (FET): Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, FET as Voltage Variable Resistor, MOSFET, MOSTET as a capacitor.

UNIT – V

Special Purpose Devices: Zener Diode - Characteristics, Zener diode as Voltage Regulator, Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode, Photo diode, Solar cell, LED, Schottky diode.

TEXT BOOKS:

1. Jacob Millman - Electronic Devices and Circuits, McGraw Hill Education
2. Robert L. Boylestead, Louis Nashelsky- Electronic Devices and Circuits theory, 11th Edition, 2009, Pearson.

REFERENCE BOOKS:

1. Horowitz -Electronic Devices and Circuits, David A. Bell – 5thEdition, Oxford.
2. Chinmoy Saha, Arindam Halder, Debaati Ganguly - Basic Electronics-Principles and Applications, Cambridge, 2018.

APPLIED PYTHON PROGRAMMING LABORATORY

I-B.Tech II-Semester **L T P C**
Course Code: A2CS202ES **0 1 2 2**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. Understand the basics and function of Python Programming Language.
2. Understand the string operation and sequences used in Python Programming Language.
3. Know the Data Structures in Python Programming Language.
4. Use the reusability concepts in Python Programming Language.
5. Use Exception Handling mechanism in Python Programming Language.
6. Know the packages in Python Programming Language.

COURSE OUTCOMES:

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

1. Develop programs on data types, operators and expressions
2. Apply the data structures in real time scenarios
3. Write the programs on strings and functions
4. Implement programs on class and related issues.
5. Use of python exception handling and libraries.

LIST OF EXPERIMENTS

WEEK-1:

a. Write a program to perform different Arithmetic Operations on numbers in Python
b. Write a Python program which accepts the radius of a circle from the user and compute the area
c. Write a Python program to get the Python version you are using.
d. Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn.

WEEK-2:

a. Write a Python program to convert temperatures to and from Celsius, Fahrenheit.
b. [Formula: c/5= f-32/9]
c. Write a python script to print the current date in the following format “Sun May 29 02:26:23 IST 2017”
d. A library charges a fine for every book returned late. For first 6 days the fine is 50 paisa, for 10-15 days fine is one rupee and above 15 days fine is 5 rupees. If you return the book after 30 days your membership will becancelled. Write a python program to accept the number of days the
e. Member is late to return the book and display the fine or the appropriate message.

WEEK-3:

a. Write a python function to find largest of three numbers
b. Write a Python function that prints prime numbers in between 50 and 100
c. Write a python program to find factorial of a number using Recursion
d. Write a function that receives marks received by a student in 6 subjects and returns the average andpercentage of these marks. Call this function from main() and print the result in main

WEEK-4:

a. Write a program to demonstrate working with tuples and List in python
b. Write a program to demonstrate working with dictionaries in python

WEEK-5:

a. Write a program to demonstrate working with Strings and string operations

WEEK-6:

a. Write a script named hellow.py. This script should prompt the user for the names of two text files. Thecontents of the first file should be input and written to the second file.

b. Write a program that inputs a text file. The program should print all of the unique words in the file
c. in alphabetical order.

WEEK-7:

a. Write python programs to demonstrate class & object, static and instance method implementation.

WEEK -8:

a. Write python programs to demonstrate Inheritance and Polymorphism.

WEEK-9:

a. Write python programs to demonstrate Exception Handling in python.

WEEK-10:

a. Write python programs to demonstrate Numpy library and supporting functions.

WEEK-11:

a. Write python programs to demonstrate Pandas libraries' supported structures like series,data frame and panel.

WEEK-12:

a. Write a python program to demonstrate matplotlib library and supporting functions

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

I-B. Tech II-Semester **L T P C**
Course Code: A2EN213HS **0 0 2 1**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. Facilitate computer-assisted multi-media instruction enabling individualized and independent language learning.
2. Enhance English language skills, communication skills and to practice soft skills.
3. Improve fluency and pronunciation intelligibility by providing an opportunity for practice in speaking.
4. Get trained in different interview and public speaking skills such as JAM, debate, role play, group discussion etc.
5. Instill confidence and make them competent enough to express fluently and neutralize their mother tongue influence.

COURSE OUTCOMES:

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

1. Recognize differences among various accents and speak with neutralized accent.
2. Neutralization of accent for intelligibility
3. Take part in group activities.
4. Speaking skills with clarity and confidence which in turn enhances their employability
5. Generate dialogues for various situations.

LIST OF ACTIVITIES

English Language and Communication Skills Lab (ELCS) shall have two parts:
a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

LISTENING SKILLS

Objectives

1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

SPEAKING SKILLS

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
    1. Oral practice: Just A Minute (JAM) Sessions
    2. Describing objects/situations/people
    3. Role play – Individual/Group activities

EXERCISE – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.
Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:

Understand: Communication at Work Place- Spoken vs. Written language.
Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave –Introducing Oneself and Others.

EXERCISE – II

CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.
Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.
Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

EXERCISE - III

CALL Lab:

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).
Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:

Understand: How to make Formal Presentations.
Practice: Formal Presentations.

EXERCISE – IV

CALL Lab:

Understand: Listening for General Details.
Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks.
Practice: Making a Short Speech – Extempore.

EXERCISE – V

CALL Lab:

Understand: Listening for Specific Details.
Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Interview Skills.
Practice: Mock Interviews.

TEXT BOOKS:

1. Michael Swan. Practical English Usage. Oxford University Press. 2017.
2. Wren & Martin. High School English Grammar and Composition Book. S Chand Publishing. 2017.

REFERENCE BOOKS:

1. Whitby, N. Business Benchmark. Cambridge University Press (with CD) 2nd Edition.
2. Kumar, S. & Lata, P. (2011). Communication Skills. Oxford University Press.
3. Balasubramanian, T. (2008). A Text book of English Phonetics for Indian Students, Macmillan.
4. Thorpe, E. (2006). Winning at Interviews, Pearson Education.
5. Sethi, J. et al. (2005). A Practical Course in English Pronunciation (with CD), Prentice Hall of India.

WEBSITES:

1. https://www. britishcouncil.org
2. https://www. bbc.co.uk
3. https://www. grammarly.com
4. https://www. fluentu.com
5. https://www.cambridgeenglish.org/exams-and-tests/business-preliminary
6. https://www.cambridgeenglish.org/exams-and-tests/business-vantage

APPLIED PHYSICS LAB

I-B.Tech II-Semester **L T P C**
Course Code: A2AP212BS **0 0 3 1.5**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. To provide an experimental foundation for the theoretical concepts introduced in the lectures.
2. To teach how to make careful experimental observations and how to think about and draw conclusions from such data
3. To help students understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments.
4. To introduce the concepts and techniques which have a wide application in experimental science but have not been introduced in the standard courses
5. To teach how to write a technical report this communicates scientific information in a clear and concise manner.

COURSE OUTCOMES:

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

1. Develop skills to impart practical knowledge in real time solution. Discuss the working and characteristics of the various optoelectronic devices.
2. Analyze various properties of the semi-conductor devices and built the circuits with appropriate components.
3. Recall the magnetic properties of materials and determines the related parameters of magnetic fields.
4. Understand the comparison of results with theoretical calculations.
5. Focus on the principles, concepts, working and applications of new technology.

LIST OF EXPERIMENTS

WEEK – 1 Energy gap of P-N junction diode: To determine the energy gap of a semiconductor diode
WEEK – 2 Solar Cell: To study the V-I and P-I characteristics of solar cell
WEEK – 3 Light Emitting Diode: Plot V-I characteristics of light emitting diode Plot V-I characteristics of light emitting diode
WEEK – 4 Hall Effect: To determine Hall co-efficient of a given semiconductor
WEEK – 5 PIN Photo Diode to study the V-I Characteristics of Photo Diode by calculating the photo current.
WEEK – 6 Optical fiber: To determine the numerical aperture and acceptance angle of an optical fiber
WEEK – 7 LASER: To determine the wavelength of a given laser source by using diffraction rating method
WEEK – 8 LCR Circuit: To determine the Resonance frequency and Quality factor of a LCR Circuit
WEEK – 9 Thermistor: To study the variation of resistance with respect to temperature using thermistor.
WEEK – 10 Torsional Pendulum: To determine the rigidity modulus of a given metal wire by using Torsional pendulum.
WEEK – 11 Plank's Constant: To determine value of plank's constant using by measuring Radiation in fixed spectral range.
WEEK – 12 Stewart Gee's experiment: To study the variation of magnetic field along the axisof a circular coil.

TEXT BOOKS:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi – Cengage Learing
2. R. Robinett, "Quantum Mechanics", OUP Oxford, 2006.IIndEdn.
3. P.K Palanisamy, Engineering Physics, Sitech Publications, 2013, 4th Ed Nielsen M. A.,
4. L Chung, Quantum Computation & Quantum Information, Cambridge Univ. Press.

REFERENCE BOOKS:

1. "Semiconductor Physics and Devices: Basic Principles" by Donald A Neamen
2. "Optics, Principles and Applications" by K K Sharma.
3. "Principles of Optics" by M Born and E Wolf.
4. "Oscillations and Waves" by Satya Prakash and Vinay Dua

IT WORKSHOP LAB

I B. TECH- II SEMESTER **L T P C**
Course Code: A2EC212ES **- - 2 1**

COURSE OBJECTIVES:

The IT Workshop for engineers is a training lab course spread over 60 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

PC HARDWARE: Introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible. Internet & World Wide Web** module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks would be introduced. **Productivity tools** module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools and LaTeX.

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Task 6: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using LaTeX and Word: to create project certificate. Features to be covered:- Formatting Fontsin word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task 3: Creating project abstract Features to be covered: Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4 : Creating a Newsletter : Features to be covered: Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler: Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2 : Calculating GPA: Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

Task 3: Performance Analysis: Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes: - PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and PowerPoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Task 2: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEY Dreamtech
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware - A Handbook – Kate J. Chase PHI (Microsoft)
5. LaTeX Companion – Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and KenQuamme. – CISCO Press, Pearson Education.
7. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan –CISCO Press, Pearson Education.

ENGINEERING EXPLORATION

I-B. Tech II-Semester **L T P C**
Course Code: A2CS202MC **0 0 2 0**

COURSE DESCRIPTION:

Course Overview:

This Course provides an opportunity for freshman students to learn in new ecosystem and is one of the unique outcomes of innovative education ecosystem in digital era of our nation. The focus of this course is on Engineering Design Process, Problem Solving, and Multi-disciplinary skills, Ethics and Data Acquisition and Analysis. This course is co-designed and co-taught by faculty members drawn from multiple engineering disciplines; it follows Project Based Learning (PBL) pedagogy with need statements covering broad themes of environmental, educational, smart appliances, smart agriculture, industrial needs etc. are used by students to carve out problem definitions by linking Sustainable Development Goals defined by United Nation. Students work in teams to solve identified problems and serves as a platform for peer learning and push students in Multi-disciplinary design thinking in first year itself.

COURSE OUTCOMES:

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

1. Explain the role of an Engineer as a problem solver.
2. Identify multi-disciplinary approach required in solving an engineering problem
3. Analyse a given problem using process of engineering problem analysis.
4. Build simple systems using engineering design process.
5. Analyse engineering solutions from sustainability perspectives.
6. Use basics of engineering project management skills in doing projects.
7. Demonstrate data acquisition and analysis skills using a tool.

MODULE 1

Introduction to Engineering and Engineering Study: Introduction to Engineering and Engineering Study: Difference between science and engineering, scientist and engineer needs and wants, various disciplines of engineering, some misconceptions of engineering, Expectation for the 21st century engineer.

MODULE 2

Engineering Design: Engineering Design Process, Multidisciplinary facet of design, Importance of analysis in engineering design, general analysis procedure, Pair wise comparison chart, Introduction to mechatronics system, generation of multiple solution, decision matrix, Concepts of reverse engineering

MODULE 3

Mechanisms: Basic Components of a Mechanism, Degrees of Freedom or Mobility of a Mechanism, 4 Bar Chain, Crank Rocker Mechanism, Slider Crank Mechanism.

MODULE 4

Platform based development: Introduction to various platform-based development, programming and its essentials, Introduction to transducers and actuators and its interfacing. Concepts of reverse engineering.

Data Acquisition and Analysis: Types of Data, Descriptive Statistics techniques as applicable to different types of data, Types of graphs as applicable to different types of data, Usage of data acquisition tools for descriptive statistics, Data Acquisition, Exporting acquired data to analysis using visual representation.

MODULE 5

Project Management: Introduction, Significance of teamwork, Importance of communication in engineering profession, Project management tools: Checklist, Timeline, Gantt Chart, Significance of documentation.

Sustainability: Introduction to sustainability, Sustainability leadership, Life cycle assessment, carbon footprint.

REFERENCE BOOKS:

1. Engineering Fundamentals: An Introduction to Engineering (Mind Tap Course List) 5th Edition by Saeed Moaveni.
2. Software Project Management (SIE), (Fifth Edition); Bob Hughes, Mike Cotterell, Rajib Mall; Published by Tata McGraw-Hill Education Pvt. Ltd (2011) ; ISBN 10: 0071072748 ISBN 13: 9780071072748
3. A Ghosh and AK Malik: Theory of Mechanism and Machine; East West Press (Pvt) Ltd., New Delhi.
4. Arduino Cookbook, 2nd Edition by Michael Margolis: O'Reilly Media
5. Data Acquisition and Analysis - Building an Excel Budget Forecast Workbook by Andrew Greaney (Kindle Edition)ISBN: 1521903468
6. Concepts in Engineering Design – 2016; by Sumesh Krishnan (Author), Dr. Mukul Shukla (Author), Publisher: Notion Press

II-YEAR (I-SEMESTER)

DIGITAL ELECTRONICS

II-B.Tech I-Semester **L T P C**
Course Code: A2DS301ES **3 0 0 3**

Course Objectives: This course aims at through understanding of binary number system, logic gates, combination logic and synchronous and asynchronous logic

UNIT - I:

BOOLEAN ALGEBRA AND LOGIC GATES: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.

Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, Digital logic gates.

UNIT - II:

GATE – LEVEL MINIMIZATION: The map method, Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – Or function.

UNIT - III:

COMBINATIONAL LOGIC: Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Subtractor Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

UNIT - IV:

SEQUENTIAL LOGIC: Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, state Reduction and Assignment, Design Procedure**.** Registers, shift Registers, Ripple counters, synchronous counters, other counters.

UNIT - V

MEMORIES AND ASYNCHRONOUS SEQUENTIAL LOGIC: Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices.

Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and Flow Tables, Race-Free state Assignment Hazards, Design Example.

TEXT BOOKS:

1. Digital Design – Third Edition, M. Morris Mano, Pearson Education/PHI.
2. Digital Principles and Applications Albert Paul Malvino Donald P. Leach TATA McGraw Hill Edition.
3. Fundamentals of Logic Design, Roth, 5th Edition, Thomson.

REFERENCE BOOKS:

1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2. Switching and Logic Design, C.V.S. Rao, Pearson Education
3. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic and Microcomputer Design, 5TH Edition, M. Rafiquzzaman John Wiley.

DATA STRUCTURES

II B. Tech - I Semester **L T P C**
Course Code: A2DS302PC **3 0 0 3**

COURSE OBJECTIVES:

1. Impart the basic concepts of data structures and algorithms.
2. Understand concepts linked lists and their applications.
3. Understand basic concepts about stacks, queues and their applications.
4. Understand basic concepts of trees, graphs and their applications.
5. Enable them to write algorithms for sorting and searching and hashing.
6. Use advanced data structures like B-Trees, AVL-trees etc., for efficient problem solving.

COURSE OUTCOMES:

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

1. Evaluate algorithms in terms of time and memory complexity.
2. Formulate new solutions for problems or improve existing code using data structures and algorithms.
3. Implement basic data structures such as arrays, linked lists, stacks and queues.
4. Solve problem involving graphs, trees and heaps
5. Apply Algorithms for solving problems like sorting, searching, and hashing.
6. Implement advanced data structures such as B-Trees, Red-Black, and AVL Trees

UNIT-I: INTRODUCTION TO DATA STRUCTURES

Basic concepts- Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O,Omega and Theta notations.

Introduction to Linear and Non Linear data structures-Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, Circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists-Operations- Insertion, Deletion. Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

UNIT-II: STACKS AND QUEUES

Stacks-Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation.

Queues-Queue ADT, definition and operations, array and linked Implementations in C, Circular queues-Insertion and deletion operations, Dequeue (Double ended queue) ADT, array and linked implementations in C.

UNIT-III: TREES AND GRAPHS

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, threaded binary trees.

Max Priority Queue-ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap. Graphs, Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS.

UNIT-IV: SEARCHING AND SORTING

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Merge Sort, Heap Sort, Comparison of Sorting methods.

UNIT-V: BINARY SEARCH TREES

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees-Definitionand Examples, Insertion into an AVL Tree ,B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees(Elementary treatment-only Definitions and Examples), Comparison of Search Trees.

Pattern matching algorithm- The Knuth-Morris-Pratt algorithm, Tries (examples only).

TEXT BOOKS:

1. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer SciencePress.
2. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press

REFERENCE BOOKS:

1. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
2. "How to Solve it by Computer", 2nd Impression by R. G. Dromey, Pearson Education

DISCRETE MATHEMATICS

II B. Tech - I Semester **L T P C**
Course Code: A2DS303PC **3 0 0 3**

COURSE OBJECTIVES:

The course should enable the students to:

1. To help students understand discrete and continuous mathematical structures
2. To impart basics of relations and functions
3. To facilitate students in applying principles of Recurrence Relations to calculate generating functions and solvethe Recurrence relations
4. To acquire knowledge in graph theory

COURSE OUTCOMES:

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

1. Apply the knowledge of discrete and continuous mathematical structures.
2. Solve various problems on relations and functions.
3. Apply the principles of Recurrence Relations to generate functions and solve various problems on it.
4. Solve problems using the knowledge of graph theory.

UNIT-I: MATHEMATICAL LOGIC

Statements and notations, Connectives, Well-formed formulas, Truth Tables, Tautology, Equivalence implication, Normal forms, Logical Inference, Rules of inference, Direct Method, Direct Method using CP(Conditional Proof), Consistency, Proof of contradiction, Automatic Theorem Proving. Quantifiers, Universal quantifiers. Predicates: Predicative logic, Free & Bound variables.

UNIT-II: RELATIONS

Introduction to set theory**,** Relations, Properties of Binary Relations, Equivalence Relation, Transitive closure, Compatibility and Partial ordering relations, Lattices, Hasse diagram. Functions: inverse Function , Composition of functions, Recursive Functions

UNIT-III: ELEMENTARY COMBINATORICS

Basis of counting, Combinations & Permutations, Enumeration of Combinations and Permutations, Enumeration of Combinations and Permutations With repetitions, Enumerating Permutations with Constrained repetitions, Binomial Coefficients, Binomial and Multinomial theorems, The principles of Inclusion – Exclusion, Pigeon-hole principles and its applications.

UNIT-IV: RECURRENCE RELATION

Generating Functions, Function of Sequences, Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating functions, The method of Characteristics roots, Solution of Inhomogeneous Recurrence Relation.

UNIT-V: GRAPHS

Basic Concepts, Isomorphism and Sub graphs, Trees and their properties, Spanning Trees- DFS,BFS, Minimal Spanning Trees- Prims, Kruskal's Algorithm, Planar Graphs, Euler's Formula, Multi graph and Euler circuits, Hamiltonian Graphs, Chromatic number.

TEXT BOOKS:

1. T1. Discrete Mathematics for computer scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker PHI
2. Discrete Mathematical Structures With Applications to Computer Science, JP Tremblay, R Manohar

REFERENCE BOOKS:

1. R1. Logic and Discrete Mathematics, *Grass Man & Trembley*, Pearson Education.

COMPUTER ORGANIZATION AND ARCHITECTURE

II-B.Tech I-Semester | **L T P C**
Course Code: A2DS304PC | **3 0 0 3**

Co-requisite: A Course on "Digital Electronics".

COURSE OBJECTIVES

- The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
- It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
- Topics include computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors

COURSE OUTCOMES

- Understand the basics of instruction sets and their impact on processor design.
- Demonstrate an understanding of the design of the functional units of a digital computer system.
- Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
- Design a pipeline for consistent execution of instructions with minimum hazards.
- Recognize and manipulate representations of numbers stored in digital computers

UNIT - I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.
Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.
Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

UNIT - II

Microprogrammed Control: Control memory, Address sequencing, micro program example, design of control unit.
Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT - III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.
Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT - IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT - V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.
Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.
Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.

TEXT BOOK:

1. Computer System Architecture – M. Morris Mano, Third Edition, Pearson/PHI.

REFERENCE BOOKS:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, V th Edition, McGraw Hill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4 th Edition, PHI/Pearson

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

II-B.Tech I-Semester **L T P C**
Course Code: A2DS305PC **3 0 0 3**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. Understand the basic object oriented programming concepts and apply them in problem solving.
2. Illustrate inheritance and polymorphism concepts for reusing the program.
3. Demonstrate on the exception handling mechanism.
4. Demonstrate on the multi-tasking by using multiple threads.
5. Develop data-centric applications using JDBC.
6. Understand the basics of java collection framework.

COURSE OUTCOMES:

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

1. Use object oriented programming concepts to solve real world problems.
2. Demonstrate the user defined exceptions by exception handling keywords (try, catch, throw, throws andfinally).
3. Use multithreading concepts to develop inter process communication.
4. Develop java application to interact with database by using relevant software component (JDBC Driver).
5. Solve real world problems using Collections.

UNIT – I JAVA BASICS

JAVA BASICS: Review of Object oriented concepts, History of Java, Java buzzwords, JVM architecture, Data types, Variables, Scope and life time of variables, arrays, operators, control statements, type conversion and casting, simple java program, constructors, methods, Static block, Static Data, Static
Method String and String Buffer Classes, Using Java API Document.

UNIT – II INHERITANCE, POLYMORPHISM, PACKAGES AND INTERFACES

INHERITANCE AND POLYMORPHISM: Basic concepts, Types of inheritance, Member access rules, Usage of this and Super key word, Method Overloading, Method overriding, Abstract classes, Dynamicmethod dispatch, Usage of final keyword.

PACKAGES AND INTERFACES: Defining package, Access protection, importing packages, defining and implementing interfaces, and Extending interfaces.

UNIT – III EXCEPTION HANDLING AND FILES

EXCEPTION HANDLING: Exception types, Usage of Try, Catch, Throw, Throws and Finally keywords,Built-in Exceptions, Creating own Exception classes.

I / O STREAMS AND FILES: Concepts of streams, Stream classes- Byte and Character stream, Reading console Input and Writing Console output, File Handling.

UNIT – IV MULTITHREADING AND JDBC

MULTI THREADING: Concepts of Thread, Thread life cycle, creating threads using Thread class andRunnable interface, Synchronization, Thread priorities, Inter Thread communication.

JDBC-Connecting to Database - JDBC Type 1 to 4 drives, connecting to a database, querying a database and processing the results, updating data with JDBC.

UNIT – V COLLECTION FRAMEWORK

COLLECTION FRAMEWORK: Introduction to Java Collections, Overview of Java Collection frame work, Generics, Commonly used Collection classes- Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calendar and Properties.

TEXT BOOKS:

1. Herbert Schildt and Dale Skrien,"Java Fundamentals – A comprehensive Introduction", McGraw Hill, 1st Edition, 2013.
2. Herbert Schildt, "Java the complete reference", McGraw Hill, Osborne, 7th Edition, 2011.
3. T.Budd, "Understanding Object- Oriented Programming with Java", Pearson Education, Updated Edition (New Java 2 Coverage), 1999.

REFERENCE BOOKS:

1. P.J.Dietel and H.M.Dietel, "Java How to program", Prentice Hall, 6th Edition, 2005.
2. P.Radha Krishna, "Object Oriented programming through Java", CRC Press, 1st Edition, 2007.
3. S.Malhotra and S. Choudhary, "Programming in Java", Oxford University Press, 2nd Edition, 2014.

DATA STRUCTURES LAB

II-B.Tech I-Semester | **L T P C**
Course Code: A2DS306PC | **0 0 3 1.5**

COURSE OBJECTIVES:

The course should enable the students to:

1. Ability to identify the appropriate data structure for given problem.
2. Design and analyze the time and space complexity of algorithm or program.
3. Effectively use compilers include library functions, debuggers and troubleshooting.
4. Write and execute programs using data structures such as arrays, linked lists to implement stacks, queues.
5. Write and execute programs in C to implement various sorting and searching.
6. Write and execute programs using data structures such as arrays, linked lists to implement trees, graphs, hashtables and search trees.

COURSE OUTCOMES:

The course should enable the students to:

1. Use appropriate data structure for given problem.
2. To analyze the time and space complexity of algorithm or program.
3. Use compilers include library functions, debuggers and troubleshooting.
4. Execute programs using data structures such as arrays, linked lists to implement stacks and queues.
5. Execute write programs in C to implement various sorting and searching.
6. Execute programs using data structures such as arrays, linked lists to implement trees, graphs, hash tables andsearch trees

LIST OF EXPERIMENTS

WEEK-1: SINGLE LINKED LIST

Write a C program that uses functions to perform the following:

a) Create a singly linked list of integers.
b) Delete a given integer from the above linked list.
c) Display the contents of the above list after deletion.

WEEK-2: DOUBLE LINKED LIST

Write a C program that uses functions to perform the following:

a) Create a doubly linked list of integers.
b) Delete a given integer from the above doubly linked list.
c) Display the contents of the above list after deletion.

WEEK-3: INFIX TOPOSTFIX CONERSION

Write a C program that uses stack operations to convert a given infix expression into its postfix Equivalent, Implement the stack using an array.

WEEK-4: DOUBLE ENDED QUEUE

Write C programs to implement a double ended queue ADT using

i) array and
ii) doubly linked list

WEEK-5: BINARY SEARCH TREES USING RESURSION

Write a C program that uses functions to perform the following:

a) Create a binary search tree of characters.
b) Traverse the above Binary search tree recursively in Postorder

WEEK-6: BINARY SEARCH TREES USING NON-RESURSION

Write a C program that uses functions to perform the following:

a) Create a binary search tree of integers.
b) Traverse the above Binary search tree non recursively in order.

WEEK-7: SORTING

Write C programs for implementing the following sorting methods to arrange a list of integers in Ascending order:

a) Insertion sort
b) Merge sort

WEEK-8: SORTING

Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order:

a) Quick sort
b) Selection sort

WEEK-9: AVL-TREES

a) Write a C program to perform the following operations on AVL:
    i. Insertion into an AVL.
    ii. Display elements of AVL Tree
b) Write a C program for implementing Heap sort algorithm for sorting a given list of integers in ascending order

WEEK-10: HASHING

Write a C program to implement all the functions of a dictionary (ADT) using hashing.

WEEK-11: PATTERN MATCHING ALGORITHM

Write a C program for implementing Knuth-Morris- Pratt pattern matching algorithm.

WEEK-12: GRAPH TRAVERSAL ALGORITHMS

Write C programs for implementing the following graph traversal algorithms:

a) Depth first traversal
b) Breadth first traversal

TEXT BOOKS:

1. C and Data Structures, Prof. P.S.Deshpande and Prof. O.G. Kakde, DreamtechPress.
2. Data structures using C, A.K.Sharma, 2nd edition, Pearson.
3. Data Structures using C, R.Thareja, Oxford UniversityPress.

WEB REFERENCES:

1. http://www.sanfoundry.com/data structures-examples
2. http://www.geeksforgeeks.org/c
3. http://www.cs.princeton.edu

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

II-B.Tech I-Semester **L T P C**
Course Code: A2DS307PC **0 0 3 1.5**

COURSE OBJECTIVES:

- To write programs using abstract classes.
- To write programs for solving real world problems using the java collection framework.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands-on experience with java programming.

COURSE OUTCOMES:

- Able to write programs for solving real world problems using the java collection framework.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

Note:

1. Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the use of the Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.

List of Experiments:

1. Use Eclipse or Net bean platform and acquaint yourself with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

3. a) Develop an applet in Java that displays a simple message.

   b)Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.

4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.

6. Write a Java program for the following:
   Create a doubly linked list of elements.
   Delete a given element from the above list.
   Display the contents of the list after deletion.

7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in the selected color. Initially, there is no message shown.

8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas.
Write a java program to display the table using Labels in Grid Layout.

10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

12. Write a Java program that correctly implements the producer – consumer problem using the concept of inter thread communication.

13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

REFERENCE BOOKS:

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

DATA VISUALIZATION - R PROGRAMMING /POWER BI

II-B.Tech I-Semester **L T P C**
Course Code: A2DS308PW **0 0 4 2**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. To discern patterns and relationships in the data.
2. To build Dashboard applications
3. To communicate the results clearly and concisely.
4. To be able to work with different formats of data sets.

COURSE OUTCOMES:

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

1. Understand How to import data into Tableau.
2. Understand Tableau concepts of Dimensions and Measures.
3. Develop Programs and understand how to map Visual Layouts and Graphical Properties.
4. Create a Dashboard that links multiple visualizations.
5. Use graphical user interfaces to create Frames for providing solutions to real world problems.

LAB PROBLEMS:

1. Understanding Data, What is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization?
2. Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts(line, bar charts, Tree maps),Using the Show me panel.
3. Tableau Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculations and fields.
4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.
5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data.
6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.
7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.
8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.
9. Tableau file types, publishing to Tableau Online, Sharing your visualizations, printing, and Exporting.
10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

REFERENCE BOOKS:

1. Microsoft Power BI cookbook, Brett Powell, 2nd edition.
2. R Programming for Data Science by Roger D. Peng (References)

The Art of R Programming by Norman Matloff Cengage Learning India.updating

ENVIRONMENTAL STUDIES

	L	T	P	C
II-B.Tech I-Semester				
Course Code: A2DS303MC	**2**	**0**	**0**	**0**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations
4. Determine the Natural resources on which the structure of development is raised for sustainability of the society through equitable maintenance of natural resources.
5. Illustrate about biodiversity that raises an appreciation and deeper understanding of species, ecosystems and also the interconnectedness of the living world and thereby avoids the mismanagement, misuse and destruction of biodiversity.
6. Summarize a methodology for identification, assessment and quantification of global environmental issues in order to create awareness about the international conventions for mitigating global environmental problems.
7. Sustainable development that aims to meet raising human needs of the present and future generations through preserving the environment.
8. Outline green environmental issue provides an opportunity to overcome the current global environmental issues by implementing modern techniques like CDM, green building, green computing etc.

COURSE OUTCOMES:

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

1. Demonstrate an understanding of the Significance of environmental education.
2. Outline the context of environmentalism.
3. Comprehend the multidisciplinary nature of the course environmental Studies.
4. Illustrate the components of the environment and its interactions.
5. Outline the causes, effects and management options for various environmental problems related to Air, Water and land.

UNIT – I ECO SYSTEMS

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food web and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Bio magnification, ecosystem value, services and carrying capacity.

UNIT – II NATURAL RESOURCES & MINERAL RESOURCES

Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable and non-Renewable energy sources, use of alternate energy source, case studies.

UNIT – III BIODIVERSITY AND BIOTIC RESOURCES

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Threats to biodiversity: habitat loss, poachingof wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT – IV ENVIRONMENTAL POLLUTION AND CONTROL TECHNOLOGIES

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution: Sources and types, Impacts of modern agriculture. Noise Pollution: Sources and Healthhazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. Global Environmental Problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). International conventions / Protocols: Earth Summit, Kyoto protocol and Montréal Protocol.

UNIT – V ENVIRONMENTAL POLICY, LEGISLATION & EIA

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Towards Sustainable Future: Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL LearningPrivate Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications

II YEAR (II-SEMESTER)

COMPUTER ORIENTED STATISTICAL METHODS

II B. Tech - II Semester **L T P C**
Course Code: A2MA401BS **3 1 0 4**

PRE-REQUISITES: Mathematics courses of first year of study.

COURSE OBJECTIVES:

1. Apply the concept of Correlation and regression with rank correlation.
2. To learn the basic ideas of probability and random variables.
3. Discuss various discrete and continuous probability distributions and their properties.
4. Explain the concept of Test of significance.
5. Understand the concept of stochastic process and Markov chains.

COURSE OUTCOMES: After learning the contents of this paper the student must be able to

1. Explain the concept of correlation and regression.
2. Understand the concept of probability and random variables.
3. Explain the concept of probability distributions.
4. Analyze the Testing of hypothesis.
5. Apply the Marcov chain and stochastic process.

UNIT - I: APPLIED STATISTICS

Correlation, Coefficient of Correlation, Multiple Correlation, Rank Correlation, Regression, Regression Coefficient, The lines of Regression , Multiple Regression.

UNIT – II: BASIC PROBABILITY

Probability, Sample Space, Probability of an Event, Conditional probability Multiplication theorem(without proof), Independent events and Baye's theorem.

Random variables: Discrete random variable, Probability distribution function Continuous random variables, Probability density function, Expectation and Variance of Random Variables.

UNIT - III: PROBABILITY DISTRIBUTIONS

Binomial distribution, Poisson distribution, Evaluation of Statistical parameters for these distributions, Poisson approximation to the binomial distribution. Fitting of Binomial and Poisson distributions. Normal distribution, Properties and Evaluation of statistical parameters for Normal distribution.

UNIT – IV TESTING OF HYPOTHESIS

Test of significance: Basic of testing of Hypothesis. Null and alternate Hypothesis, Types of errors, Level of significance, Critical region.

Large sample test for Single proportion, Difference of proportions, Single mean, Difference of means; Small sample tests: Test for single mean, Difference of means and test for ratio of variances.

UNIT – V STOCHASTIC PROCESSES AND MARKOV CHAINS:

Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n- step transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye, Probability and statistics for Engineers and scientists, 9th Edition, Pearson Publications
2. Fundamentals of Mathematical Statistics, Khanna Publications, S C Guptha and V.K. Kapoor.
3. S.D. Sharma, Operations research Kedarnath and ramnath publishers.

REFERENCE BOOKS:

1. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations
2. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
3. Probability and Statistics for engineers and scientists by Jay.I.Devore.

BUSINESS ECONOMICS & FINANCIAL ANALYSIS

II-B.Tech II-Semester **L T P C**
Course Code: A2DS402HS **3 0 0 3**

COURSE OBJECTIVES:

The course should enable the students to learn:
To understand and appreciate, with a particular insight, the importance of certain basic issues governing the business operations namely; demand and supply, production function, cost analysis, markets, forms of business organizations, capital budgeting and financial accounting and financial analysis.

COURSE OUTCOMES:

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

1. Understand the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing in different market structures.
2. Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis.
3. Develop an understanding of Markets & New Economic Environment.
4. Analyze how capital budgeting decisions are carried out.
5. Understanding the framework for both manual and computerized accounting process.
6. Know how to analyses and interpret the financial statements through ratio analysis.

UNIT – I

Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing
Demand forecasting, methods of demand forecasting.

UNIT – II

Production & Cost Analysis: Production Function - Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-
Even Point (simple problems) - Managerial Significance.

UNIT – III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organization: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment: Changing Business Environment in Post-liberalization scenario.

UNIT – IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of return (ARR) and Net Present Value Method (simple problems).

UNIT – V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Introduction IFRS - Double - Entry Book Keeping, Journal, Ledger, Trial Balance - Final Accounts (TrasingAccount, Profit and Loss Account and Balance Sheet with simple adjustments). Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

OPERATING SYSTEMS

II-B.Tech II-Semester **L T P C**
Course Code: A2DS403PC **3 0 0 3**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. To understand the role of OS in the overall computer system and study the operations performed by OS as a resource manager.
2. To understand the scheduling policies and different memory management techniques for different operating systems.
3. To understand process concurrency and synchronization.
4. To understand the concepts of I/O, storage and file management and introduce system call interface for file and process management.
5. To introduce the goals and principles of protection

COURSE OUTCOMES:

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

1. Acquire a High-level understanding of what are an operating system and the role it plays and the services it provides.
2. Understand process management concepts including scheduling, synchronization.
3. Describe System model for deadlock, Methods for handling deadlocks.
4. Understand memory management including virtual memory.
5. Acquire Knowledge on issues related to file system interface and implementation.
6. Understand the issues related to disk management.

UNIT – I

Overview-Introduction-Operating system objectives, User view, System view, Operating system definition, Computer System Organization, Computer System Architecture, OS Structure, OS Operations, Process Management, Memory Management, Storage Management, Protection and Security, Computing Environments.
Operating System services, User and OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure.

UNIT – II

Process: Process concepts-The Process, Process State, Process State transitions, Process Control Block, Context Switch.
Threads: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads.
Process Scheduling: Scheduling Queues, Schedulers, Scheduling Criteria, Scheduling algorithms, Multiprocessor Scheduling. Case Studies: Linux, Windows.

UNIT – III

Process Synchronization: Inter-process Communication: Background, The Critical Section Problem, Race Conditions, Mutual Exclusion, Peterson's solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization- Bounded Buffer Problem, The Producer/ Consumer Problem, Reader's & Writer Problem, Dinning Philosopher Problem, Event counters, Monitors, Message passing.
Deadlocks: Deadlocks - System Model, Deadlock Characterization: Necessary and sufficient conditions for Deadlock, Methods for Handling Deadlocks: Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

UNIT – IV

Memory Management: Basic Hardware, Address Binding, Logical and physical address space, Dynamic loading, linking and Shared libraries, Swapping, Contiguous Memory Allocation- Fixed and variable partition–Internal and External fragmentation and Compaction; Segmentation, Paging- Hardware support for paging, Protection, shared pages, Structure of Page Table. Case Studies: Linux, Windows.

Virtual Memory Management: Background, Demand Paging-locality of reference, Page fault; Copy- on-Write, Page replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing.

UNIT – V

File Management: Concept of File - Attributes, operations, file types, internal structure, access methods, Directory structure, file protection, file system structure, Allocation methods (contiguous, linked, indexed),Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk formatting- Boot-block, Bad blocks.

Protection: System Protection, Goals of Protection, Principles of Protection.

TEXT BOOKS

1. Abraham Silberschatz, Peter B.Galvin, Greg Gagne, Operating System Concepts, 9th Edition, Wiley Asia Student Edition.
2. William Stallings, Operating Systems: Internals and Design Principles, 5th Edition, Prentice Hall of India.

REFERENCE BOOKS:

1. Charles Crowley, Operating System: A Design-oriented Approach, 1st Edition, Irwin Publishing.
2. Gary J. Nutt, Addison, Operating Systems: A Modern Perspective, 2nd Edition, Wesley.
3. Maurice Bach, Design of the UNIX Operating Systems, 8th Edition, Prentice Hall of India.
4. Daniel P. Bovet, Marco Cesati, Understanding the Linux Kernel, 3rd Edition, O'Reilly and Associates.

WEB REFERENCES:

1. Abraham-Silberschatz-Operating-System-Concepts---9th 2012.12.pdf
2. https://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems

DATABASE MANAGEMENT SYSTEMS

II-B.Tech II-Semester **L T P C**
Course Code: A2DS404PC **3 0 0 3**

COURSE OBJECTIVES:

The course should enable the students to:

1. Discuss the basic database concepts, applications, data models, schemas and instances.
2. Design Entity Relationship model for a database.
3. Demonstrate the use of constraints and relational algebra operations.
4. Describe the basics of SQL and construct queries using SQL
5. Understand the importance of normalization in databases.
6. Demonstrate the basic concepts of transaction processing and concurrency control.
7. Understand the concepts of database storage structures and identify the access techniques.

COURSE OUTCOMES:

At the end of the course the students are able to:

1. Use the basic concepts of Database Systems in Database design
2. Apply SQL queries to interact with Database
3. Apply normalization on database design to eliminate anomalies
4. Analyze database transactions and can control them by applying ACID properties
5. Analyze physical database storage system of database.

UNIT-I:

Introduction: Database system applications, Database system Vs file systems, Advantage of a DBMS, Describing and storing data in a DBMS, Structure of a DBMS, People who work with databases.

Entity Relationship Model (ER Model): Database Design and ER Diagrams, Entities Attributes and Entity sets, Features of ER Model, Conceptual design with the ER model.

UNIT-II:

Introduction to relational model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition language, Basic Structure of SQL Queries, Basic operations, Set Operations, NULL Values, Aggregate Functions, Nested Sub Queries, JOIN Expressions, Views, Transactions, Integrity Constraints, SQL Data types and Schemas, Functions and Procedures, Triggers.

UNIT-III:

Relational Algebra and Calculus: Relational Algebra, Tuple Relational Calculus, Domain Relational Calculus. **Schema Refinement and Normal Forms:** Introduction to schema refinement, Functional Dependencies, Reasoning about FDs, Normal Forms: 1NF, 2NF, 3NF, Boyce Codd Normal Form, Properties of decompositions, Multi valued Dependencies, Fourth Normal Form, Join Dependencies and Fifth Normal Form.

UNIT-IV:

Transaction Management: Transaction Concept, A simple transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability.

Concurrency Control and Recovery System: Lock based protocols, Deadlock handling, multiple granularity, Time stamp based protocols, Validation based protocols. Failure Classification, Storage, Recovery and Atomicity, Failure with Non-volatile Storage, Remote backup systems.

UNIT-V:

Storage and File Structure: Overview of Physical Storage Media, Magnetic Disk and Flash Storage, RAID, TertiaryStorage, File Organization, Organization of Records in Files, Data Dictionary storage.

Indexing and Hashing: Basic Concepts, Ordered Indices, B+ Tree Index Files, Multiple Key access, Static Hashing,Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Sixth Edition, TataMcGraw Hill, 2011.
2. Raghurama Krishnan, Johannes Gehrke, "Data base Management Systems", TATA McGraw Hill, 3rd Edition,2007.
3. R.P. Mahapatra & Govind Verma, Database Management Systems, Khanna Publishing House, 2013.

REFERENCE BOOKS:

1. Peter Rob, Carlos Coronel, Database Systems Design Implementation and Management, 7th edition, 2009.
2. Scott Urman, Michael McLaughlin, Ron Hardman, "Oracle database 10g PL/SQL programming", 6th edition,Tata McGraw Hill,2010
3. .K.Singh, "Database Systems Concepts, Design and Applications", First edition, Pearson Education, 2006.
4. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fourth Edition, Pearson / Addisionwesley, 2007.

SOFTWARE ENGINEERING

II-B.Tech II-Semester **L T P C**
Course Code: A2DS405PC **3 0 0 3**

COURSE OBJECTIVES

- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

COURSE OUTCOMES

- Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

UNIT - I

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths. **A Generic view of process**: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI). **Process models**: The waterfall model, Spiral model and Agile methodology

UNIT - II

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

UNIT - III

Design Engineering: Design process and design quality, design concepts, the design model. Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT - IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging. Metrics for Process and Products: Software measurement, metrics for software quality.

UNIT - V

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM. **Quality Management:** Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.

OPERATING SYSTEMS LAB

	L	T	P	C
II-B.Tech II-Semester				
Course Code: A2DS406PC	**0**	**0**	**2**	**1**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. To write programs in Linux environment.
2. To implement the scheduling algorithms.
3. To develop solutions for synchronization problems using semaphores.
4. To implement page replacement algorithms and other memory management techniques.
5. To implement file allocation methods

COURSE OUTCOMES:

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

1. Design and solve synchronization problems.
2. Simulate and implement scheduling concepts.
3. Model a deadlock situation and implementing methods for handling deadlocks.
4. Simulate and implement memory management techniques.
5. Simulate and implement various file management concepts.
6. Use different system calls for writing application programs.

LIST OF EXPERIMENTS

WEEK 1

Programs using system calls

a. Write a C program to simulate ls | sort command.

b. Write a C program to implement the Process system calls. Create a new process, create a child process to it and then make it wait and abort.

c. Write a C program to simulate copy the contents of one file to another using system calls.

WEEK 2

Write C programs to simulate the following CPU scheduling algorithms:

a. FCFS b. SJF

WEEK 3

Write C programs to simulate the following CPU scheduling algorithms

a. Priority b. Round Robin

WEEK 4

Write a C program to solve the Producer- Consumer problem using semaphores

WEEK 5

Write a C program to solve the Dining- Philosopher problem using monitors

WEEK 6

Write a C program to simulate Bankers Algorithm for Dead Lock Avoidance**.**

WEEK 7

Write a C program to simulate Bankers Algorithm for Dead Lock Prevention.

WEEK 8

Write C program to simulate the paging technique of memory management

WEEK 9

Write C program to simulate the segmentation technique of memory management

WEEK 10

Write C programs to simulate the following page replacement algorithms:

a. FIFO b. LRU

WEEK 11

Write C programs to simulate the following Directory organization techniques:

a. Single level directory b. Two level directory

WEEK 12

Write C programs to simulate the following File allocation methods:

a. Contiguous b. Linked

TEXT BOOKS:

1. Abraham Silberschatz, Peter Galvin and Greg Gagne, Operating System Concepts, 9th Edition, Wiley Asia Student Edition.
2. William Stallings, Operating Systems: Internals and Design Principles, 5th Edition, Prentice Hall of India

REFERENCE BOOKS:

1. C.P Bhatt, An Introduction to Operating Systems, 2nd Edition, PHI.
2. Terrence Chan, Unix System Programming Using C++, PHI/ Pearson.
3. Andrew S Tanenbaum, Modern Operating Systems, 3rd Edition, PHI

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WEB REFERENCES:

1. http://codex.cs.yale.edu/avi/os-book/os9
2. www.cs.uic.edu/~jbell/course notes/operating systems

DATABASE MANAGEMENT SYSTEMS LAB

II-B.Tech II-Semester **L T P C**
Course Code: A2DS407PC **0 0 2 1**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. Apply the basic concepts of Database Systems and Applications.
2. Use the basics of SQL and construct queries using SQL in database creation and interaction
3. Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
4. Analyze and Select storage and recovery techniques of database system.

COURSE OUTCOMES:

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

1. Apply the basic concepts of Database Systems and Applications.
2. Develop an ER model for a given database.
3. Use the basics of SQL and construct queries using SQL in database creation and interaction.
4. Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
5. Analyze and Select storage and recovery techniques of database system.
6. Develop Procedures, Cursors, and Triggers in database system.

LIST OF EXPERIMENTS

WEEK -1 DDL Commands

Creation of Tables using SQL- Overview of using SQL tool and Data types in SQL

- Altering Tables and
- Dropping Tables

WEEK -2 Create Table with Primary key and Foreign Key& DML Commands

Creating Tables (along with Primary and Foreign keys),Practicing DML commands-

- Insert,
- Update
- Delete.

WEEK -3 Selection Queries

Practicing Select command using following operations

- AND, OR
- ORDER BY
- BETWEEN
- LIKE
- Apply CHECK constraint

WEEK -4 Aggregate Functions and Views

Practice Queries using following functions

- COUNT,
- SUM,
- AVG,
- MAX,
- MIN,

Apply constraint on aggregation using

- GROUP BY,
- HAVING,

VIEWS Create, Modify and Drop

WEEK -5 Nested Queries

Practicing Nested Queries using

- UNION,
- INTERSECT,
- CONSTRAINTS
- IN

WEEK -6 Co- Related Nested Queries

Practicing Co – Related Nested Queries using

- EXISTS
- NOT EXISTS. ANY, ALL

WEEK -7 Join Queries

Practicing Join Queries using

- Inner join
- Outer join
- Equi join
- Natural join

WEEK -8 Triggers

Practicing on Triggers - creation of trigger, Insertion using trigger, Deletion using trigger, Updatingusing trigger.

WEEK -9 Procedures

Procedures- Creation of Stored Procedures, Execution of Procedure, and Modification of Procedure

WEEK -10 Cursors

Cursors- Declaring Cursor, Opening Cursor, Fetching the data, closing the cursor.

WEEK -11 PL/SQL Part 1

Practice PL/SQL –

- block structure,
- variables,
- data types,

WEEK -12 PL/SQL Part 2

Practice PL/SQL –

- operators,
- control structures;
- aseca

Case study 1: College Management
Case study 2: An Enterprise/Organization
Case study 3: Library Management system
Case study 4: Sailors and shipment system

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", SixthEdition, Tata McGraw Hill, 2011.
2. Raghurama Krishnan, Johannes Gehrke, "Data base Management Systems", TATA McGraw Hill, 3rd Edition, 2007.
3. R.P. Mahapatra & Govind Verma, Database Management Systems, Khanna PublishingHouse, 2013.
4. Michael McLaughlin, Oracle Database 11g PL/SQL Programming, Oracle press.

REFERENCE BOOKS:

1. Database System Concepts, by Silberschatz, Sudarshan, and Korth, 6th edition.
2. Database management System by Raghu Rama Krishna, 3rd edition

WEB REFERENCES:

2. http://www.learndb.com/databases/how-to-convert-er-diagram-to-relational-database
3. https://www.w3schools.com/sql/sql_create_table.asp
4. http://www.edugrabs.com/conversion-of-er-model-to-relational-model/?upm_export=print
5. http://ssyu.im.ncnu.edu.tw/course/CSDB/chap14.pdf
6. http://web.cs.ucdavis.edu/~green/courses/ecs165a-w11/8-query.pdf

NODE JS/ REACT JS/ DJANGO

II-B.Tech II-Semester **L T P C**
Course Code: A2DS409PW **0 0 2 1**

PREREQUISITES: Object Oriented Programming through Java, HTML Basics

COURSE OBJECTIVES:

- To implement the static web pages using HTML and do client side validation using JavaScript.
- To design and work with databases using Java
- To develop an end to end application using java full stack.
- To introduce Node JS implementation for server side programming.
- To experiment with single page application development using React.

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

- Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
- Demonstrate Advanced features of JavaScript and learn about JDBC
- Develop Server – side implementation using Java technologies like
- Develop the server – side implementation using Node JS.
- Design a Single Page Application using React.

Exercises:

1. Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid.
2. Make the above web application responsive web application using Bootstrap framework.
3. Use JavaScript for doing client – side validation of the pages implemented in experiment 1 and experiment 2.
4. Explore the features of ES6 like arrow functions, callbacks, promises, async/await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.
5. Develop a java stand alone application that connects with the database (Oracle / mySql) and perform the CRUD operation on the database tables.
6. Create an xml for the bookstore. Validate the same using both DTD and XSD.
7. Design a controller with servlet that provides the interaction with application developed in experiment 1 and the database created in experiment 5.
8. Maintaining the transactional history of any user is very important. Explore the various session tracking mechanism (Cookies, HTTP Session)
9. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.
10. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)
11. For the above application create authorized end points using JWT (JSON Web Token).
12. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
13. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation using chart.js
14. Create a TODO application in react with necessary components and deploy it into github.

REFERENCE BOOKS:

1. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications, 2010
2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets` and JSP, O'Reilly Media, 2nd Edition, 2008.
3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, A Press.

GENDER SENSITIZATION

II-B.Tech II-Semester **L T P C**
Course Code: A2DS404MC **0 0 2 0**

COURSE OBJECTIVES:

The course should enable the students to learn:

1. To provide a critical perspective on the socialization of men and women.
2. To introduce students to information about some key biological aspects of genders. To expose the students to debates on the politics and economics of work.
3. To help students reflect critically on gender violence.
4. To expose students to more egalitarian interactions between men and women.

COURSE OUTCOMES:

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

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT – I UNDERSTANDING GENDER

Gender: Why Should We Study It? (*Towards a World of Equals*: Unit -1) **Socialization:** Making Women, Making Men (*Towards a World of Equals*: Unit -2) Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT – II GENDER AND BIOLOGY

Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals*: Unit -4) Declining SexRatio. Demographic Consequences.

Gender Spectrum: Beyond the Binary (*Towards a World of Equals*: Unit -10) Two or Many? Struggles with Discrimination.

UNIT – III GENDER AND LABOUR

Housework: the Invisible Labour (*Towards a World of Equals*: Unit -3) "My Mother doesn't Work." "Share the Load."

Women's Work: Its Politics and Economics (*Towards a World of Equals*: Unit -7)
Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions ofWork.

UNIT – IV ISSUES OF VIOLENCE

Sexual Harassment: Say No! (*Towards a World of Equals*: Unit -6)
Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading:"*Chupulu".*
Domestic Violence: Speaking Out (*Towards a World of Equals*: Unit -8)
Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading:New Forums for Justice.
Thinking about Sexual Violence (*Towards a World of Equals*: Unit -11) Blaming the Victim-"I Fought for my Life…." - Additional Reading: The Caste Face of Violence.

UNIT – V GENDER: CO – EXISTENCE

Just Relationships: Being Together as Equals (*Towards a World of Equals*: Unit -12)
Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.Additional Reading: Rosa Parks-The Brave Heart.

TEXT BOOKS:

1. ***"Towards a World of Equals: A Bilingual Textbook onGender"***, A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote,Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by **Telugu Akademi,**
   Hyderabad,Telangana State,**2015**.

REFERENCE BOOKS:

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. "I Fought For My Life…and Won."Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

WEB REFERENCES:

1. http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/