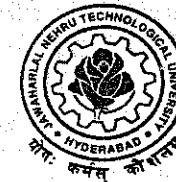# ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

(XV)

MECHANICAL (MECHATRONICS) ENGINEERING

For

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2009-2010)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

KUKATPALLY, HYDERABAD – 500 085.

Academic Regulations 2009 for B. Tech (Regular)

(Effective for the students admitted into I year from the Academic Year 2009-2010 onwards)

1. **Award of B.Tech. Degree**

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

   i. Pursued a course of study for not less than four academic years and not more than eight academic years.

   ii. Register for 200 credits and secure 200 credits

2. Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course.

3. **Courses of study**

   The following courses of study are offered at present for specialization for the B. Tech. Course:

Branch Code	Branch
I	Aeronautical Engineering.
II	Automobile Engineering.
III	Bio-Medical Engineering.
IV	Biotechnology.
V	Chemical Engineering.
VI	Civil Engineering.
VII	Computer Science and Engineering.
VIII	Electrical and Electronics Engineering.
IX	Electronics and Communication Engineering.
X	Electronics and Computer Engineering.
XI	Electronics and Instrumentation Engineering.
XII	Electronics and Telematics Engineering.
XIII	Information Technology.
XIV	Instrumentation and Control Engineering.
XV	Mechanical Engineering (Mechatronics).
XVI	Mechanical Engineering (Production).
XVII	Mechanical Engineering.
XVIII	Metallurgy and Material Technology.

and any other course as approved by the authorities of the University from time to time.

4. Credits

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

5. Distribution and Weightage of Marks

i. The performance of a student in each semester / I year shall be evaluated subject –wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, Industry oriented mini-project, seminar and project work shall be evaluated for 50, 50 and 200 marks respectively.

ii. For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End-Examination.

iii. For theory subjects, during the semester there shall be 2 mid term examinations. Each mid term examination consists of one objective paper, one subjective paper and one assignment. The objective paper is for 10 marks and subjective paper is for 10 marks, with a duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for subjective paper). Objective paper is set for 20 bits of – multiple choice questions, fill-in the blanks, matching type questions – for the 10 marks. Subjective paper of each semester shall contain 4 full questions (one from each unit) of which, the student has to answer 2 questions. each carrying 5 marks.

First mid term examination shall be conducted for 1-4 units of syllabus and second mid term examination shall be conducted for 5-8 units. 5 marks are allocated for Assignments (as specified by the concerned subject teacher) – first Assignment should be submitted before the conduct of the first mid, and the second Assignment should be submitted before the conduct of the second mid. The total marks secured by the student in each mid term examination are evaluated for 25 marks, and the better of the two mid term examinations shall be taken as the final marks secured by each candidate.

However, for first year, there shall be 3 mid term examinations (each for 25 marks), *along with 3 assignments* in a similar pattern as above [1st mid shall be from 1-2 units, 2nd mid from 3-5 units and 3rd mid shall be from 6-8 units], and the average marks of the best two examinations secured *(each evaluated for a total of 25 marks)* in each subject shall be considered as final marks for the internals / sessionals.

iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Out of the 25 marks for internal, day-to-day work in the laboratory shall be evaluated for 15 marks and internal examination for practical shall be evaluated for 10 marks conducted by the concerned laboratory teacher. The end examination shall be conducted with external examiner and laboratory teacher. The external examiner shall be appointed from the cluster of colleges as decided by the University examination branch.

v. For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 marks for end examination. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marks for internal tests. However in the I year class, there shall be three tests and the average of best two will be taken into consideration.

vi. There shall be an industry-oriented mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. However, the mini project and its report shall be evaluated with the project work in IV year II Semester. The industry oriented mini project shall be submitted in report

form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of mini project and a senior faculty member of the department. There shall be no internal marks for industry oriented mini project.

vii. There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall be evaluated by the Departmental committee consisting of Head of the department, seminarsupervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.

viii. There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of (i) Head of the Department (ii) two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he / she studied during the B.Tech course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive viva-voce.

ix. Out of a total of 200 marks for the project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by the same committee appointed for industry oriented mini project. In addition the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from each other. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.

x. Laboratory marks and the sessional marks awarded by the College are not final. They are subject to scrutiny and scaling by the University wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to a Committee. The Committee will arrive at a scaling factor and the marks will be scaled as per the

scaling factor. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same is asked for.

6. Attendance Requirements:

i. A student shall be eligible to appear for University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

ii. **Shortage of Attendance below 65% in aggregate shall in NO case be condoned.**

iii. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester or I year may be granted by the College Academic Committee.

iv. A student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester / I year, as applicable. They may seek re-admission for that semester / I year when offered next.

v. Students whose shortage of attendance is not condoned in any semester / I year are not eligible to take their end examination of that class and their registration shall stand cancelled.

vi. A stipulated fee shall be payable towards condonation of shortage of attendance.

7. Minimum Academic Requirements:

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

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.

ii. A student shall be promoted from II to III year only if he fulfils the academic requirement of 37 credits from one regular and one supplementary examinations of I year, and one regular examination of II year

I semester irrespective of whether the candidate takes the examination or not.

iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of total 62 credits from the following examinations, whether the candidate takes the examinations or not.

a. Two regular and two supplementary examinations of I year.

b. Two regular and one supplementary examinations of II year I semester.

c. One regular and one supplementary examinations of II year II semester.

d. One regular examination of III year I semester.

iv. A student shall register and put up minimum attendance in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.

v. Students who fail to earn 200 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

8. Course pattern :

i. The entire course of study is of four academic years. The first year shall be on yearly pattern and the second, third and fourth years on semester pattern.

ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the supplementary examination.

When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester / year is offered after fulfilment of academic regulations, whereas the academic regulations hold good with the regulations he was first admitted.

9. Award of Class:

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	Class Awarded
First Class with Distinction	70% and above	From the aggregate marks secured for the best 200 Credits.
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

10. Minimum Instruction Days :

The minimum instruction days for each semester / I year shall be 90/ 180 clear instruction days.

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

12. There shall be no place transfer within the Constituent Colleges and Units of Jawaharlal Nehru Technological University Hyderabad.

13. General:

i. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

ii. The academic regulation should be read as a whole for the purpose of any interpretation.

iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.

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

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Academic Regulations for B. Tech. (Lateral Entry Scheme)
(Effective for the students getting admitted into
II year from the Academic Year 2009-2010 and onwards)

1. The Students have to acquire 150 credits from II to IV year of B.Tech. Program (Regular) for the award of the degree.
   Register for **150** credits and secure **150** credits.

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

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

4. **Promotion Rule :**
   A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 37 credits from the examinations.

   a. Two regular and one supplementary examinations of II year I semester.
   b. One regular and one supplementary examinations of II year II semester.
   c. One regular examination of III year I semester.

5. **Award of Class:**
   After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes :

Class Awarded	% of marks to be secured	Class Awarded
First Class with Distinction	70% and above	From the aggregate marks secured for 150 Credits. (i.e. II year to IV year)
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

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

MALPRACTICES RULES
DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/ Improper conduct	Punishment
	If the candidate:	
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 tha 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 subj-ect only of all the candidates involved. Incase of an out-sider, 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, programm-able calculators, palm computers or any other form of material rele-vant to the subject of the exami-nation	Expulsion from the exami-nation hall and cancellation of the performance in that subj-ect and all other subjects the candidate has already appe-ared including practical exam-inations and project work and

	(theory or practical) in which the candidate is appearing.	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 University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has imperson-ated 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 canc-elled in all the subj-ects of the examination (including practicals and project work) alre-ady 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 University examinations. The continuation of the course by the candidate is subject to the academic regu-lations 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 University 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 Chief Superintendent/Assistant – Superintendent / 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 officer-in charge or	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 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 officer-in-charge, 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.	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 University 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 University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
(i) A show cause notice shall be issued to the college.
(ii) Impose a suitable fine on the college.
(iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.TECH. MECHANICAL (MECHATRONICS) ENGINEERING

I YEAR   COURSE STRUCTURE

Code	Subject	L	T/P/D	C
51001	English	2	-	4
51002	Mathematics - I	3	1	6
51003	Engineering Mechanics	3	1	6
51004	Engineering Physics	2	1	4
51005	Engineering Chemistry	2	-	4
51006	Computer Programming & Data Structures	3	-	6
51007	Engineering Drawing	2	3	4
51636	Computer Programming Lab.	-	3	4
51637	Engineering Physics & Engineering Chemistry Lab	-	3	4
51638	English Language Communication Skills Lab.	-	3	4
51639	Engineering Workshop / IT Workshop	-	3	4
	Total	17	18	50

II YEAR I SEMESTER   COURSE STRUCTURE

Code	Subject	L	T/P/D	C
53014	Probability and Statistics	3	1	3
53025	Basic Electrical Engineering	3	1	3
53016	Mechanics of Solids	3	1	3
53009	Electronic Devices & Circuits	4	0	4
53038	Thermal Science	4	1	4
53018	Metallurgy and Material Science	4	1	4
53618	Mechanics of Solids & Metallurgy Lab	0	3	2
53619	Electronic Devices and Circuits Lab	0	3	2
	Total	21	11	25

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HYDERABAD

II YEAR II SEMESTER   COURSE STRUCTURE

Code	Subject	L	T/P/D	C
54013	Production Technology	4	1	4
54014	Kinematics of Machinery	3	1	3
54004	Environmental Studies	3	0	3
54018	Numerical Methods	3	1	3
54017	Machine Drawing	0	6	4
54029	Fluid Mechanics and Heat Transfer	4	0	4
54620	Basic Electrical Engineering Lab	0	3	2
54621	Fluid Mechanics and Thermal Engineering Lab	0	3	2
	Total	**17**	**15**	**25**

III YEAR I SEMESTER   COURSE STRUCTURE

Code	Subject	L	T/P/D	C
55015	Managerial Economics and Financial Analysis	4	0	4
55017	Dynamics of Machinery	4	1	4
55052	Finite Element Techniques	4	1	4
55053	Switching Theory and Logic Design	3	1	3
55018	Machine Tools	3	1	3
55054	Principles of Machine Design	3	1	3
55019	Machine Tools Lab	0	3	2
55620	Heat Transfer and Production Technology Lab	0	3	2
	Total	**21**	**11**	**25**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD
B.TECH. MECHANICAL (MECHATRONICS) ENGINEERING

III YEAR II SEMESTER   COURSE STRUCTURE

Code	Subject	L	T/P/D	C
56016	Industrial Management	4	0	4
56057	CAD/CAM	4	1	4
56058	Mechanical Measurements & Control Systems	4	1	4
56059	Analog and Digital I.C. Applications	4	1	4
	Open Elective	3	1	3
56021	Engineering Optimization			
56014	Nonotechnology			
56022	Automobile Engineering			
56621	CAD / CAM Lab	0	3	2
56622	Instrumentation and I.C Applications Lab	0	3	2
56623	Advanced English Communication Skills Lab	0	3	2
	Total	**19**	**13**	**25**

IV YEAR I SEMESTER   COURSE STRUCTURE

Code	Subject	L	T/P/D	C
57022	Operations Research	4	1	4
57075	Microprocessors and Micro Controllers	3	1	3
57086	Robotics and its applications	4	1	4
57087	Motion Control Design	4	0	4
	Elective-I	3	1	3
57088	Product Design and Assembly Automation			
57089	Renewable Energy Sources			
57090	Computational Fluid Dynamics			
57091	Advanced Data Structures			
	Elective-II	3	1	3
57023	Power Plant Engineering			
57092	Computer Organization			
57093	Flexible Manufacturing System			
57094	Advanced Kinematics and Dynamics of Machinery			
57619	Microprocessors & Micro Controllers Lab	0	3	2
57620	Motion Control Design and CNC & Robotics Lab	0	3	2
	Total	**21**	**11**	**25**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. MECHANICAL (MECHATRONICS) ENGINEERING
IV YEAR II SEMESTER   COURSE STRUCTURE

Code	Subject	L	T/P/D	C
58066	MEMS Design	3	1	3
	Elective-III	3	0	3
58067	Automation in manufacturing			
58015	Production Planning and Control			
58068	Concurrent Engineering			
58069	Plant Engineering & Maintenance			
	Elective-IV	3	1	3
58016	Artificial Neural Networks			
58070	Mathematical Modeling and Simulation			
58071	Principles of Entrepreneurship			
58072	Operating Systems			
58637	Industry Oriented Mini Project	0	0	2
58638	Seminar	0	6	2
58639	Project Work	0	15	10
58640	Comprehensive Viva	0	0	2
	Total	9	23	25

Note: All End Examinations (Theory and Practical) are of three hours duration.

T - Tutorial   L – Theory
P – Practical/Drawing   C – Credits

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

	L	T/P/D	C
I Year B.Tech MC.	2	-/-/-	4

(51001) ENGLISH

1. **INTRODUCTION:** In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure by the students. Hence, it is suggested that they read it on their own with topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section , as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development and practice of language skills.

2. **OBJECTIVES:**

a. To improve the language proficiency of the students in English with emphasis on LSRW skills.

b. To equip the students to study academic subjects with greater facility through the theoretical and practical components of the English syllabus.

c. To develop the study skills and communication skills in formal and informal situations.

3. SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill 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 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 recognise them, to distinguish between them to mark stress and recognise 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 make students aware of the role of speaking in English and its contribution to their success.

2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: Learning English : A Communicative Approach.)
- Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.

2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Recognizing coherence/sequencing of sentences

  NOTE : The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from the non-detailed text or other authentic texts, such as magazines/newspaper articles.

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill

2. To equip them with the components of different forms of writing, beginning with the lower order ones.

- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Editing a passage

4. **TEXTBOOKS PRESCRIBED:** In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Eight Units, are prescribed:

For Detailed study

1. First Text book entitled "Enjoying Everyday English", Published by Sangam Books, Hyderabad

For Non-detailed study

1. Second text book "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

A. STUDY MATERIAL:

Unit –I

1. Chapter entitled Heaven's Gate from "Enjoying Everyday English", Published by Sangam Books, Hyderabad
2. Chapter entitled Haragovind Khorana from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Unit –II

1. Chapter entitled Sir CV Raman: A Pathbreaker in the Saga of Indian Science from "Enjoying Everyday English", Published by Sangam Books, Hyderabad
2. Chapter entitled Sam Petroda from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Unit –III

1. Chapter entitled The Connoisseur from "Enjoying Everyday English", Published by Sangam Books, Hyderabad
2. Chapter entitled Mother Teresa from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Unit –IV

1. Chapter entitled The Cuddalore Experience from "Enjoying Everyday English", Published by Sangam Books, Hyderabad
2. Chapter entitled Dr Amartya Kumar Sen from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Unit –V

1. Chapter entitled Bubbling Well Road from "Enjoying Everyday English", Published by Sangam Books, Hyderabad
2. Chapter entitled I Have a Dream by Martin Luther King from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Unit –VI

1. Chapter entitled Odds Against Us from "Enjoying Everyday English", Published by Sangam Books, Hyderabad

2. Chapter entitled Ask Not What Your Country can do for you by John F Kennedy from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur
* Exercises from the lessons not prescribed shall also be used for classroom tasks.

Unit – VII

Exercises on	Reading and Writing Skills
Reading Comprehension	Situational dialogues
Letter writing	Essay writing

Unit – VIII

Practice Exercises on Remedial Grammar covering

Common errors in English, Subject-Verb agreement, Use of Articles and Prepositions,

Tense and aspect

Vocabulary development covering

Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

REFERENCES:

1. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books
2. English Grammar Practice, Raj N Bakshi, Orient Longman.
3. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
4. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
5. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
6. Technical Communication, Meenakshi Raman, Oxford University Press
7. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
8. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
9. Murphy's English Grammar with CD, Murphy, Cambridge University Press.

10. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,

11. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.

12. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education

13. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.

14. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO

15. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education

16. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,

17. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers.

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(51002) MATHEMATICS – I

UNIT – I Sequences – Series

Basic definitions of Sequences and series – Convergences and divergence – Ratio test – Comparison test – Integral test – Cauchy's root test – Raabe's test – Absolute and conditional convergence

UNIT – II Functions of Single Variable

Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized Mean Value theorem (all theorems without proof) Functions of several variables – Functional dependence-Jacobian- Maxima and Minima of functions of two variables with constraints and without constraints

UNIT – III Application of Single variables

Radius, Centre and Circle of Curvature – Evolutes and Envelopes Curve tracing – Cartesian , polar and Parametric curves.

UNIT – IV Integration & its applications

Riemann Sums , Integral Representation for lengths, Areas, Volumes and Surface areas in Cartesian and polar coordinates multiple integrals - double and triple integrals – change of order of integration-change of variable

UNIT – V Differential equations of first order and their applications

Overview of differential equations- exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories and geometrical applications.

UNIT – VI Higher Order Linear differential equations and their applications

Linear differential equations of second and higher order with constant coefficients, RHS term of the type $f(X)= e^{ax}$, Sin ax, Cos ax, and x^n, eV(x), xV(x), method of variation of parameters. Applications bending of beams, Electrical circuits, simple harmonic motion.

UNIT – VII Laplace transform and its applications to Ordinary differential equations

Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms-Application of Laplace transforms to ordinary differential equations.

UNIT – VIII   Vector Calculus

Vector Calculus: Gradient- Divergence- Curl and their related properties Potential function - Laplacian and second order operators. Line integral – work done –- Surface integrals - Flux of a vector valued function.

Vector integrals theorems: Green's -Stoke's and Gauss's Divergence Theorems (Statement & their Verification) .

TEXT BOOKS:

1. Engineering Mathematics – I by P.B. Bhaskara Rao, S.K.V.S. Rama Chary, M. Bhujanga Rao.
2. Engineering Mathematics – I by C. Shankaraiah, VGS Booklinks.

REFERENCES:

1. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
2. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
3. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
4. Higher Engineering Mathematics – B.S. Grewal, Khanna Publications.
5. Advance Engineering Mathematics by Jain and S.R.K. Iyengar, Narosa Publications.
6. A text Book of KREYSZIG'S Engineering Mathematics, Vol-1 Dr .A. Ramakrishna Prasad. WILEY publications

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(51003) ENGINEERING MECHANICS

UNIT – I

Introduction to Engineering. Mechanics – Basic Concepts.

Systems of Forces : Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

UNIT – II

Equilibrium of Systems of Forces : Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorem, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.

UNIT – III

Centroid : Centroids of simple figures (from basic principles) – Centroids of Composite Figures

Centre of Gravity : Centre of gravity of simple body (from basis principles), centre of gravity of composite bodies, pappus theorem.

UNIT – IV

Area moment of Inertia : Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia : Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT – V

Analysis of perfect frames (Analytical Method) – Types of Frames – Assumptions for forces in members of a perfect frame, Method of joints, Method of sections, Force table, Cantilever Trusses, Structures with one end hinged and the other freely supported on rollers carrying horizontal or inclined loads.

UNIT – VI

Kinematics : Rectilinear and Curvilinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion.

Kinetics : Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

UNIT – VII

Work – Energy Method : Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method.

UNIT – VIII

Principle of virtual work: Equilibrium of ideal systems, efficiency of simple machines, stable and unstable equilibriums

TEXT BOOKS :

1. Engineering. Mechanics / Timoshenko & Young.
2. Engineering. Mechanics / S.S. Bhavikatti & J.G. Rajasekharappa

REFERENCES :

1. Engineering Mechanics / Fedinand . L. Singer / Harper – Collins.
2. Engineering. Mechanics / Irving. H. Shames Prentice – Hall.
3. Engineering. Mechanics Umesh Regl / Tayal.
4. Engineering. Mechanics / R.V. Kulkarni & R.D. Askhevkar
5. Engineering. Mechanics/Khurmi/S.Chand.
6. Engineering. Mechanics / KL Kumar / Tata McGraw Hill.

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(51004) ENGINEERING PHYSICS

UNIT-I

1. **Bonding in Solids:** Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy.

2. **Crystallography and Crystal Structures:** Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Diamond and hcp Structures, Structures of NaCl, ZnS, CsCl.

UNIT-II

3. **X-ray Diffraction:** Basic Principles, Bragg's Law, Laue Method, Powder Method, Applications of X- ray Diffraction.

4. **Defects in Crystals:** Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects; Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger's Vector, Surface Defects and Volume Defects.

UNIT-III

5. **Elements of Statistical Mechanics:** Maxwell-Boltzman, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Photon gas , Wein's Law, Rayleigh-Jeans law, Planck's Law of Black Body Radiation, Concept of Electron Gas, Fermi Energy, Density of States.

6. **Principles of Quantum Mechanics:** Waves and Particles, de Broglie Hypothesis , Matter Waves, Davisson and Germer's Experiment, G. P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function - Particle in One Dimensional Potential Box.

UNIT-IV

7. **Band Theory of Solids:** Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), Origin of

Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators, Concept of Effective Mass of an Electron and Hole.

UNIT-V

8. **Semiconductor Physics:** Fermi Level in Intrinsic and Extrinsic Semiconductors, Intrinsic Semiconductors and Carrier Concentration, Extrinsic Semiconductors and Carrier Concentration, Equation of Continuity, Direct & Indirect Band Gap Semiconductors, Hall Effect.

9. **Physics of Semiconductor Devices:** Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, I-V Characteristics of PN Junction, PN Diode as a Rectifier (Forward and Reverse Bias), Diode Equation, LED, LCD and Photo Diodes.

UNIT-VI

10. **Dielectric Properties:** Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro-electricity.

11. **Magnetic Properties:** Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials, Ferrites and their Applications, Concept of Perfect Diamagnetism, Meissner Effect, Magnetic Levitation, Applications of Superconductors.

UNIT-VII

12. **Lasers:** Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them, Ruby Laser, Helium-Neon Laser, Carbon Dioxide Laser, Semiconductor Diode Laser, Applications of Lasers.

13. **Fiber Optics:** Principle of Optical Fiber, Acceptance Angle and

Acceptance Cone, Numerical Aperture, Types of Optical Fibers and Refractive Index Profiles, Attenuation in Optical Fibers, Application of Optical Fibers.

UNIT-VIII

14. **Acoustics of Buildings & Acoustic Quieting:** Basic Requirement of Acoustically Good Hall, Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time(Qualitative Treatment), Measurement of Absorption Coefficient of a Material, Factors Affecting The Architectural Acoustics and their Remedies. Acoustic Quieting: Aspects of Acoustic Quieting, Methods of Quieting, Quieting for Specific Observers, Mufflers, Sound-proofing.

15. **Nanotechnology:** Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Precipitation, Combustion Methods; Top-down Fabrication: Chemical Vapour Deposition, Physical Vapour Deposition, Pulsed Laser Vapour Deposition Methods, Characterization(XRD&TEM) and Applications.

TEXT BOOKS:

1. Applied Physics – P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd., Fifth Print 2008).
2. Applied Physics – S.O. Pillai & Sivakami (New Age International (P) Ltd., Second Edition 2008).
3. Applied Physics – T. Bhima Shankaram & G. Prasad (B.S. Publications, Third Edition 2008).

REFERENCES:

1. Solid State Physics – M. Armugam (Anuradha Publications).
2. Modern Physics – R. Murugeshan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
3. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
4. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd
5. Nanotechnology – M.Ratner & D. Ratner (Pearson Ed.).
6. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
7. Solid State Physics – A.J. Dekker (Macmillan).
8. Applied Physics – Mani Naidu Pearson Education

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(51005) ENGINEERING CHEMISTRY

UNIT I:

Electrochemistry and Batteries: Concept of Electro Chemistry, Conductance-Electrolyte in solution, Conductance-Specific, Equivalent and molar conductance, Ionic mobilities, Kolrausch's Law. Application of conductance. EMF: Galvanic Cells, types of Electrodes, Reference Electrode (SCE, Quinhydrone electrode), Ion Selective Electrodes (Glass Electrode) Nernest equation, Concentration Cells, Galvanic series, Potentiometric titrations, Numerical problems.

Batteries: Primary and secondary cells, (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries, fuel cells – Hydrogen – Oxygen fuel cells, Advantages of fuel cells.

UNIT II:

Corrosion and its corrosion control: Introduction, causes and different types of corrosion and effects of corrosion, theories of corrosion – Chemical, Electrochemical corrosion, corrosion reactions, factors affecting corrosion – Nature of metal – galvanic series, over voltage, purity of metal, nature of oxide film, nature of corrosion product. Nature of environment-effect of temperature, effect of pH, Humidity, effect of oxidant. Corrosion control methods – Cathodic protection, sacrificial anode, impressed current cathode. Surface coatings – methods of application on metals- hot dipping, galvanizing, tinning, cladding, electroplating - Organic surface coatings – paints constituents and functions.

UNIT III:

Polymers: Types of Polymerization, Mechanism (Chain growth & Step growth).Plastics: Thermoplastic resins & Thermo set resins. Compounding & fabrication of plastics, preparation, properties, engineering applications of: polyethylene, PVC, PS, Teflon, Bakelite, Nylon. Conducting Polymers: Poly acetylene, polyaniline, conduction, doping, applications. Liquid Crystal polymers: Characteristics and uses Rubber – Natural rubber, vulcanization. Elastomers – Buna-s,

Butyl rubber, Thiokol rubbers, Fibers – polyester, fiber reinforced plastics (FRP), applications

UNIT IV:

Water: Introduction, Hardness: Causes, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water, numerical problems. Boiler troubles – Scale & sludge formation, caustic enbsittlement, corrosion, priming & foaming Softening of water (Internal & external treatment-Lime soda, Zeolite, Ion exchange process and Numerical problems) Reverse osmosis, electro dialysis.

UNIT V:

Surface Chemistry: Solid surfaces, types of adsorption, Longmuir adsorption isotherm, BET adsorption equip. Calculation of surface area of solid & application adsorption, classification of colloids, Electrical & optical properties micelles, applications of colloids in industry. Nano materials: Introduction, preparation and applications of nano meterials

UNIT VI:

Energy sources: fuels, classification – conventional fuels (solid, liquid, gaseous) Solid fuels – coal – analysis – proximate and ultimate analysis and their significance Liquid fuels – primary – petroleum – refining of petroleum-cracking knocking synthetic petrol – Bergius and Fischer Tropsech's process; Gaseous fuels – natural gas, analysis of flue gas by Orsat's method Combustion – problems, Calorific value of fuel – HCV, LCV, determination of calorific value by Junker's gas calorie meter.

UNIT VII:

Phase rule: Definitions – phase, component, degree of freedom, phase rule equitation. Phase diagrams – one component system: water system. Two component system lead- silver system, heat treatment based on iron-carbon phase diagram, hardening, annealing.

UNIT VIII:

Materials Chemistry: Cement: composition of Portland cement, manufacture of port land Cement, setting & hardening of cement (reactions). Lubricants: Criteria of a good lubricant, mechanism,

properties of lubricants: .Cloud point, pour point,flash & fire point,Viscocity. Refractoriess: Classification, Characteristics of a good refractory. Insulators & conductors: Classification of insulators characteristics of thermal & electrical insulators and applications of Superconductors (Nb-Sn alloy, $YBa_2 Cu_3 O_{7-x}$), applications.

TEXT BOOKS:

1. Text Books of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).

2. Text of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co,New Delhi(2006)

REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited , New Delhi(2006)

2. Enginering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills co., New Delhi (2004).

3. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

4. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.

5. Chemistry of Engineering Meterials by R.P Mani and K.N.Mishra, CENGAGE learning.   •

6. Applied Chemistry – A text for Engineering & Technology – Springar (2005).

7. Text Book of Engineering Chemistry – Shasi Chawla, Dhantpat Rai publishing Company, NewDelhi (2008).

8. Engineering Chemistry – R, Gopalan, D. Venkatappayya, D.V. Sulochana Nagarajan – Vikas Publishers (2008).

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(51006) COMPUTER PROGRAMMING AND DATA STRUCTURES

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programmes, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

UNIT - II

Introduction to C Language – Background, Simple C Programme, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.

Selection Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Programming examples.

UNIT - III

Designing Structured Programmes, Functions, basics, user defined functions, inter function communication,

Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programmes

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C programme examples.

UNIT - IV

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments.

Strings – Concepts, C Strings, String Input / Output functions, arrays of

strings, string manipulation functions, string / data conversion, C programme examples.

UNIT - V

Derived types – Structures – Declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types, C programming examples.

UNIT - VI

Input and Output – Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C programme examples.

UNIT – VII

Searching and Sorting – Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, Searching-linear and binary search methods.

UNIT - VIII

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack application-infix to postfix conversion, postfix expression evaluation, recursion implementation, Queues-operations, array and linked representations.

TEXT BOOKS :

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, Pearson education.

REFERENCES:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

3. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
4. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
5. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
6. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
7. C Programming & Data Structures, E. Balagurusamy, TMH.
8. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
9. C& Data structures – E V Prasad and N B Venkateswarlu, S. Chand&Co.

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(51007) ENGINEERING DRAWING

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING : Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions. Curves used in Engineering Practice & their Constructions :

a) Conic Sections including the Rectangular Hyperbola – General method only.

b) Cycloid, Epicycloid and Hypocycloid

c) Involute.

d) Scales: Different types of Scales, Plain scales comparative scales, scales of chords.

UNIT – II

DRAWING OF PROJECTIONS OR VIEWS ORTHOGRAPHIC PROJECTION IN FIRST ANGLE PROJECTION: Principles of Orthographic Projections – Conventions – First and Third Angle, Projections of Points and Lines inclined to both planes, True lengths, traces.

UNIT – III

PROJECTIONS OF PLANES & SOLIDS: Projections of regular Planes, auxiliary planes and Auxiliary projection inclined to both planes. Projections of Regular Solids inclined to both planes – Auxiliary Views.

UNIT – IV

SECTIONS AND SECTIONAL VIEWS:- Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

DEVELOPMENT AND INTERPENETRATION OF SOLIDS: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramid Cone and their parts. Interpenetration of Right Regular Solids

UNIT – V

INTERSECTION OF SOLIDS:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT - VI

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.

UNIT –VII

TRANSFORMATION OF PROJECTIONS : Conversion of Isometric Views to Orthographic Views – Conventions.

UNIT – VIII

PERSPECTIVE PROJECTIONS : Perspective View : Points, Lines, Plane Figures and Simple Solids, Vanishing Point Methods (General Method only).

TEXT BOOK :

1. Engineering Drawing, N.D. Bhat / Charotar

2. Engineering Drawing and Graphics, Venugopal / New age.

3. Engineering Drawing – Basant Agrawal, TMH

REFERENCES :

1. Engineering drawing – P.J. Shah.S.Chand.

2. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.

3. Engineering Drawing- Johle/Tata Macgraw Hill.

4. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. International.

5. Engineering Drawing – Grower.

6. Engineering Graphics for Degree – K.C. John.

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(51636) COMPUTER PROGRAMMING LAB

Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To Introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

Week I.

a) Write a C program to find the sum of individual digits of a positive integer.

b) 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.

c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Week 2.

a) Write a C program to calculate the following Sum:

Sum=1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!

b) Write a C program toe find the roots of a quadratic equation.

Week 3

a) Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

iii) To solve Towers of Hanoi problem.

Week 4

a) The total distance travelled by vehicle in 't' seconds is given by

distance = ut+1/2at^2 where 'u' and 'a' are the initial velocity (m/ sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

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)

Week 5

a) Write a C program to find both the largest and smallest number in a list of integers.

b) Write a C program that uses functions to perform the following:
   i) Addition of Two Matrices   ii) Multiplication of Two Matrices

Week 6

a) Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string in to a given main string from a given position.
   ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not

Week 7

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.

b) Write a C program to count the lines, words and characters in a given text.

Week 8

a) Write a C program to generate Pascal's triangle.

b) Write a C program to construct a pyramid of numbers.

Week 9

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\ldots\ldots\ldots+x^n$$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

Week 10

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11

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

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Week 12

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

Week 13

a) Write a C programme to display the contents of a file.

b) Write a C programme 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)

Week 14

Write a C program that uses functions to perform the following operations on singly linked list.:

i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 15

Write C programs that implement stack (its operations) using

i) Arrays ii) Pointers

Week 16

Write C programs that implement Queue (its operations) using

i) Arrays ii) Pointers

Week 17

Write a C program that uses Stack operations to perform the following:

i) Converting infix expression into postfix expression

ii) Evaluating the postfix expression

Week 18

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

i) Bubble sort ii) Selection sort

Week 19

Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers :

i) Linear search ii) Binary search

Week 20

Write C program that implements the following sorting method to sort a given list of integers in ascending order: i) Quick sort

Week 21

Write C program that implement the following sorting method to sort a given list of integers in ascending order: i) Merge sort

Week 22

Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

Week 23

Write C programs to implement the linear regression and polynomial regression algorithms.

Week 24

Write C programs to implement Trapezoidal and Simpson methods.

Text Books

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications.

2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.

3. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.

4 Practical C Programming,Steve Oualline,O'Reilly,SPD. TMH publications.

5. Computer Basics and C Programming, V. Rajaraman, PHI Publications.

6. Data structures and Program Design in C,R.Kruse, C.L.Tondo, B.P.Leung,M.Shashi,Pearson Education.

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(51637) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

(Any twelve experiments compulsory)

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Study the characteristics of p-i-n and avalanche photodiode detectors.
10. Bending losses of fibres.
11. Evaluation of numerical aperture of given fibre.
12. Energy gap of a material of p-n junction.
13. Thermo electric effect – Seebeck effect and Peltier effect.
14. Torsional pendulum.
15. Single slit diffraction using laser.

ENGINEERING CHEMISTRY LAB

List of Experiments (Any 12 of the following):

Titrimetry:

a. Estimation of hardness of water by EDTA method. (or)
   Estimation of calcium in limestone by Permanganometry.

Mineral Analysis:

2. Determination of percentage of copper in brass
3. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:

4. Colorimetry:
   Determination of ferrous iron in cement by colorimetric method.
   (Or) Estimation of Copper by Colorimetric method.

5. **Conductometry:**

Conductometric titration of strong acid Vs strong base.

(or) Conductometric titration of mixture of acids Vs strong base.

6. **Potentiometry:**

Titration of strong acid Vs strong base by potentiometry.

(or) Titration of weak acid Vs strong base by potentiometry.

Physical Properties:

7. Determination of viscosity of sample oil by redwood/oswald's viscometer

8. Determination Surface Tension of lubricants.

Identification and Preparations:

9. Identification of functional groups present in organic compounds.

10. Preparation of organic compounds

Asprin (or) Benzimidazole

Kinetics:

11. To determine the rate constant of hydrolysis of methyl acetate catalysed by an acid and also the energy of activation. (or) To study the kinetics of reaction between $K_2S_2O_8$ and KI.

12. Demonstration Experiments (Any One of the following) :

a. Determination of dissociation constant of weak acid-by PH metry

b. Preparation of Thiokol rubber

c. Adsorption on Charcoal

d. Heat of reaction

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.

2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel.

2. A text book on experiments and calculation Engg. S.S. Dara.

3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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(51638) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The Language Lab focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Objectives:

1. To expose the students to a variety of self-instructional, learner-friendly modes of language learning.

2. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.

3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.

4. To train them to use language effectively to face interviews, group discussions, public speaking.

5. To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.

SYLLABUS : The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.

2. Introduction to Stress and Intonation.

3. Situational Dialogues / Role Play.

4. Oral Presentations- Prepared and Extempore.

5. 'Just A Minute' Sessions (JAM).

6. Describing Objects / Situations / People.

7. Information Transfer

8. Debate

9. Telephoning Skills.

10. Giving Directions.

Minimum Requirement: The English Language Lab shall have two parts:

i) The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

ii) The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component): Computer network with Lan with minimum 60 multimedia systems with the following specifications:

i) P – IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

ii) Headphones of High quality

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- The Rosetta Stone English Library.
- Clarity Pronunciation Power – Part I.
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- Language in Use, Foundation Books Pvt Ltd with CD.
- Oxford Advanced Learner's Compass, 7th Edition.
- Learning to Speak English - 4 CDs.
- Vocabulary in Use, Michael McCarthy, Felicity O'Den, Cambridge.
- Murphy's English Grammar, Cambridge with CD.
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. A Handbook for English Language Laboratories – Prof. E. Suresh Kumar, P. Sreehari, Foundation Books.

2. Effective Communication & Public Speaking by S. K. Mandal, Jaico Publishing House.

3. English Conversation Practice by Grant Taylor, Tata McGraw Hill.

4. Speaking English effectively by Krishna Mohan, N. P. Singh, Mac Millan Publishers.

5. Communicate or Collapse: A Handbook of Efffective Public Speaking, Group Discussions and Interviews, by Pushpa Lata & Kumar, Prentice-Hall of India.

6. Learn Correct English, Grammar, Usage and Composition by Shiv. K. Kumar & Hemalatha Nagarajan, Pearson Longman

7. Spoken English by R. K. Bansal & J. B. Harrison, Orient Longman.

8. English Language Communication: A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr. G. Natanam & Prof. S. A. Sankaranarayanan, Anuradha Publications, Chennai.

9. Effective Technical Communication, M. Ashraf Rizvi, Tata McGraw-Hill.

10. A Practical Course in English Pronunciation, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.

11. A text book of English Phonetics for Indian Students by T. Balasubramanian, Mac Millan

12. Spoken English: A foundation Course, Parts 1 & 2, Kamalesh Sadanand and Susheela punitha, Orient Longman

DISTRIBUTION AND WEIGHTAGE OF MARKS English Language Laboratory Practical Paper:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.

2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by an external examiner/ or the teacher concerned with the help of another member of the staff of the same department of the same institution.

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(51639) ENGINEERING WORKSHOP / IT WORKSHOP

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

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring
6. Foundry
7. Welding
8. Power tools in construction, wood working, electrical engineering and mechanical Engineering.
9. IT Workshop-I : Computer hard ware , identification of parts , Disassembly, Assembly of computer to working condition, Simple diagnostic exercises.
10. IT workshop-II : Installation of Operating system windows and Linux , simple diagnostic exercises.

2. **TRADES FOR DEMONSTRATION & EXPOSURE:**

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual by Venkat Reddy

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II Year B.Tech MC. I Sem	L	T/P/D	C
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(53014) PROBABILITY AND STATISTICS

UNIT-I : Probability

Sample space and events – Probability – The axioms of probability – Some Elementary theorems - Conditional probability – Baye's theorem, Random variables – Discrete and continuous.

UNIT-II: Distributions

Binomial , Poisson & normal distributions related properties . Sampling distributions –Sampling distribution of means (known and Unknown)

UNIT-III: Testing of Hypothesis I

Tests of hypothesis point estimations – interval estimations Bayesian estimation. Large samples, Null hypothesis – Alternate hypothesis type I, & type II errors – critical region confidential interval for mean testing of single variance. Difference between the mean.

UNIT-IV : Testing of Hypothesis II

Confidential interval for the proportions. Tests of hypothesis for the proportions single and difference between the proportions.

UNIT-V: Small samples

Confidence interval for the t- distribution – Tests of hypothesis – t- distributions, F- distributions distribution. Test of Hypothesis –.

UNIT-VI : Correlation & Regression

Coefficient of correlation – Regression Coefficient – The lines of regression – The rank correlation

UNIT-VII : Queuing Theory

Arrival Theorem - Pure Birth process and Death Process M/M/1 Model.

UNIT-VIII : Stochastic processes

Introduction to Stochastic Processes – Markov process classification of states – Examples of Markov Chains, Stochastic Matrix, limiting probabilities.

TEXT BOOKS:

1. Probability & Statistics by D.K. Murugesan & P.Guru Swamy, Anuradha Publications.

2. Probability & Statistics for Engineers by G.S.S.Bhisma Rao, Scitech Publications.

REFERENCES:

1. Probability & Statistics by T.K.V.Iyengar & B.Krishna Gandhi & Others, S.Chand.

2. Probability & Statistics by William Mendenhall & Others, Cengage Publications.

3. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.

4. Higher Engineering Mathematics by Jain & S.K.R. Iyengar, Narasa Publications.

5. A first course in Probability & Statistics by B.L.S. Prakasa Rao, World Scientific.

6. Probability & Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India.

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(53025) BASIC ELECTRICAL ENGINEERING

UNIT - I

Introduction to Electrical Engineering : ohm's law, basic circuit components, Kirchhoff's laws. Simple problems.

UNIT-II

Network Analysis: Basic definitions, types of elements , types of sources, resistive networks, inductive networks, capacitive networks, series parallel circuits, star delta and delta star transformation. Network theorems- Superposition , Thevenins's, Maximum power transfer theorems and simple problems.

UNIT-III

Alternating Quantities: Principle of ac voltages , waveforms and basic definitions, root mean square and average values of alternating currents and voltage, form factor and peak factor, phasor representation of alternating quantities, the J operator and phasor algebra, analysis of ac circuits with single basic network element, single phase series circuits.

UNIT-IV

Transformers : Principles of operation, Constructional Details, Ideal Transformer and Practical Transformer, Losses, Transformer Test, Efficiency and Regulation Calculations (All the above topics are only elementary treatment and simple problems).

UNIT-VI

D.C Generators: Principle of operation of dc machines, types of D.C generators, e.m.f equation in D.C generator.

UNIT-V

D.C motors: Principle of operation of dc motors, types of D.C motors, losses and torque equation, losses and efficiency calculation in D.C generator

UNIT-VII

A.C Machines: Three phase induction motor, principle of operation,

slip and rotor frequency, torque (simple problems.

UNIT VIII

Basic Instruments: Introduction, classification of instruments, operating principles, essential features of measuring instruments, Moving coil permanent magnet (PMMC) instruments, Moving Iron of Ammeters And Voltmeters (elementary Treatment only)

TEXT BOOKS:

1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshiah – TMH.
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.
3. Electrical and Electronic Technology-By Hughes – Pearson Education.

REFERENCES:

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath PHI.
2. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.
3. Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David Irwin Pearson.

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(53016) MECHANICS OF SOLIDS

UNIT – I

SIMPLE STRESSES & STRAINS : Elasticity and plasticity – Types of stresses & strains–Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain – Elastic moduli & the relationship between them – Bars of varying section – composite bars – Temperature stresses.Strain energy – Resilience – Gradual, sudden, impact and shock loadings.

UNIT – II

SHEAR FORCE AND BENDING MOMENT : Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l., uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

FLEXURAL STRESSES : Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I,T,Angle and Channel sections – Design of simple beam sections.

UNIT – IV

SHEAR STRESSES : Derivation of formula – Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T angle sections.

UNIT – V

ANALYSIS OF PIN-JOINTED PLANE FRAMES : Determination of Forces in members of plane, pinjointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever& simply–supported trusses-by method of joints,method of sections & tension coefficient methods.

UNIT – VI

DEFLECTION OF BEAMS : Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, - U.D.L uniformly varying load. Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

UNIT – VII

THIN CYLINDERS : Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Riveted boiler shells – Thin spherical shells.

UNIT – VIII

Thick cylinders–lame's equation – cylinders subjected to inside & out side pressures – compound cylinders.

TEXT BOOKS :

1. Strength of materials – R.S. Kurmi and Gupta.
2. Solid Mechanics, by Popov
3. Strength of Materials – Ryder. G.H.; Macmillan Long Man Pub.
4. Strength of Materials – W.A. Nash, TMH

REFERENCES :

1. Strength of Materials -By Jindal, Umesh Publications.
2. Analysis of structures by Vazirani and Ratwani.
3. Mechanics of Structures Vol-III, by S.B.Junnarkar.
4. Strength of Materials by S.Timshenko

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(53009) ELECTRONIC DEVICES AND CIRCUITS

Unit- I: p-n Junction Diode

Qualitative Theory of p-n Junction, p-n Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semi Conductor Diodes, Zener Diode Characteristics.

Unit- II: Rectifiers and Filters

The p-n junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters, π- Section Filters, Comparision of Filters, Voltage Regulation using Zener Diode.

Unit- III: Bipolar Junction Transistor

The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications.

Unit- IV: Transistor Biasing and Stabilization

Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in V_{BE} and β, Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability.

Unit- V: Small Signal Low Frequency BJT Models

BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Analysis of a Transistor Amplifier Circuit using h-Parameters, Comparison of CB, CE, and CC Amplifier Configurations.

Unit-VI: Field Effect Transistor

The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics,

The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

Unit VII: FET Amplifiers

FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET, The Uni Junction Transistor.

Unit VIII: Special Purpose Electronic Devices

Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram) and Varactor Diode. Principle of Operation of Schottky Barrier Diode, SCR, and Semiconductor Photo Diode.

Text Books

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2ed., 1998, TMH.

2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 ed., 2006, PEI/PHI.

3. Introduction to Electronic Devices and Circuits - Rober T. Paynter, PE.

References

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 ed., 2008, TMH.

2. Electronic Devices and Circuits -- K. Lal Kishore, 2 ed., 2005, BSP.

3. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 ed., 2009, Wiley India Pvt. Ltd.

4. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 ed., 2008, TMH.

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II Year B.Tech MC. I Sem	L	T/P/D	C
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(53038) THERMAL SCIENCE

UNIT – I

Introduction: Basic Concepts: System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State Property, Process, Cycle – Reversibility – Quasi – static Process, Irreversible Process Work and Heat, Point and Path function.

UNIT II

Zeroth Law of Thermodynamics – Concept of quality of Temperature – Principles of Thermometry – Reference Points – Const. Volume gas Thermometer – Scales of Temperature, Ideal Gas Scale – PMM I - Joule's Experiments – First law of Thermodynamics – Corollaries – First law applied to a Process – applied to a flow system – Steady Flow Energy Equation. Limitations of the First Law

UNIT – III

Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Clausius Inequality, Entropy, Principle of Entropy Increase – Energy Equation, Availability and Irreversibility –Elementary Treatment of the Third Law of Thermodynamics.

UNIT- IV

Power Cycles : Otto, Diesel, Dual Combustion cycles, – Description and representation on P–V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis – comparison with Ideal and Actual Cycles.

UNIT V

Joule and Rankine cycles- Description and representation on P–V and T-S diagram, Thermal Efficiency - Performance , Evaluation – combined cycles

Refrigeration Cycles: Brayton and Rankine cycles – Performance Evaluation – combined cycles, Bell-Coleman cycle, Vapour compression cycle-performance Evaluation.

UNIT- VI

I.C. ENGINES: Classification – Two & Four Stroke Engines , Working principles, Valve and Port Timing Diagrams, - Engine systems.

Fuel system: Fuels used , Modes of fuel Admission to engine cylinder, Induction and injection , chemically correct fuel- air ratios. Fuel carburetor, Fuel Injection System, Ignition, Cooling and Lubrication.

UNIT – VII

S.I. Engines – Mixture requirements, Simple carburetor, Limitations, need of auxiliary systems and their working, problems faced in S.I Engine operation.

C.I. Engines : Four stages of combustion – Delay period and its importance – Effect of engine variables – Diesel Knock. Fuel pump and injector , Types of Fuel injection systems and their working, Nozzles, Introduction of cooling, Lubrication and super charging systems.

UNIT VIII

Gas Turbine: Introduction , thermodynamic cycles, schematic Layout ,open, closed and semi closed cycles, Parameters of performance and methods of improving performance- Inter cooling Reheating and Regeneration, applications of Gas turbines.

TEXT BOOKS :

1. Thermal Engineering / Rajput / Lakshmi Publications
2. Engineering Thermodynamics – P.K Nag, TMH
3. Thermal Engineering - Yadav, Lakshmi Publications
4. I.C. Engines – V. Ganesan, TMH
5. Thermal Sciences – Merle C. Potter, Elaine P. Scott, Cengage Learning

REFERENCE BOOKS:

1. Engineering Thermodynamics – Jones & Dugan

2. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles /TMH
3. Thermodynamics – J.P.Holman / McGrawHill
4. An introduction to Thermodynamics / YVC Rao / University Press
5. I.C. Engies – K.K. Ramalingam – Sci.Tech. Publications

Pre-Requisite: Physics

Objective: To understand the basic concepts of Thermodynamics and their applications

Tables/Codes: Steam Tables and Mollier Chart, Refrigeration Tables

Question Paper Pattern: 5 questions to be answered out of 8 questions, Each question should not have more than 3 bits.

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(53018) METALLURGY AND MATERIAL SCIENCE

UNIT – I

Structure of Metals : Bonds in Solids – Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys – determination of grain size.

UNIT - II

Constitution of Alloys : Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT -III

Equilibrium of Diagrams : Experimental methods of construction of equilibrium diagrams, Isomorphous alloy systems, equilibrium cooling and heating of alloys, Lever rule, coring miscibility gaps, eutectic systems, congruent melting intermediate phases, peritectic reaction. Transformations in the solid state – allotropy, eutectoid, peritectoid reactions, phase rule, relationship between equilibrium diagrams and properties of alloys. Study of important binary phase diagrams of Cu-Ni-, Al-Cu, Bi-Cd, Cu-An, Cus-Sn and Fe-Fe3C.

UNIT -IV

Cast Irons and Steels : Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels, Low alloy steels, Hadfield manganese steels, tool and die steels.

UNIT – V

Heat treatment of Alloys : Effect of alloying elements on Fe-Fe3C system, Annealing, normalizing, Hardening, TTT diagrams, tempering , Hardenability, surface - hardening methods, Age hardening treatment, Cryogenic treatment of alloys.

UNIT - VI

Non-ferrous Metals and Alloys : Structure and properties of copper

and its alloys, Aluminium and its alloys, Titanium and its alloys.

UNIT – VII

Ceramic materials : Crystalline ceramics, glasses, cermaets, abrasive materials, nanomaterials – definition, properties and applications of the above.

UNIT - VIII

Composite materials : Classification of composites, various methods of component manufacture of composites, particle – reinforced materials, fiber reinforced materials, metal ceramic mixtures, metal – matrix composites and C – C composites.

TEXT BOOKS :

1. Introduction to Physical Metallurgy / Sidney H. Avener.

2. Essential of Materials science and engineering/ Donald R.Askeland/Thomson.

REFERENCES :

1. Material Science and Metallurgy/kodgire.

2. Science of Engineering Materials / Agarwal

3. Materials Science and engineering / William and collister.

4. elements of Material science / V. Rahghavan

5. An introduction to materialscience / W.g.vinas & HL Mancini

6. Material science & material / C.D.Yesudian & harris Samuel

7. Engineering Materials and Their Applications – R. A Flinn and P K Trojan / Jaico Books.

8. Engineering materials and metallurgy/R.K.Rajput/ S.Chand.

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II Year B.Tech MC. I Sem

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(53618) MECHANICS OF SOLIDS AND METALLURGY LAB

(A) MECHNICS OF SOLIDS LAB :

1. Direct tension test
2. Bending test on
a) Simple supported
b) Cantilever beam
3. Torsion test
4. Hardness test
a) Brinells hardness test
b) Rockwell hardness test
5. Test on springs
6. Compression test on cube
7. Impact test
8. Punch shear test

(B) METALLURGY LAB :

1. Preparation and study of the Micro Structure of pure metals like Iron, Cu and Al.
2. Preparation and study of the Microstructure of Mild steels, low carbon steels, high – C steels.
3. Study of the Micro Structures of Cast Irons.
4. Study of the Micro Structures of Non-Ferrous alloys.
5. Study of the Micro structures of Heat treated steels.
6. Hardeneability of steels by Jominy End Quench Test.
7. To find out the hardness of various treated and untreated steels.

   NOTE : Any 10 experiments from the above are to be conducted taking at least 4 from each section.

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(53619) ELECTRONIC DEVICES AND CIRCUITS LAB

PART A: (Only for Viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions) :

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Input & Output Characteristics of Transistor in CB Configuration.
4. Input & Output Characteristics of Transistor in CE Configuration.
5. Half Wave Rectifier with & without filters
6. Full Wave Rectifier with & without filters
7. FET characteristics
8. Measurement of h parameters of transistor in CB, CE, CC configurations
9. Frequency Response of CC Amplifier.
10. Frequency Response of CE Amplifier.
11. Frequency Response of Common Source FET amplifier
12. SCR characteristics.
13. UJT Characteristics

PART C:

Equipment required for Laboratories:

1. Regulated Power supplies (RPS) — 0-30 V
2. CRO's — 0-20 MHz.
3. Function Generators — 0-1 MHz.
4. Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital) — 0-20 µA, 0-50µA, 0-100µA, 0-200µA, 0-10 mA.
8. Voltmeters (Analog or Digital) — 0-50V, 0-100V, 0-250V
9. Electronic Components — Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs, diodes Ge& Si type, Transistors – npn, pnp type)

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II Year B.Tech MC.II-Sem	L	T/P/D	C
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(54013) PRODUCTION TECHNOLOGY

UNIT – I

CASTING : Steps involved in making a casting – Advantage of casting and its applications. – Patterns and Pattern making – Types of patterns – Materials used for patterns, pattern allowances and their construction, Principles of Gating, Gating ratio and design of Gating systems

UNIT – II

Solidification of casting – Concept – Solidification of pure metal and alloys, short & long freezing range alloys. Risers – Types, function and design, casting design considerations, special casting processes 1) Centrifugal 2)Die, 3) Investment.

Methods of Melting : Crucible melting and cupola operation, steel making processes, special.

UNIT – III

A) Welding : Classification of welding process types of welds and welded joints and their characteristics, design of welded joints, Gas welding, ARC welding, Forge welding, resistance welding, Thermit welding and Plasma (Air and water) welding.

B) Cutting of Metals: Oxy – Acetylene Gas cutting, water plasma. Cutting of ferrous, non-ferrous metals.

UNIT – IV

Inert Gas welding, TIG & MIG, welding, Friction welding, Induction welding, Explosive welding, Laser welding, Soldering & Brazing: Heat affected zones in welding; welding defects – causes and remedies – destructive nondestructive testing of welds.

UNIT – V

Hot working, cold working, strain hardening, recovery, recrystallisation and grain growth, Comparison of properties of Cold and Hot worked parts, Rolling fundamentals – theory of rolling, types of Rolling mills and products. Forces in rolling and power requirements.

UNIT - VI

Stamping, forming and other cold working processes : Blanking and piercing – Bending and forming – Drawing and its types – wire drawing and Tube drawing – coining – Hot and cold spinning – Types of presses and press tools. Forces and power requirement in the above operations.

UNIT- VII

EXTRUSION OF METALS : Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion Hydrostatic extrusion.

Forging processes: Principles of forging – Tools and dies – Types Forging – Smith forging, Drop Forging – Roll forging – Forging hammers : Rotary forging – forging defects.

UNIT - VIII

Processing of Plastics: Types of Plastics, Properties, applications and their Processing methods & Equipment (blow &injection modeling)

TEXT BOOKS :

1. Manufacturing Engineering and Technology/Kalpakjin S/ Pearson Edu.
2. Manufacturing Technology / P.N. Rao/TMH

REFERENCES :

1. Production Technology / R.K. Jain
2. Metal Casting / TV Ramana Rao / New Age
3. Principles of Metal Castings / Roenthal.
4. Welding Process / Paramar
5. Production Technology /Sarma P C
6. Production Engineering – Suresh Dalela & Ravi Shankar / Galgotia Publications Pvt. Ltd.

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(54014) KINEMATICS OF MACHINERY

UNIT – I

MECHANISMS : Elements or Links – Classification – Rigid Link, flexible and fluid link – Types of kinematic pairs – sliding, turning, rolling, screw and spherical pairs – lower and higher pairs – closed and open pairs – constrained motion – completely, partially or successfully constrained and incompletely constrained .

MACHINES : Mechanism and machines – classification of machines – kinematic chain – inversion of mechanism – inversion of mechanism – inversions of quadric cycle, chain – single and double slider crank chains.

UNIT - II

STRAIGHT LINE MOTION MECHANISMS : Exact and approximate copiers and generated types – Peaucellier, Hart and Scott Russul – Grasshopper – Watt T. Chebicheff and Robert Mechanisms and straight line motion, Pantograph.

UNIT – III

KINEMATICS : Velocity and acceleration – Motion of link in machine – Determination of Velocity and acceleration diagrams – Graphical method – Application of relative velocity method four bar chain.

Analysis of Mechanisms : Analysis of slider crank chain for displacement , velocity and acceleration of slider – Acceleration diagram for a given mechanism, Kleins construction, Coriolis acceleration, determination of Coriolis component of acceleration.

Plane motion of body : Instantaneous center of rotation, centroids and axodes – relative motion between two bodies – Three centres in line theorem – Graphical determination of instantaneous centre, diagrams for simple mechanisms and determination of angular velocity of points and links.

UNIT – IV

STEERING Mechanisms : Conditions for correct steering – Davis Steering gear, Ackermans steering gear – velocity ratio.

HOOKE'S JOINT : Single and double Hooke's joint – Universal coupling – application – problems.

UNIT – V

CAMS : Definitions of cam and followers – their uses – Types of followers and cams – Terminology – Types of follower motion - Uniform velocity – Simple harmonic motion and uniform acceleration. Maximum velocity and maximum acceleration during outward and return strokes in the above 3 cases.

Analysis of motion of followers : Roller follower – circular cam with straight, concave and convex flanks.

UNIT – VI

Higher pairs, friction wheels and toothed gears – types – law of gearing, condition for constant velocity ratio for transmission of motion, Form of teeth: cycloidal and involute profiles. Velocity of sliding – phenomena of interferences – Methods of interference. Condition for minimum number of teeth to avoid interference, expressions for arc of contact and path of contact – Introduction to Helical, Bevel and worm gearing.

UNIT – VII

Belt Rope and Chain Drives : Introduction, Belt and rope drives, selection of belt drive- types of belt drives, V-belts, materials used for belt and rope drives, velocity ratio of belt drives, slip of belt, creep of belt, tensions for flat belt drive, angle of contact, centrifugal tension, maximum tension of belt, Chains- length, angular speed ratio, classification of chains.

UNIT – VIII

GEAR TRAINS: Introduction – Train value – Types – Simple and reverted wheel train – Epicyclic gear Train. Methods of finding train value or velocity ratio – Epicyclic gear trains. Selection of gear box-Differential gear for an automobile.

TEXT BOOKS :

1. Theory of Machines by Thomas Bevan, CBS
2. Theory of Machines - R.K Bansal
3. Theory of Machines R.S Khurmi & J.K Gupta

REFERENCES :

1. Theory of machines – Rattan .S.S., TMH, 2009 Edition
2. Theory of machines – PL. Ballaney / khanna publishers.
3. Theory of Machines Sadhu Singh Pearsons Edn
4. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age
5. Theory of Machines / Shigley / Oxford.

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(54004) ENVIRONMENTAL STUDIES

UNIT-I : ECOSYSTEMS:

Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, Structure and Structural Components of an ecosystem, Functions of ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Homeostasis / Cybernetics, Food chain concentration, Biomagnification, ecosystems value, services and carrying capacity.

UNIT-II: NATURAL RESOURCES:

Classification of Resources: Living and Non-Living resources, Renewable and non-renewable 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 – case studies. Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources – case studies. Land resources: land as a resource, land degradation, man induced landslides and land use / land cover mapping.

UNIT-III: BIODIVERSITY AND BIOTIC RESOURCES:

Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, conservation of biodiversity: In-Situ and Ex-situ conservation. Food and fodder resources, Timber and non-timber forest products.

UNIT-IV: ENVIRONMENTAL POLLUTION AND CONTROL:

Classification of pollution and pollutants, causes, effects and control technologies. Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Point and non-point sources of pollution, Major pollutant of water and their sources, drinking water quality standards.

Waste water treatment methods: effluent treatment plants (ETP), Sewage treatment plants (STP), common and combined effluent treatment plants (CETP).Soil Pollution: Soil as sink for pollutants, impact of modern agriculture on soil, degradation of soil. Marine Pollution: Misuse of International water for dumping of hazardous waste, coastal pollution due to sewage and marine disposal of industrial effluents. Noise Pollution: Sources, Industrial Noise-Occupational Health hazards, standards, Methods of control of Noise. Thermal Pollution: Thermal Comforts, Heat Island effect, Radiation effects. Nuclear Pollution: Nuclear power plants, nuclear radiation, disasters and impacts, genetical disorders. Solid waste: types, Collection processing and disposal of industrial and municipal solid wastes composition and characteristics of e-Waste and its management.

UNIT-V: GLOBAL ENVIRONMENTAL PROBLEMS AND GLOBAL EFFORTS:

Green house effect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol,

UNIT-VI: ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MANAGEMENT PLAN:

Definition of Impact: classification of impacts, Positive and Negative, Reversible and irreversible, light, moderate and severe, methods of baseline data acquisition. Impacts on different components: such as human health resources, air, water, flora, fauna and society. Prediction of impacts and impact assessment methodologies. Environmental Impact Statement (EIS). Environmental Management Plan (EMP): Technological Solutions, preventive methods, Control technologies, treatment technologies: green-belt-development, rain water harvesting. Remote sensing and GIS methods.

UNIT-VII: ENVIRONMENTAL POLICY, LEGISLATION, RULES AND REGULATIONS

National Environmental Policy, Environmental Protection act, Legal aspects Air (Prevention and Control of pollution) Act- 1981, Water(

Prevention and Control of pollution) Act-1974, Water pollution Cess Act-1977, Forest Conservation Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules .

UNIT: VIII — TOWARDS SUSTAINABLE FUTURE

Concept of Sustainable Development, Threats to Sustainability, Population and its explosion, Crazy Consumerism, Over-exploitation of resources, Strategies for Achieving Sustainable development, Environmental Education, Conservation of Resources, Urban Sprawl, Sustainable Cities and Sustainable Communities, Human health, Role of IT in Environment, Environmental Ethics, Environmental Economics, Concept of Green Building, Clean Development Mechanism (CDM).

SUGGESTED TEXT BOOKS:

1. Environmental studies , From crisis to cure by R.Rajagopalan, 2005
2. Text book of Environmental Science and Technology by M.Anji Reddy 2007
3. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.

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(54018) NUMERICAL METHODS

UNIT-I: Roots of Non linear equations

Solution of Algebraic and Transcendental Equations: Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.

UNIT-II: Solution of linear equations:

Existence of solution – Gauss Elimination method – Gauss elimination with Pivoting. Gauss Jordon Method- Ill conditioned systems – Jacobi iterative method – Gauss Seidel Method – Convergence of Iterative methods.

UNIT-III: Interpolation:

Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences – Symbolic relations and separation of symbols- Difference Equations - Differences of a polynomial-Newton's formulae for interpolation –Interpolation with unevenly spaced points-Lagrange's Interpolation formula. - Cubic spline.

UNIT-IV: Least squares method:

Linear, Non linear and curvilinear curve fitting – Multiple linear regression

UNIT – V: Numerical differentiation and integration

Numerical differentiation and integration Trapezoidal rule, simpson's 1/3 rule and 3/8ᵗʰ rule.

UNIT – VI : Numerical solution of Initional Value Problems in Ordinary Differential Equations

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods –Predictor-Corrector Methods- Adams-Bashforth Method.

UNIT-VII: Boundary values & Eigen value problems

Shooting method, Finite difference method and solving eigen values problems, power method.

UNIT-VIII: Solution of partial differential equations

Classification of partial differential equation –Finite difference methods for: Elliptic equations –Laplace equations – Leibmann's iterative method – Parabola equations – Solution of heat equation (One dimensional).

TEXT BOOKS:

1. Numerical Methods by E. Balaguruswamy by Tata – Mc Graw Hill.
2. An Introduction to Numerical Analysis by S.S.Sastry – PHI Learning
3. Numerical Methods by Jain, Iyengar & Jain.

REFERENCES:

1. Numerical Methods by S. Armugam & Others Scitech.
2. Introduction to Numerical Analysis by K.E. Aitkinson, Wiley Publications.
3. Numerical Analysis by Scarborough, Oxford IVH.
4. Elements of Numerical Analysis by Radha S.Gupta McMillan.
5. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.

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II Year B.Tech MC.II-Sem   L   T/P/D   C

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(54017) MACHINE DRAWING

I. **Machine Drawing Conventions:** Need for drawing conventions – introduction to ISI conventions

a) Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.

b) Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.

c) Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.

d) Title boxes, their size, location and details – common abbreviations and their liberal usage

e) Types of Drawings – working drawings for machine parts.

II. **Drawing of Machine Elements and simple parts :** Selection of Views, additional views for the following machine elements and parts with every drawing proportions.

a) Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.

b) Keys, cottered joints and knuckle joint.

c) Rivetted joints for plates

d) Shaft coupling, spigot and socket pipe joint.

e) Journal, pivot and collar and foot step bearings.

III. **Assembly Drawings:** Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportions.

a) Engine parts – stuffing boxes, cross heads, Eccentrics, Petrol Engine connecting rod, piston assembly.

b) Other machine parts - Screws jacks, Machine Vices Plummer block, Tailstock.

c) Valves : Steam stop valve, spring loaded safety valve, feed check valve and air cock.

NOTE : First angle projection to be adopted. The student should be able to provide working drawings of actual parts.

TEXT BOOK :

1. Machine Drawing – Dhawan, S.Chand Publications
2. Machine Drawing –K.L.Narayana, P.Kannaiah & K. Venkata Reddy / New Age/Publishers

REFERENCES:

1. Machine Drawing – P.S.Gill.
2. Machine Drawing – Luzzader
3. Machine Drawing – Rajput

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II Year B.Tech MC.II-Sem

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(54029) FLUID MECHANICS AND HEAT TRANSFER

Unit-I : Physical properties of fluids, Measurement of pressure. Introduction to fluid mechanics, static, kinematics and dynamics.

Unit-II : Fluid kinematics: Streamline, path line and streak lines and stream tube, classification of flows, steady, unsteady, uniform, non-uniform, laminar, turbulent. Rotational and irrotational flows – Equation of continuity for one dimensional flows – Stream and velocity potential functions – Flow net analysis.

Fluid Dynamics: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line. Momentum equation and its applications – Boundary layer along a thin flat plate – Separation of boundary layer – Drag and lift – Flow measurement by pitot tube Venturimeter and orifice meter.

Unit-III : Flow through closed conduit, Reynolds number laminate flow through circular tube, Hydraulic gradient and total energy lines, loss of head due to sudden enlargement and contraction.

Unit-IV : Hydraulic Turbines : Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies , hydraulic design –draft tube theory- functions and efficiency.

Unit-V : Introduction : Modes of heat transfer, Mechanism of heat transfer, Basic laws of heat transfer.

Conduction: Fourier heat conduction equation, general heat condition equation, initial and boundary conditions, conduction through homogeneous slab, cylinder and sphere.

Unit-VI : Convection: Dimensional analysis, Rayleigh and Buckingham methods applied to heat transfer, Non-dimensional members in heat transfer. Boundary layer concept, concept of stagnant film, Reference temperature for evaluation of fluid properties. Forced convection of laminar flow inside ducts and over bodies. Local and average heat transfer coefficients.

Unit-VII : Radiation: Emission characteristics and laws of Black body radiation. Incident radiation, total and Monochromatic quantities. Laws of black, Wien, Kirchoff, Lambart, Stephan and Boltzman. Heat exchange between two black bodies, concept of shape factor, Emissivity. Heat exchange between grey bodies.

Unit-VIII : Heat Exchangers: Classification of heat exchangers – overall heat transfer Coefficient and fouling factor – Concepts of LMTD and NTU methods - Problems using LMTD and NTU methods

TEXT BOOKS

1. Heat Transfer - PK Nag - TMH
2. Fluid Mechanics Hydraulics and Hydraulics Machines Modi & Seth, Standard publications, New Delhi.

REFERENCE TEXT BOOKS:

1. Heat Transfer / Sukhatme.
2. Heat Transfer – A Practical Approach – Yunus Cengel, Boles / TMH.
3. Fundamentals of Engineering Thermodynamics / Michael J Moran / John Wiley & Sons
4. Engineering Fluid Mechanics by K.L.Kumar, S.Chand & Co.

Objective : Objective of this subject is to introduce basic concept in fluid mechanics & heat Transfer which a typical Production Engineer is expected to know.

Code/Data books:

1. Heat Transfer Databook/CP Kodandaraman,
2. Steam Tables

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II Year B.Tech MC.II-Sem

	L	T/P/D	C
	0	-/3/-	2

(54020) BASIC ELECTRICAL ENGINEERING LAB

1. Verification of Superposition and Reciprocity theorems.
2. Verification of maximum power transfer theorem (Verification on DC with Resistive load).
3. Experimental determination of Thevenin's theorem
4. Analysis of RLC circuits
5. Magnetization characteristics of D.C. Shunt generator.
6. Swinburne's Test on DC shunt machine (Predetermination of efficiency of a given DC Shunt machine working as motor and generator).
7. Brake test on DC shunt motor. Determination of performance Characteristics.
8. OC & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors).
9. Brake test on 3-phase Induction motor (performance characteristics).
10. Load test on single phase transformer.
11. Load test on D.C shunt generator
12. Power measurement in single phase circuits

NOTE: Any ten experiments have to be done.

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II Year B.Tech MC.II-Sem	L	T/P/D	C
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(54621) FLUID MECHANICS AND THERMAL ENGINEERING LAB

Any six experiments from each Lab.

(A) FLUID MECHANICS LAB

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Calibration of Venturimeter.
6. Calibration of Orifice meter.
7. Determination of friction factor for a given pipe line.
8. Determination of loss of head due to sudden contraction in a pipeline.

(B) THERMAL ENGG LAB

1. I.C. Engines Valve / Port Timing Diagrams
2. I.C. Engines Performance Test(4 -S Diesel Engines)
3. I.C. Engines Performance Test on 2-S, Petrol.
4. Evaluation of Engine friction by conducting Morse Test on 4-S Multi cylinder Petrol Engine and retardation and motoring test on 4- S diesel engine
5. I.C. Engines Heat Balance Test.
6. I.C. Engines - Determination of A/F Ratio and Volumetric Efficiency
7. Performance Test on Variable Compression Ratio Engines.
8. Performance Test on Reciprocating Air – Compressor Unit
9. Dis-assembly / Assembly of Engines.
10. Performance of Air – Conditioning System

   Pre-Requisite: Thermodynamics & Thermal Engineering I

   Objective: To understand the working principles of IC Engines, Compressors, Refrigeration and Air Conditioning Systems.

   Tables/Codes: Refrigeration Tables, Psychrometric Chart

   Question Paper Pattern:

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III Year B.Tech. MC - I Sem	L	T/P/D	C
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(55015) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Unit I Introduction to Managerial Economics:

Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

Unit II Elasticity of Demand:

Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

Unit III Theory of Production and 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, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

Unit IV Introduction to Markets & Pricing Policies:

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

Objectives and Policies of Pricing- Methods of Pricing: Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

Unit V Business & New Economic Environment:

Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

Unit VI Capital and Capital Budgeting:

Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of 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 VII Introduction to Financial Accounting:

Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Unit VIII Financial Analysis through ratios:

Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Profit Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.

REFERENCES:

1. Raghunatha Reddy & Narasimhachary: Managerial Economics & Financial Analysis, Scitech, 2009.
2. V.Rajasekarn & R.Lalitha, Financial Accounting, Pearson Education, New Delhi, 2010.
3. Suma Damodaran, Managerial Economics, Oxford University Press, 2009.
4. Domnick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Cengage, 2009.
5. Subhash Sharma & M P Vittal, Financial Accounting for Management, Text & Cases, Machmillan, 2008.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2008.

7. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley, 2009.
8. Dwivedi:Managerial Economics, Vikas, 2009.
9. M.Kasi Reddy, S.Saraswathi: Managerial Economics and Financial Accounting, PHI, 2007.
10. Erich A. Helfert: Techniques of Financial Analysis, Jaico, 2007.

Prerequisites: Nil

Objective: To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.

Codes/Tables: Present Value Tables need to be permitted into the examinations Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions. Out of eight questions 4 questions will be theory questions and 4 questions should be problems.

Each question should not have more than 3 bits.

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(55017) DYNAMICS OF MACHINERY

UNIT – I:

PRECESSION : Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships.

UNIT – II:

Static and dynamic force analysis of planar mechanisms: Introduction – Free Body Diagrams – Conditions for equilibrium – Two, three and four force Members – Inertia forces and D- Alembert's Principle – planar rotation about a fixed center.

UNIT – III:

Synthesis of Linkages: Three position synthesis – Four Position Synthesis – Precision positions – Structural error – Chebychev's spacing, Freudentein's Equation, Problems.

UNIT –IV:

Clutches: Friction clutches- Single Disc or plate clutch, Multiple Disc Clutch, Cone Clutch, Centrifugal Clutch.

BRAKES AND DYNAMOMETERS : Simple block brakes, internal expanding brake, band brake of vehicle. Dynamometers – absorption and transmission types. General description and methods of operations.

UNIT – V:

TURNING MOMENT DIAGRAM AND FLY WHEELS : Turning moment – Inertia Torque connecting rod angular velocity and acceleration crank effort and torque diagrams – Fluctuation of energy – Fly wheels and their design.

UNIT-VI:

GOVERNERS : Watt, Porter and Proell governors. Spring loaded governors – Hartnell and hartung with auxiliary springs. Sensitiveness, isochronism and hunting.

UNIT – VII:

BALANCING : Balancing of rotating masses Single and multiple – single and different planes. Balancing of Reciprocating Masses: Primary and Secondary balancing of reciprocating masses. Analytical and graphical methods -. Unbalanced forces and couples – Balancing of "V" , multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing.

UNIT – VIII:

VIBRATION : Free Vibration of mass attached to vertical spring – Simple problems on forced damped vibration Vibration Isolation & Transmissibility- Whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems.

TEXT BOOKS :

1. Theory of Machines by T. Bevan, Pearson Education
2. Theory of Machines and Mechanisms by Uicker, Pennock and Shigley, Oxford

REFERENCES:

1. Theory of Machines and Mechanisms by P.L.Ballaney, Khanna Publishers
2. Kinematics and Dynamics of Machinery by R.L.Norton, Mc Graw - Hill
3. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age
4. Theory of Machines by SS Ratan, Mc Graw Hill

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III Year B.Tech. MC - I Sem	L	T/P/D	C
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(55052) FINITE ELEMENT TECHNIQUES

UNIT -I:

Introduction to FEM: basic concepts, historical back ground, application of FEM, general description, comparison of FEM with other methods. Basic equations of elasticity, Stress – Strain and strain - displacement relations. Rayleigh- Ritz method, Weighted residual methods.

UNIT -II:

One Dimensional problems : Stiffness equations for a axial bar element in local co-ordinates using Potential Energy approach and Virtual energy principle - properties of stiffness matrix. Finite element analysis of uniform, stepped and tapered bars subjected to mechanical and thermal loads - Assembly of Global stiffness matrix and load vector - Quadratic shape functions.

UNIT -III:

Stiffness equations for a truss bar element oriented in 2D plane - Finite Element Analysis of Trusses – Plane Truss and Space Truss elements – methods of assembly.

UNIT -IV:

Analysis of beams: Hermite shape functions – Element stiffness matrix – Load vector – Problems.

UNIT -V:

2-D problems: CST element - Stiffness matrix and load vector - isoparametric element representation – Shape functions – convergence requirements – Problems.

Unit – VI:

Two dimensional four noded isoparametric elements - Numerical integration - Finite element modeling of Axisymmetric solids subjected to Axisymmetric loading with triangular elements - 3-D problems : Tetrahedran element.

UNIT -VII:

Scalar field problems: 1-D Heat conduction – 1D fin elements –

Composite slabs - 2D heat conduction - analysis of thin plates – problems.

UNIT -VII:

Dynamic Analysis: Dynamic equations – Lumped and consistent mass matrices – Eigen Values and Eigen Vectors – mode shapes – modal analysis for bars and beams.

TEXT BOOKS:

1. The finite element methods in Engineering – S.S. Rao – Elsevier – 4ᵗʰ edition
2. Introduction to finite elements in engineering – Tirupathi K. Chandrupatla and Ashok D. Belagundu.

REFERENCES:

1. Introduction of Finite Element Analysis – S.Md.Jalaludeen – Anuradha publications
2. An Introduction to Finite Element Methods – J. N. Reddy – Mc Grawhill
3. The Finite element method in engineering science – O.C. Zienkowitz, Mc Grawhill.
4. Finite Element Methods/ Alavala/TMH
5. Concepts and applications of finite element analysis – Robert Cook - Wiley

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III Year B.Tech. MC - I Sem	L	T/P/D	C
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(55053) SWITCHING THEORY AND LOGIC DESIGN

UNIT I

Number Systems & Codes: Philosophy of number systems – complement representation of negative numbers-binary arithmetic – binary codes – error detecting and error correcting codes –hamming codes.

UNIT - II

Boolean Algebra And Switching Functions: Fundamental postulates of Boolean Algebra-Basic theorems and properties - switching functions–Canonical and Standard forms—Algebraic simplification—digital logic gates, properties of XOR gates –universal gates-Multilevel NAND/NOR realizations.

UNIT III

Minimization Of Switching Functions: Map method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, simplification rules

UNIT IV

Combinational Logic Design: Design using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design using IC chips, MUX Realization of switching functions Parity bit generator, Code-converters, Hazards and hazard free realizations. -

UNIT V

Programmable Logic Devices, Threshold Logic : Basic PLD's-ROM, PROM, PLA, PLD Realization of Switching functions using PLD's. Capabilities and limitations of Threshold gate, Synthesis of Threshold functions, Multigate Synthesis.

UNIT VI

Sequential Circuits – I: Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples) Basic flip-flops-Triggering and excitation tables. Steps in synchronous sequential circuit design. Design of modulo-N Ring and Shift counters.

Serial binary adder, sequence detector.

UNIT VII

Sequential Circuits - II : Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.

UNIT VIII

Algorothimic State Machines: Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

TEXTBOOKS

1. Switching & Finite Automata theory – Zvi Kohavi, TMH, 2nd Edition
2. Digital Design - Morris Mano, PHI, 2nd edition.

REFERENCES

1. An Engineering Approach To Digital Design – Fletcher, PHI.
2. Fundamentals of Logic Design – Charles H. Roth, Thomson Publications, 5th Edition, 2004.
3. Digital Logic – Application and Design – John M. Yarbrough, Thomson Publications, 1997.
4. Switching and Logic design – A. Ananda Kumar

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III Year B.Tech. MC - I Sem

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(55018) MACHINE TOOLS

for Mechanical Engg, Mechanical Mechatronics , Mechanical Production

UNIT – I

Elementary treatement of metal cutting theory – Element of cutting process – Geometry of single point tool and angles chip formation and types of chips – built up edge and its effects chip breakers. Mechanics of orthogonal cutting –Merchant's Force diagram, cutting forces – cutting speeds, feed, depth of cut, tool life, coolants, machinability – Tool materials.

Kinematic schemes of machine tools – Constructional features of speed gear box and feed gear box.

UNIT – II

Engine lathe – Principle of working, specification of lathe – types of lathe – work holders tool holders – Box tools Taper turning thread turning – for Lathes and attachments.

Turret and capstan lathes – collet chucks – other work holders – tool holding devices – box and tool layout.

Principal features of automatic lathes – classification – Single spindle and multi-spindle automatic lathes – tool layout and cam design.

UNIT – III

Shaping slotting and planing machines – Principles of working – Principal parts – specification classification, operations performed. Kinematic scheme of the shaping slotting and planning machines, machining time calculations.

UNIT – IV

Drilling and Boring Machines – Principles of working, specifications, types, operations performed – tool holding devices – twist drill – Boring machines – Fine boring machines – Jig Boring machine. Deep hole drilling machine. Kinematics scheme of the drilling and boring machines

UNIT – V

Milling machine – Principles of working – specifications – classifications of milling machines – Principal features of horizontal, vertical and universal milling machines – machining operations Types geometry of milling cutters – milling cutters – methods of indexing – Accessories to milling machines, kinematic scheme of milling cutters – milling cutters – methods of indexing.

UNIT –VI

Grinding machine – Fundamentals – Theory of grinding – classification of grinding machine – cylindrical and surface grinding machine – Tool and cutter grinding machine – special types of grinding machines – Different types of abrasives – bonds specification of a grinding wheel and selection of a grinding wheel Kinematic scheme of grinding machines.

UNIT - VII

Lapping, honing and broaching machines – comparison to grinding – lapping and honing. Kinematics scheme of Lapping, Honing and Broaching machines. Constructional features of speed and feed Units, machining time calculations

UNIT - VIII

Principles of design of Jigs and fixtures and uses. Classification of Jigs & Fixtures – Principles of location and clamping – Types of clamping & work holding devices. Typical examples of jigs and fixtures.

TEXT BOOKS :

1. Production Technology by R.K. Jain and S.C. Gupta.
2. Production Technology by H.M.T. (Hindustan Machine Tools).

REFERENCES:

1. Machine Tools – C.Elanchezhian and M. Vijayan /.Anuradha Agencies Publishers.
2. Workshop Technology – B.S.Raghu Vamshi – Vol II

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III Year B.Tech. MC - I Sem	L	T/P/D	C
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(55054) PRINCIPLES OF MACHINE DESIGN

UNIT – I

INTRODUCTION : General considerations in the design of Engineering Materials and their properties – selection –Manufacturing consideration in design. Tolerances and fits – BIS codes of steels. STRESSES IN MACHINE MEMBERS : Simple stresses –Complex stresses – impact stresses – stress strain relations – static theories of failure – factor of safety – Design for strength and rigidity – preferred numbers. The concept of stiffness in tension, bending, torsion and combined situations.

UNIT – II

Fatigue Loading : Stress concentration – Theoretical stress Concentration factor – Fatigue stress concentration factor notch sensitivity – Design for fluctuating stresses – Endurance limit – Estimation of Endurance strength – Fatigue theories of failure – Goodman and Soderberg lines.

UNIT – III

RIVETED AND WELDED JOINTS: Riveted joints: Modes of failure of riveted joints – Strength Equations – efficiency of riveted joints - Design of boiler joints – eccentrically loaded riveted joints. Welded joints: Design of Fillet welds - axial loads - Circular fillet welds - bending and torsion – eccentrically loaded joints.

UNIT – IV

AXIALLY LOADED JOINTS and Shafts: Keys, Cotters And Knuckle Joints : Design of Keys-stresses in keys-cottered joints-spigot and socket, sleeve and cotter, jib and cotter joints- Knuckle joints. DESIGN OF SHAFTS : Design of solid and hollow shafts for strength and rigidity – Design of shafts for complex loads – Shaft sizes – BIS code – Design of shaft for a gear and belt drives.

UNIT – V

MECHANICAL SPRINGS : Stresses and deflections of helical springs –

Extension -compression springs – Springs for static and fatigue loading – natural frequency of helical springs – Energy storage capacity – helical torsion springs – Co-axial springs.

UNIT – VI

POWER TRANSMISSIONS SYSTEMS, PULLEYS : Transmission of power by Belt and Rope drives , Transmission efficiencies. Belts – Flat and V types – Ropes - pulleys for belt and rope drives, Materials, Chain drives.

UNIT – VII

SPUR and Helical GEAR DRIVES : Spur and helical gears - Load concentration factor – Dynamic load factor. Surface compressive strength – Bending strength – Design analysis of spur and helical gears – Estimation of centre distance, module and face width, check for plastic deformation. Check for dynamic and wear considerations.

UNIT – VIII

BEARINGS : Types of bearings – basic modes of Lubrication – Bearing construction - bearing design - bearing materials – Selection of lubricants. Rolling contact bearings: Types of rolling contact bearings – selection of bearing type – selection of bearing life - Design for cyclic loads and speeds – Static and dynamic loading of ball & roller bearings.

TEXT BOOKS :

1. Mechanical Engineering Design by Bahl and Goel, Standard Publications

2. Design of machine elements by Kulakarni – Mc Graw Hill-3rd edition.

REFERENCES :

1. Machine Design by Timothy H, Wenzell PE, Cengage
2. Machine Design by R.L.Norton, Mc Graw Hill
3. Machine Design by V.Bandari, Tmh Publishers
4. Machine design / Schaum Series.
5. Machine design – Pandya & shah.
6. Machine Design, S MD Jalaludin, Anuradha Publishers

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III Year B.Tech. MC - I Sem	L	T/P/D	C
	0	-/3/-	2

(55619) MACHINE TOOLS LAB

Note: Any ten of the following

1. Introduction to general purpose machines
2. Step turning and taper turning on lathe machine
3. Thread cutting and knurling on – lathe machine
4. Drilling
5. Tapping
6. Shaping
7. Planning
8. Slotting
9. Milling
10. Cylindrical / Surface Grinding
11. Grinding of Tool angles- Tool and cutter grinder
12. Electric Discharge Machining

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III Year B.Tech. MC - I Sem	L	T/P/D	C
	0	-/3/-	2

(55620) HEAT TRANSFER AND PRODUCTION TECHNOLOGY LAB

Note: Any five from each lab

(A) HEAT TRANSFER LAB

1. Composite Slab Apparatus – Overall heat transfer co-efficient.
2. Heat transfer through lagged pipe.
3. Heat Transfer through a Concentric Sphere
4. Thermal Conductivity of given metal rod.
5. Heat transfer in pin-fin
6. Experiment on Transient Heat Conduction
7. Heat transfer in forced convection apparatus.
8. Heat transfer in natural convection
9. Emissivity apparatus.
10. Stefan Boltzman Apparatus

(B) PRODUCTION TECHNOLOGY LAB

I. METAL CASTING LAB

1. Pattern Design and making - for one casting drawing.
2. Sand properties testing .-for strengths, and permeability – 1 Exercise
3. Moulding Melting and Casting - 1 Exercise

II WELDING LAB

1. ARC Welding   -2 Exercises
2. Lap & Butt Joint   – 1 Exercise
3. Spot Welding   – 1 Exercise
4. TIG Welding   – 1 Exercise
5. Brazing   – 1 Exercise

III MECHANICAL PRESS WORKING

1. Blanking & Piercing operation and study of simple, compound and progressive press tool.
2. Hydraulic Press : Deep drawing and extrusion operation.
3. Bending

IV PROCESSING OF PLASTICS

1. Injection Moulding   2. Blow Moulding

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III Year B.Tech. MC - II Sem	L	T/P/D	C
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(56016) INDUSTRIAL MANAGEMENT

Unit I: Introduction to Management:

Entrepreneurship and organization - Nature and Importance of Management, Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

Unit II: Designing Organisational Structures:

Departmentation and Decentralisation, Types of Organisation structures - Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure and their merits, demerits and suitability.

Unit III: Operations Management:

Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control: chart, R chart, c chart, p chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

Unit IV: A) Materials Management:

Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records - Supply Chain Management

B) Marketing: Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution.

Unit V: Human Resources Management (HRM):

Evolution of HRM, Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and

Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

Unit VI: Project Management (PERT/CPM):

Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (simple problems)

Unit VII: Strategic Management:

Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

Unit VIII: Contemporary Management Practices:

Basic concepts of Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Value Chain Analysis, Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering 5S Model, Deming's PDCA, Kaizen, Poka-Yoke, Muda, Benchmarking, Balanced Score Card.

TEXT BOOKS:

1. Aryasri: Management Science, TMH, New Delhi, 2009

REFERENCE BOOKS:

1. Stoner, Management, Pearson, 2009
2. Kotler Philip & Keller Kevin Lane: Marketing Management PHI, 2009.
3. Koontz, Weihrich, & Aryasri: Principles of Management, TMH, 2009.
4. Thomas N.Duening & John M.Ivancevich Management, Principles and Guidelines, Cengage, 2009.
5. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2009.
6. Memoria & S.V.Ganker, Personnel Management, Himalaya, 2009
7. Schermerhorn: Management, Wiley, 2009.
8. Parnell: Strategic Management, Biztantra, 2009.

9. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2009.
10. William J. Stevenson & Ceyhun Ozgur: Introduction to Management Science, TMH, 2007.

Pre-requisites: Managerial Economics

Objective: To familiarize with the process of management and to provide basic insights into select contemporary management practices.

Codes/Tables: Normal Distribution Function Table need to be permitted into the examination Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions. The question paper should contain atleast 2 practical problems, one each from units –III & VI

Each question should not have more than 3 bits.

Unit VIII will have only short questions, not essay questions.

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III Year B.Tech. MC - II Sem	L	T/P/D	C
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(56057) CAD / CAM

UNIT – I

Computers in Industrial Manufacturing, Product cycle, CAD / CAM Hardware, Basic structure, CPU, Memory types, input devices, display devices, hard copy devices, storage devices.

UNIT – II

Computer Graphics: Raster scan graphics coordinate system, database structure for graphics modeling, transformation of geometry, 3D transformations, mathematics of projections, clipping, hidden surface removal.

UNIT – III

Geometric modeling: Requirements, geometric models, geometric construction models, curve representation methods, surface representation methods, modeling facilities desired.

UNIT – IV

Drafting and Modeling systems: Basic geometric commands, layers, display control commands, editing, dimensioning, solid modeling.

UNIT – V

Numerical control: NC, NC modes, NC elements, NC machine tools, structure of CNC machine tools, features of Machining center, turning center, CNC Part Programming : fundamentals, manual part programming methods, Computer Aided Part Programming.

UNIT – VI

Group Tech: Part family, coding and classification, production flow analysis, advantages and limitations, Computer Aided Processes Planning, Retrieval type and Generative type.

UNIT – VII

Computer aided Quality Control: Terminology in quality control, the computer in QC, contact inspection methods, noncontact inspection methods-optical, noncontact inspection methods-nonoptical, computer aided testing, integration of CAQC with CAD/CAM.

UNIT – VIII

Computer integrated manufacturing systems: Types of Manufacturing systems, Machine tools and related equipment, material handling systems, computer control systems, human labor in the manufacturing systems, CIMS benefits.

TEXT BOOKS :

1. CAD / CAM A Zimmers & P.Groover/PE/PHI
2. CAD / CAM Theory and Practice / Ibrahim Zeid / TMH

REFERENCES :

1. Automation, Production systems & Computer integrated Manufacturing/ Groover/P.E
2. Computer Aided Design and Manufacturing –Lalit Narayan ,etal - PHI
3. CAD / CAM / CIM / Radhakrishnan and Subramanian / New Age
4. Principles of Computer Aided Design and Manufacturing / Farid Amirouche / Pearson
5. CAD/CAM: Concepts and Applications/Alavala/ PHI
6. Computer Numerical Control Concepts and programming / Warren S Seames / Thomson.

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III Year B.Tech. MC - II Sem	L	T/P/D	C
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(56058) MECHANICAL MEASUREMENTS AND CONTROL SYSTEMS

UNIT – I : Definition – Basic principles of measurement – Measurement systems, generalized configuration and functional descriptions of measuring instruments – examples. Dynamic performance characteristics – sources of error, Classification and elimination of error.

UNIT – II : Measurement of Displacement: Theory and construction of various transducers to measure displacement – Piezo electric, Inductive, capacitance, resistance, ionization and Photo electric transducers, Calibration procedures.

Measurement Of Temperature : Classification – Ranges – Various Principles of measurement – Expansion, Electrical Resistance – Thermistor – Thermocouple – Pyrometers – Temperature Indicators..

UNIT – III : Measurement Of Pressure : Units – classification – different principles used. Manometers, Piston, Bourdon pressure gauges, Bellows – Diaphragm gauges. Low pressure measurement – Thermal conductivity gauges – ionization pressure gauges, Mcleod pressure gauge.

UNIT – IV : Measurement Of Level : Direct method – Indirect methods – capacitative, ultrasonic, magnetic, cryogenic fuel level indicators – Bubler level indicators.

Flow Measurement : Rotameter, magnetic, Ultrasonic, Turbine flow meter, Hot – wire anemometer, Laser Doppler Anemometer (LDA) .

UNIT – V : Measurement Of Speed : Mechanical Tachometers – Electrical tachometers – Stroboscope, Non- contact type of tachometer

Measurement of Acceleration and Vibration : Different simple instruments – Principles of Seismic instruments – Vibrometer and accelerometer using this principle.

UNIT – VI : Stress Strain Measurements : Various types of stress and strain measurements – electrical strain gauge – gauge factor – method of usage of resistance strain gauge for bending compressive and

tensile strains – usage for measuring torque, Strain gauge Rosettes.

UNIT – VII : Measurement Of Humidity : Moisture content of gases, sling psychrometer, Absorption psychrometer, Dew point meter

Measurement Of Force, Torque And Power: Elastic force meters, load cells, Torsion meters, Dynamometers.

UNIT – VIII : Elements Of Control Systems : Introduction, Importance – Classification – Open and closed systems Servomechanisms – Examples with block diagrams – Temperature, speed and position control systems.

TEXT BOOKS :

1. Measurement systems: Applications and design, by Ernest O. Doebelin, TMH

2. Measurement Systems: Applications & design by D.S Kumar.

REFERENCE BOOKS :

1. Instrumentation and Control systems/ S.Bhaskar/ Anuradha Agencies

2. Experimental Methods for Engineers / Holman

3. Mechanical and Industrial Measurements / R.K. Jain/ Khanna Publishers.

4. Instrumentation, measurement & analysis by B.C.Nakra & K.K.Choudhary, TMH

5. Mechanical Measurements / Sirohi and Radhakrishna / New Age5.

6. Instrumentation &mech. Measurements by A.K. Tayal ,Galgotia Publications.

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III Year B.Tech. MC - II Sem	L	T/P/D	C
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(56059) ANALOG AND DIGITAL IC APPLICATIONS

UNIT I

INTEGRATED CIRCUITS : Classification, chip size and circuit complexity, basic information of Opamp, ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC characteristics, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.

UNIT II

OP-AMP APPLICATIONS : Basic application of Op-amp, instrumentation amplifier, ac amplifier, V to I and I to V converters, sample & hold circuits, multipliers and dividers, Differentiators and Integrators, Comparators, Schmitt trigger, Multivibrators, introduction to voltage regulators, features of 723.

UNIT III

ACTIVE FILTERS & OSCILLATORS : Introduction, 1st order LPF, HPF filters. Band pass, Band reject and all pass filters. Oscillator types and principle of operation – RC, Wien and quadrature type, waveform generators – triangular, sawtooth, square wave and VCO.

UNIT IV

TIMERS & PHASE LOCKED LOOPS : Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565.

UNIT V

D-A AND A- D CONVERTERS : Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC specifications.

UNIT VI

Classification of Integrated circuits, comparison of various logic

families, standard TTL NAND Gate- Analysis& characteristics, TTL open collector O/Ps, Tristate TTL, MOS & CMOS open drain and tristate outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS & CMOS driving TTL.

UNIT VII

Design using TTL-74XX & CMOS 40XX series, code converters, decoders, Demultiplexers, decoders & drives for LED & LCD display. Encoder, priority Encoder, multiplexers & their applications, priority generators/checker circuits. Digital arithmetic circuits-parallel binary adder/subtractor circuits using 2's, Complement system. Digital comparator circuits.

UNIT VIII

SEQUENTIAL CIRCUITS : Flip-flops & their conversions. Design of synchronous counters. Decade counter, shift registers & applications, familiarities with commonly available 74XX & CMOS 40XX series of IC counters.

Memories : ROM architecture, types & applications, RAM architecture, Static & Dynamic RAMs, synchronous DRAMs.

TEXT BOOKS :

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Ed., 2003.

2. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 1987.

REFERENCES :

1. Operational Amplifiers & Linear Integrated Circuits – R.F. Coughlin & Fredrick F. Driscoll, PHI, 1977.

2. Operational Amplifiers & Linear Integrated Circuits: Theory & Applications –Denton J. Dalbey, TMH.

3. Design with Operational Amplifiers&Analog Integrated Circuits- Sergio Franco,McGraw Hill,3rd Ed.,2002.

4. Digital Fundamentals – Floyd and Jain, Pearson Education,8th Edition, 2005.

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III Year B.Tech. MC - II Sem	L	T/P/D	C
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(56021) ENGINEERING OPTIMIZATION
(OPEN ELECTIVE)

UNIT – I

Introduction: Optimal Problem formulation: Design variables-Constraints- Objective function-Variable bounds. Engineering Optimization problems: Classification& Some examples (just theory & discussion) : Truss structure, Ammonia structure, Transit schedule and Car suspension

UNIT – II

Single variable non-linear optimization problems: Local minimum Global minimum & Inflection point. Necessary & Sufficient conditions theorems, some problems based on this. Numerical methods: Exhaustive Search methods- Fibonacci method, Golden section method & comparison. Interpolation methods: Quadratic.

UNIT – III

Multivariable unconstrained non-linear optimization problems: Numerical methods part a: Direct Search methods: Univariate method, Pattern Search methods: Powell, Hook-Jeeve's, Rosen Brock's search and Simplex methods.

UNIT – IV

Multivariable unconstrained non-linear optimization problems: Numerical methods part b: Gradient methods: Gradient of a function-Importance- Gradient direction search based methods: Steepest descent/ascent method, Conjugate gradient method and variable meteric method.

UNIT – V

Multivariable constrained non-linear optimization problems Classical optimization techniques: Constraints –equations-Lagrangian method- inequalities-Kuhn-Tucker necessary and sufficient conditions-Quadratic problem-Statement- Wolfe's and Beale's methods.

UNIT – VI

a) Geometric Programming: Posynomials – arithmetic – geometric inequality – unconstrained G.P- constrained G.P(d" type only)

b) Integer Programming- Introduction – formulation – Gomory cutting plane algorithm – branch and bound method

UNIT – VII

Sensitivity Analysis: Linear programming – Formulation – Simplex method and Artificial variable techniques-Big-M & two-phase methods-Change in the cost coefficients, coefficients & constants of the constraints, addition of variables.

UNIT – VIII

a) Simulation-Definition-Steps involved- Types of simulation Models-Advantages and disadvantages- Simple problems on queuing & inventory.

b) Non-traditional optimization algorithms: Genetic algorithms: working principles differences and similarities between Gas and traditional methods. Simulated annealing.

Text Books

1. Engineering Optimization: Theory & Practice-S.S.Rao-New Age International Publications- Thir Edition-2003

2. Optimization for Engineering Design- Kalyanmoy Deb-Prentice-Hall of India Pvt.Ltd, NewDelhi-2005.

3. Operations Research- S.D.Sharma- Kedar Nath & Ran Nath Co., New Delhi

Reference Text books

1. Optimization Theory & Practice: Beveridge & Schechter. McGraw-Hill International Student edition.

2. Optimization in Operations Research Ronald L.Rardin. Pearson Education, Low Price Edition.

3. Optimization Theory & Practice: Mohan C.Joshi & KM Moudgalya. Narosa Publishing House, Chennai

4. Operations Research: A.P.Verma. S.K.Kataria & Sons, New Delhi-110006

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III Year B.Tech. MC - II Sem	L	T/P/D	C
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(56014) NANO TECHNOLOGY
(OPEN ELECTIVE)

Unit-I:

Introduction to nanotechnology: Importance of nanoscale, Nanostructure types, electronic, magnetic, optical Properties of Nanomaterials, top-down and bottom- up approach to nanostructures.

Unit-II:

Quantum Mechanical phenomenon in nanostructures: Quantum confinement of electrons in semiconductor Nano structures, one dimensional confinement (Quantum wires), two dimensional confinements (Quantum Wells), three dimensional confinements (Quantum dots).

Unit-III

Carbon Nano Structures: Carbon nanotubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, Properties (mechanical, optical and electrical) and applications.

Unit-IV

Fabrication of Nanomaterials: Physical Methods: Inert gas condensation, Arc discharge, RFplasma, Plasma arc technique, Ion sputtering, Laser ablation, Laser pyrolysis, Molecular beam epitaxy, Chemical vapour deposition method.

Unit-V

Nano scale characterization techniques: Scanning probe techniques (AFM, MFM, STM, SEM, TEM), XRD

Unit-VI

Nanodevices and Nanomedicine: Lab on chip for bioanalysis, Core/shell Nanoparticles in drug delivery systems (site specific and targeted drug delivery), cancer treatment, and bone tissue treatment.

Unit-VII

Nano and molecular electronics: Resonant-Tunneling structures, single electron tunneling, Single Electron transistors, coulomb

blockade, giant magneto resistance, tunneling magneto resistance.

Unit-VIII

nanolithography and nanomanipulation: e-beam lithography and SEM based nanolithography and nanomanipulation, Ion beam lithography, oxidation and metallization. Mask and its application. Deep UV lithography, X-ray based lithography.

TEXT BOOKS:

1. Charles.p.pode, Introduction to nanotechnology, springer publications

2. Springer Handbook of Nanotechnology - Bharat Bhusan

3. Phani kumar, principles of nanotechnology, scitech publications

REFERENCES BOOKS:

1. David Ferry "Transport in Nano structures" Cambridge University press 2000

2. Nanobiotechnology; ed. C.M.Niemeyer, C.A. Mirkin.

3. Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. Challa S.,S. R. Kumar, J. H. Carola.

4. Encyclopedia of Nanotechnology- Hari Singh Nalwa

5. Carbon Nanotubes: Properties and Applications- Michael J. O'Connell.

6. S. Dutta "Electron Transport in Mesoscopic systems" Cambridge University press

7. H. Grabert and M. Devoret "Single charge Tunneling" Plenum press 19922009-10

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III Year B.Tech. MC - II Sem	L	T/P/D	C
	3	1/-/-	3

(56022) AUTOMOBILE ENGINEERING
(OPEN ELECTIVE)

UNIT – I

Introduction : Components of four wheeler automobile – chassis and body – power unit – power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, engine construction, turbo charging and super charging – engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, reboring, decarbonisation, Nitriding of crank shaft..

UNIT – II

Fuel System : S.I. Engine : Fuel supply systems, Mechanical and electrical fuel pump – filters – carburettor – types – air filters – petrol injection. C.I. Engines : Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, spray formation, injection timing, testing of fuel pumps.

UNIT – III

Cooling System : Cooling Requirements, Air Cooling, Liquid Cooling, Thermo, water and Forced Circulation System – Radiators – Types – Cooling Fan - water pump, thermostat, evaporating cooling – pressure sealed cooling – antifreeze solutions.

Ignition System : Function of an ignition system, battery ignition system, constructional features of storage, battery, auto transformer, contact breaker points, condenser and spark plug – Magneto coil ignition system, electronic ignition system using contact breaker, electronic ignition using contact triggers – spark advance and retard mechanism.

Unit – IV

Emission from Automobiles – Pollution standards National and International – Pollution Control – Techniques – Multipoint fuel injection for SI Engines. Common rail diesel injection Energy alternatives – Solar, Photo-voltaic, hydrogen, Biomass, alcohols, LPG,CNG, liquid Fuels and gaseous fuels, electrical-their merits and demerits.

UNIT – V

Electrical System : Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism solenoid switch, lighting systems, Horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.

UNIT – VI

Transmission System : Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – gear boxes, types, sliding mesh, construct mesh, synchro mesh gear boxes, epicyclic gear box , over drive torque converter. Propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles – types – wheels and tyres.

UNIT – VII

Suspension System : Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, Independent suspension system.

Braking System : Mechanical brake system, Hydraulic brake system, Master cylinder, wheel cylinder tandem master cylinder Requirement of brake fluid, Pneumatic and vacuum brakes.

UNIT – VIII

Steering System : Steering geometry – camber, castor, king pin rake, combined angle toein, center point steering. Types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.

TEXT BOOKS :

1. Automotive Mechanics – Vol. 1 & Vol. 2 / Kripal Sing.
2. Automobile Engineering / William Crouse

REFERENCES :

1. Automotive Mechanics / G.B.S. Narang
2. Automotive Mechanics / Heitner
3. Automotive Engines / Srinivasan
4. Automobile Engineering – K.K. Ramalingam / Scitech Publications (India) PVT. LTD.
5. Automotive Engineering / Newton Steeds & Garrett

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III Year B.Tech. MC - II Sem	L	T/P/D	C
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(55621) CAD / CAM LAB
(Any ten of the following)

A) CAD / CAM LAB :

1. Drafting : Development of part drawings for various components in the form of orthographic and isometric. Representation of Dimensioning and tolerances and plotting. Study of script, DXE AND IGES FILES.
2. Part Modeling : Generation of various 3D Models through Protrusion, revolve, shell sweep. Creation of various features. Study of parent child relation. Feature based and Boolean based modeling surface and Assembly Modeling. Study of various standard Translators. Design simple components.
3. Determination of deflection and stresses in 2D and 3D trusses and beams.
4. Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axi-symmetric components.
5. Determination of stresses in 3D and shell structures (at least one example in each case)
6. Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam.
7. Steady state heat transfer Analysis of plane and Axi-symmetric components.
8. Development of process sheets for various components based on tooling Machines.
9. Development of manufacturing and tool management systems.
10. Study of various post processors used in NC Machines.
11. Development of NC code for free form and sculptured surfaces using CAM packages.
12. Machining of simple components on NC lathe and Mill by transferring NC Code / from a CAM package. Through RS 232.
   Any Five Software Packages from the following: Use of Auto CAD, Cadian Mechanical, CATIA, ANSYS, Edge CAM, Solid Works, Gibbs CAM, Pro-E.

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(55622) INSTRUMENTATION AND I.C.APPLICATIONS LAB

Note: Any five experiments from Each Lab

A) INSTRUMENTATION LAB

1. Calibration of Pressure Gauges
2. Measurement of temperature of a furnace using different temperature transducers
3. Study and calibration of LVDT transducer for displacement measurement.
4. Calibration of strain gauge for load measurement.
5. Calibration of thermocouple for temperature measurement.
6. Measurement of level in a tank using capacitive transducers (level transducers)
7. Study and calibration of photo and magnetic speed pickups for the measurement of speed.
8. Calibration of resistance temperature detector for temperature measurement.
9. Study and calibration of a rotometer for flow measurement.
10. Study and use of a Seismic pickup for the measurement of vibration amplitude of a vibrating member at various loads.

(B) IC APPLICATIONS LAB

1. 741 OPAMP Characteristics
2. Adder, Integrator and differentiator using 741 OPAMP
3. Function Generator using 741 OP AMP
4. IC 555 Timer –Astable Operation and Monostable Operation
5. Study of Logic Gates
6. Study of Flip-Flops using Ics
7. Half Adder, Full Adder and Subtractor
8. Counters and Shift Registers & 7490 Counter
9. BCD to 7 Segment decoder using IC 7447
10. Voltage Regulator using IC 723
11. D/A and A/D Converter
12. Multiplexer and Demultiplexer

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(56623) ADVANCED ENGLISH COMMUNICATION SKILLS LAB

1. **Introduction** : The introduction of the English Language Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

   The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

   - Gather ideas and information, to organise ideas relevantly and coherently.
   - Engage in debates.
   - Participate in group discussions.
   - Face interviews.
   - Write project/research reports/technical reports.
   - Make oral presentations.
   - Write formal letters.
   - Transfer information from non-verbal to verbal texts and vice versa.
   - To take part in social and professional communication.

2. **Objectives:** This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

   - To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
   - Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. **Syllabus:** The following course content is prescribed for the Advanced Communication Skills Lab:

➢ Functional English - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.

➢ Vocabulary Building – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.

➢ Reading Comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.

➢ Writing Skills – structure and presentation of different types of writing – Resume writing / e-correspondence/Technical report writing/Portfolio writing –planning for writing – research abilities/ data collection/organizing data/tools/analysis – improving one's writing.

➢ Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.

➢ Presentation Skills – Oral presentations (individual and group) through JAM sessions/seminars and written presentations through posters/projects/reports/PPTs/e-mails/assignments etc.

➢ Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

4. **Minimum Requirement:** The English Language Lab shall have two parts:

i) The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

ii) The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component): Computer network

with Lan with minimum 60 multimedia systems with the following specifications:

iii) P – IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

iv) Headphones of High quality

5. **Suggested Software:** The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

• Clarity Pronunciation Power – part II

• Oxford Advanced Learner's Compass, 7th Edition

• DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.

• Lingua TOEFL CBT Insider, by Dreamtech

• TOEFL & GRE(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

• The following software from 'train2success.com'

➢ Preparing for being Interviewed,

➢ Positive Thinking,

➢ Interviewing Skills,

➢ Telephone Skills,

➢ Time Management

➢ Team Building,

➢ Decision making

• English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. **Books Recommended:**

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.

3. English Language Communication : A Reader cum Lab Manual Dr

A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.

4. English Vocabulary in Use series, Cambridge University Press 2008.

5. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.

6. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.

7. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.

8. Job Hunting by Colm Downes, Cambridge University Press 2008.

9. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.

10. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.

11. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.

12. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS: Advanced Communication Skills Lab Practicals:

1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.

2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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IV Year B.Tech. MC - I Sem

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(57022) OPERATIONS RESEARCH

UNIT – I

Introduction: Development – Definition– Characteristics and Phases – Types of operation Research models ↘ applications. Allocation : Linear Programming - Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques -Two–phase method, Big-M method – Duality Principle.

UNIT – II

Transportation Problem : Formulation – Optimal solution - unbalanced transportation problem – Degeneracy. Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem- Traveling Salesman problem.

UNIT – III

Sequencing: Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines.

Replacement : Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement.

UNIT – IV

Theory Of Games : Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – dominance principle – m X 2 & 2 X n games -graphical method.

UNIT – V

Waiting Lines : Introduction – Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with ihfinite population single channel Poisson arrivals.

UNIT – VI

Inventory : Introduction – Single item – Deterministic models –

Purchase Inventory models with one price break and multiple price breaks – shortages are not allowed – Stochastic models – demand may be discrete variable or continuous variable – Instantaneous production. Instantaneous demand and continuous demand and no set up cost- Single period model.

UNIT – VII

Dynamic Programming : Introduction –Terminology- Bellman's Principle of optimality – Applications of dynamic programming- shortest path problem – linear programming problem.

UNIT – VIII

Simulation : Definition – Types of simulation models – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages – Brief Introduction of Simulation Languages.

TEXT BOOK :

1. Operations Research /J.K.Sharma 4e. /MacMilan
2. Operations Research / R.Pannerselvam 2e.,PHI Publications

REFERENCES :

1. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson Education.
2. Operations Research: Methods & Problems / Maurice Saseini, Arhur Yaspan & Lawrence Friedman
3. Introduction to O.R /Taha 8e/PHI
4. Operations Research / Wagner/ PHI Publications.
5. Operations Research / S.D.Sharma-Kedarnath
6. O.R/Wayne L.Winston/Thomson Brooks/cole
7. Introduction to O.R/Hiller & Libermann (TMH).

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(57075) MICROPROCESSORS AND MICRO CONTROLLERS

Unit I

8086 Architecture: Introduction to 8085 Microprocessor, 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical memory organization, Architecture of 8086, signal descriptions of 8086- common function signals, Minimum and Maximum mode signals, Timing diagrams, Interrupts of 8086.

Unit II

Instruction Set and Assembly Language Programming of 8086: Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

Unit III

I/O Interface: 8255 PPI, various modes of operation and interfacing to 8086, interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter.

Unit IV

Interfacing with advanced devices: Memory interfacing to 8086, Interrupt structure of 8086, Vector interrupt table, Interrupt service routine, Introduction to DOS and BIOS interrupts, Interfacing Interrupt Controller 8259 DMA Controller 8257 to 8086.

Unit V

Communication Interface: Serial communication standards, Serial data transfer schemes, 8251 USART architecture and interfacing, RS-232, IEEE- 488, Prototyping and trouble shooting.

Unit VI

Introduction to Microcontrollers: Overview of 8051 microcontroller, Architecture, I/O Ports, Memory organization, addressing modes and instruction set of 8051, simple programs

Unit VII

8051 Real Time Control: Interrupts, timer/ Counter and serial communication, programming Timer Interrupts, programming external hardware interrupts, programming the serial communication interrupts, programming 8051 timers and counters

Unit VIII

The AVR RISC microcontroller architecture: Introduction, AVR Family architecture, Register File, The ALU, Memory access and Instruction execution, I/O memory. EEPROM, I/O ports, Timers, UART, Interrupt Structure

TEXT BOOKS:

1. D. V. Hall, Micro processors and Interfacing, TMGH, 2nd edition 2006.

2. Kenneth. J. Ayala, The 8051 microcontroller , 3rd edition, Cengage learning, 2010

REFERENCES:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd edition 2006.

2. The 8051Microcontrollers, Architecture and programming and Applications -K.Uma Rao, Andhe Pallavi, , Pearson, 2009.

3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - By Liu and GA Gibson, PHI, 2nd Ed.,

4. Microcontrollers and application, Ajay. V. Deshmukh, TMGH, 2005

5. The 8085 Microprocessor: Architecture, programming and Interfacing – K.Uday Kumar, B.S.Umashankar, 2008, Pearson

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(57086) ROBOTICS AND ITS APPLICATIONS

UNIT – I

Introduction: Automation and Robotics, CAD/CAM and Robotics – An over view of Robotics – present and future applications – classification by coordinate system and control system.

UNIT – II

Components of the Industrial Robotics: Function line diagram representation of robot arms, common types of arms. Components, Architecture, number of degrees of freedom – Requirements and challenges of end effectors, determination of the end effectors, comparison of Electric, Hydraulic and Pneumatic types of locomotion devices.

UNIT – III

Motion Analysis: Homogeneous transformations as applicable to rotation and translation – problems.

UNIT – IV

Manipulator Kinematics: Specifications of matrices, D-H notation joint coordinates and world coordinates Forward and inverse kinematics – problems.

UNIT – V

Differential transformation and manipulators, Jacobians – problems. **Dynamics:** Lagrange – Euler and Newton – Euler formations – Problems.

UNIT VI

Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion – straight line motion – Robot programming, languages and software packages.

UNIT VII

Robot actuators and Feed back components: Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors. Feedback components:

position sensors – potentiometers, resolvers, encoders – Velocity sensors.

UNIT VIII

Robot Application in Manufacturing: Material Transfer - Material handling, loading and unloading- Processing - spot and continuous arc welding & spray painting - Assembly and Inspection.

TEXT BOOKS :

1. Industrial Robotics / Groover M P /Pearson Edu.

2. Robot technology fundamentals/ James G Keramas/ Cengage Publications

REFERENCES :

1. Introduction to Robotics / John J Craig / Pearson Edu.

2. Applied Robotics/ Edwin Wise/ Cengage Publications

3. Robotics / Fu K S/ McGraw Hill.

4. Robotic Engineering / Richard D. Klafter, Prentice Hall

5. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science.

6. Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Ltd.

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IV Year B.Tech. MC - I Sem	L	T/P/D	C
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(57087) MOTION CONTROL DESIGN

UNIT – I

Introduction to Mechatronics, Mechatronics key elements, Mechatronics design process, approaches in Mechatronics, objectives of Mechatronics, Examples of Mechatronic systems

Unit – II

Transmission mechanics – linear – lead screw, timing belt, conveyor – Rotary – gearing – spur gears, planetary transmission, harmonic transmission.

Unit – III

Motors – DC servo motors with encoded feedback – Brushless DC servo motors with hall effect sensor, encoder feedback stepper motors – full step, half step, microstep AC induction motors – gearheads.

Unit – IV

Control system in Motion control : programmable motion control, closed loop PID control – feed forward control – velocity, acceleration – fundamental concept for adaptive control and fuzzy logic.

Unit – V

Programmable logic controllers: Basic PLC structure, Input/ Output processing, Ladder programming, Latching and internal relays, Sequencing, Timers and counters, Shift registers, Master and jump controls

Unit – VI

INDUSTRIAL HYDRAULICS: Introduction, Merits of Fluid power and its utility for increase in productivity, symbolic representation of hydraulic element – Hydraulic control valves – Hydraulic accessories – various pumps used in hydraulic system – Hydraulic fluids – Hydraulic circuits and servo control systems.

UNIT – VII

INDUSTRIAL PNEUMATICS : Introduction, Symbolic representations of Pneumatic elements – Compressor and air installation – Pneumatic

circuits using Pneumatic cylinders and other elements – Applications to fluidics

UNIT – VIII

Pneumatic and Hydraulic Actuation Systems: Actuation systems, Pneumatic and hydraulic systems, Directional control valves, Pressure control valves, Cylinders, Servo and proportional control valves, Process control valves and Rotary actuators

TEXT BOOKS :

1. Mechatronics – W. Bolton, Pearson, 2010.
2. Pneumatic systems- Principles and Maintenance, SR Majumdar, TMH

REFERENCE BOOKS :

1. Hydraulic systems- Principles and Maintenance, SR Majumdar, TMH
2. Mechatronics system design- Devdas Shetty & Richard A. Kolk, Thomson, 2007
3. Introduction to Mechatronics and Measurement Systems, Alciatore, 2009, 3e, TMH
4. Principles of Machine Tools – Sen & Bhattacharya
5. Introduction to Mechatronics, Appuu Kuttan KK, Oxford Universities Press
6. Mechatronic systems: Fundamentals, Isermann, Springer

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IV Year B.Tech. MC - I Sem	L	T/P/D	C
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(57088) PRODUCT DESIGN AND ASSEMBLY AUTOMATION
(ELECTIVE – I)

UNIT –I

Automatic Feeding And Orienting Devices : Vibrator feeders : Mechanics of vibratory conveying, estimating the mean conveying velocity, load sensitivity, solutions to load sensitivity, spiral elevators, balanced feeders.

UNIT – II

Orientation of typical oriental system, effect of active orienting devices on feed rate, analysis of orienting systems, performance of an orienting device, natural resting aspects, of parts for automatic handing, analysis of a typical orienting system, out-of-bowl tooling. Mechanical feeders. Reciprocating -tube hopper feeder; magazines.

UNIT-III

Assemble Advantages: Development of the assemble process, choice of assemble method assemble advantages social effects of automation.

UNIT-IV

Automatic Assembly Transfer Systems : Continuous transfer, intermittent transfer, indexing mechanisms, and operator - paced free – transfer machine.

UNIT-V

Product Design For Highspeed Automatic Assembly And Robot Assembly : Introduction, design of parts for: high speed, feeding and orienting, example, additional feeding difficulties, high speed automatic insertion, example, analysis of an assembly, general rules for product design for automation, design of parts for feeding and orienting, summary of design rules for high speed automatic assembly, product for robot assembly.

UNIT-VI:

Design Of Manual Assembly: Design for assembly fits in the design

process, general design guidelines for manual assembly, development of the systematic DFA methodology, assembly efficiency, classification system for manual handling, classification system for manual insertion and fastening, effect of part symmetry on handling time, effect of part thickness and size on handling time, effect of weight on handling time, parts requiring two hands for manipulation, effects of combinations of factors, effect of symmetry effect of chamfer design on insertion operations, estimation of insertion time.

UNIT-VII

Avoiding jams during assembly, reducing risk assembly problems, effects of holding down, manual assembly data base and design data sheets, application of the DFA methodology and general design guidelines.

UNIT-VIII:

Performance And Economics Of Assembly Systems : Indexing machines, free transfer machines, basis for economic comparisons of automation equipment, comparison of indexing and free - transfer machines' economics of robot assembly. Feasibility Study For Assembly Automation : Machine design factors to redace machine downtime.d ue to defective parts. Visibility study.

TEXTBOOK:

1. Geoffrey Boothroyd, "Assembly Automation and Product Design", Marcel Dekker Inc., NY, 1992.
2. Geoffrey Boothroyd, Peter Dewhurst, Winston Knight, "Product design for manufacture and assembly",2e, CRC Press

REFERENCE BOOKS:

1. A.K. Chitale, RC Gupta, "Product design and manufacturing", PHI
2. Geoffrey Boothroyd, "Hand Book of Product Design" Marcel and Dekken, N.Y. 1990.
3. A Delbainbre "Computer Aided Assembly London, 1992.

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IV Year B.Tech. MC - I Sem	L	T/P/D	C
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(57089) RENEWABLE ENERGY SOURCES
(ELECTIVE - I)

UNIT – I

Principles Of Solar Radiation : Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

Solar Energy Collection : Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT-III

Solar Energy Storage And Applications : Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-IV

Wind Energy : Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

UNIT-V

Bio-Mass : Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.

UNIT-VI

Geothermal Energy : Resources, types of wells, methods of harnessing the energy, potential in India.

UNIT-VII

Ocean Energy : OTEC, Principles utilization, setting of OTEC plants,

thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT-VIII

Direct Energy Conversion : Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, seebeck, peltier and joul Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:

1. Renewable energy resources/ Tiwari and Ghosal/ Narosa.
2. Non-Conventional Energy Sources /G.D. Rai

REFERENCES:

1. Renewable Energy Sources /Twidell & Weir
2. Solar Energy /Sukhame
3. Splar Power Engineering / B.S Magai Frank Kreith & J.F Kreith.
4. Principles of Solar Energy / Frank Krieth & John F Kreider.
5. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
6. Non-Conventional Energy Systems / K Mittal /Wheeler
7. Renewable Energy Technologies /Ramesh & Kumar /Narosa

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	L	T/P/D	C
IV Year B.Tech. MC - I Sem	3	1/-/-	3

(57090) COMPUTATIONAL FLUID DYNAMICS
(ELECTIVE – I)

UNIT-I

Elementary details in numerical techniques: Number system and errors, representation of integers, fractions, floating point arithmetic, loss of significance and error propagation, condition for instability, computational methods for error estimation, convergence of sequences.

UNIT - II

Applied Numerical Methods: Solution of a system of simultaneous Linear Algebraic Equations, iterative schemes of Matrix Inversion, Direct Methods for Matrix inversion, Direct Methods for banded matrices.

UNIT - III

Finite Difference Applications in Heat conduction and Convection – Heat conduction, steady heat conduction in a rectangular geometry, transient heat conduction, finite difference application in convective heat transfer, closure.

UNIT - IV

Finite Differences, discretization, consistency, stability, and Fundamentals of fluid flow modeling: Introduction, elementary finite difference quotients, implementation aspects of finite-difference equations, consistency, explicit and implicit methods.

UNIT - V

Introduction to first order wave equation; stability of hyperbolic and elliptic equations, fundamentals of fluid flow modeling, conservative property, the upwind scheme.

UNIT - VI

Review of Equations Governing Fluid Flow and Heat Transfer: Introduction, conservation of mass, Newton's second law of motion, expanded forms of Navier-stokes equations, conservation of energy principle, special forms of the Navier-stokes equations.

UNIT - VII

Steady flow, dimensionless form of Momentum and Energy equations, Stokes equation, conservative body force fields, stream function - Vorticity formulation.

UNIT-VIII

Finite volume method: Approximation of surface integrals, volume integrals, interpolation and differentiation practices, upwind interpolation, linear interpolation and quadratic interpolation.

TEXT BOOKS:

1. Numerical heat transfer and fluid flow / Suhas V. Patankar Hema shava Publishers corporation & Mc Graw Hill.

2. Computational Fluid Flow and Heat Transfer/ Muralidaran- Narosa Publications

REFERENCES:

1. Computational Fluid Dynamics: Basics with applications –John D. Anderson/ Mc Graw Hill.

2. Fundamentals of Computational Fluid Dynamics – Tapan K. Sengupta / Universities Press.

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IV Year B.Tech. MC - I Sem

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(57091) ADVANCED DATA STRUCTURES
(ELECTIVE – I)

Unit I : C++ Class Overview- Basic OOP concepts,Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete), exception handling.

Unit II : Function Overloading, Operator Overloading, Generic Programming- Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control, runtime polymorphism using virtual functions, abstract classes, streams I/O.

Unit III : Algorithms, performance analysis- time complexity and space complexity. Review of basic data structures- The list ADT, Stack ADT, Queue ADT, array and linked Implementations using template classes in C++. Trees – Basic Terminology, Binary tree ADT, array and linked representations, traversals, threaded binary trees.

Unit IV : Dictionaries, linear list representation, skip list representation, operations insertion, deletion and searching, Hashing-hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing, comparison of hashing and skip lists.

Unit V : Priority Queues – Definition, ADT, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion, Heap sort, External Sorting-Model for external sorting, Multiway merge, Polyphase merge.

Unit VI : Search Trees (Part1): Binary Search Trees, Definition, ADT, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Operations – Insertion and Searching

Unit VII : Search trees (part- II): B-Trees, Definition, B-Tree of order m, insertion, deletion and searching, Comparison of Search Trees Graphs – Basic terminology, representations of Graphs, Graph search methods – DFS,BFS.

Unit VIII : Text Processing - Pattern matching algorithms-Brute force, the Knuth-Morris-Pratt algorithm, Tries- Standard Tries, Compressed Tries, Suffix tries.

TEXT BOOKS :

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press.

2. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and D.Mount, Wiley student edition, seventh edition, John Wiley and Sons.

REFERENCES :

1. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition

2. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Cengage Learning.

3. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.

4. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

5. Data Structures using C++, D.S. Malik, Cengage Learning, India Edition.

6. Data structures with C++ Using STL, 2nd edition, W.H.Ford and W.R.Topp, Pearson/PHI

7. Mastering Algorithms with C, K.Loudon, O'Reilly, SPD pvt. Ltd.

8. An Introduction to Data structures and Algorithms, J.A.Storer, Springer.

9. Advanced Data structures & Algorithms in C++, V.V. Muniswamy, Jaico Publishing House.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. MC - I Sem	L	T/P/D	C
	3	1/-/-	3

(57023) POWER PLANT ENGINEERING (ELECTIVE - II)

UNIT – I

Introduction to the Sources of Energy – Resources and Development of Power in India.

Steam Power Plant : Plant Layout, Working of different Circuits, Fuel and handling equipments, types of coals, coal handling, choice of handling equipment, coal storage, Ash handling systems.

UNIT II

Steam Power Plant : Combustion Process : Properties of coal – overfeed and underfeed fuel beds, traveling grate stokers, spreader stokers, retort stokers, pulverized fuel burning system and its components, combustion needs and draught system, cyclone furnace, design and construction, Dust collectors, cooling towers and heat rejection. Corrosion and feed water treatment.

UNIT – III

Internal Combustion Engine Plant : DIESEL POWER PLANT: Introduction – IC Engines, types, construction– Plant layout with auxiliaries – fuel supply system, air starting equipment, lubrication and cooling system – super charging.

UNIT IV

Gas Turbine Plant : Introduction – classification - construction – Layout with auxiliaries – Principles of working of closed and open cycle gas turbines. Combined Cycle Power Plants and comparision.

UNIT – V

Hydro Electric Power Plant: Water power – Hydrological cycle / flow measurement – drainage area characteristics – Hydrographs – storage and Pondage – classification of dams and spill ways.

Hydro Projects And Plant: Classification – Typical layouts – plant auxiliaries – plant operation pumped storage plants.

UNIT VI

Power From Non-Conventional Sources: Utilization of Solar-

Collectors- Principle of Working, Wind Energy – types – HAWT, VAWT - Tidal Energy.

Direct Energy Conversion: Solar energy, Fuel cells, Thermo electric and Thermo ionic, MHD generation.

UNIT – VII

NUCLEAR POWER STATION : Nuclear fuel – breeding and fertile materials – Nuclear reactor – reactor operation.

Types Of Reactors: Pressurized water reactor, Boiling water reactor, sodium-graphite reactor, fast Breeder Reactor, Homogeneous Reactor, Gas cooled Reactor, Radiation hazards and shielding – radioactive waste disposal.

UNIT – VIII

Power Plant Economics And Environmental Considerations: Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution, Load curves, load duration curve. Definitions of connected load, Maximum demand, demand factor, average load, load factor, diversity factor – related exercises. Effluents from power plants and Impact on environment – pollutants and pollution standards – Methods of Pollution control.

TEXT BOOK :

1. Power Plant Engineering – P.C.Sharma / S.K.Kataria Pub

2. A Course in Power Plant Engineering: / Arora and S. Domkundwar.

REFERENCES :

1. A Text Book of Power Plant Engineering / Rajput / Laxmi Publications

2. Power plant Engineering/ Ramalingam/ Scietech Publishers

3. Power Plant Engineering: P.K.Nag/ II Edition /TMH.

4. An Introduction to Power Plant Technology / G.D. Rai.

5. Power plant Engg - Elanchezhian- I.K. International Pub

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IV Year B.Tech. MC - I Sem	L	T/P/D	C
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(57092) COMPUTER ORGANIZATION
(ELECTIVE - II)

UNIT I :

BASIC STRUCTURE OF COMPUTERS : Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers. Data Representation. Fixed Point Representation. Floating – Point Representation. Error Detection codes.

UNIT II :

REGISTER TRANSFER LANGUAGE AND MICRO OPERATIONS : Register Transfer language. Register Transfer Bus and memory transfers. Arithmetic Mircrooperatiaons, logic micro operations, shift micro operations, Arithmetic logic shift unit. Instruction codes. Computer Registers Computer instructions – Instruction cycle. Memory – Reference Instructions. Input – Output and Interrupt. STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer.

UNIT III :

MICRO PROGRAMMED CONTROL : Control memory, Address sequencing, microprogram example, design of control unit Hard wired control. Microprogrammed control

UNIT IV :

COMPUTER ARITHMETIC : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit Decimal Arithmetic operations.

UNIT V :

THE MEMORY SYSTEM : Basic concepts semiconductor RAM memories. Read-only memories Cache memories performance considerations. Virtual memories secondary storage. Introduction to RAID.

UNIT-VI

INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt Direct memory Access, Input –Output Processor (IOP) Serial communication; Introduction to peripheral component, Interconnect (PCI) bus. Introduction to standard serial communication protocols like RS232, USB, IEEE1394.

UNIT VII :

PIPELINE AND VECTOR PROCESSING : Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

UNIT VIII :

MULTI PROCESSORS: Characteristics or Multiprocessors, Interconnection Structures, Interprocessor Arbitration. InterProcessor Communication and Synchronization Cache Coherance. Shared Memory Multiprocessors.

TEXT BOOKS :

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer System's Architecture – M.Moris Mano, IIIrd Edition, Pearson

REFERENCES :

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

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IV Year B.Tech. MC - I Sem	L	T/P/D	C
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(57093) FLEXIBLE MANUFACTURING SYSTEM
(ELECTIVE –II)

UNIT – I
Introduction: Types of production, characteristics, applications, Flexibility in Machining systems, need for FMS, Flexible Automation, where to apply FMS technology.

UNIT – II
Flexible Manufacturing Cell: Characterstics, Flexible Machining systems, achieving flexibility in machining systems, Machine cell design, quantitative techniques.

UNIT - III
Group Technology(GT): Part classification and coding systems: Part families, Parts classification and coding, Optiz system, structure, MULTICODE, differences between Optiz and MULTICODE systems, relative benefits.

UNIT - IV
GT- production flow analysis: Composite part concept, numerical problems for parts clustering, advantages of GT in manufacturing and design.

UNIT – V
Components of FMS: FMS layout configurations, Planning the FMS, FMS's Work- stations, Material Handling systems, Automatic Guided vehicle systems, Automated storage and retrieval systems, and Computer control systems.

Unit – VI
Implementing FMS: FMS Layout configurations, Quantitative Analysis methods for FMS , Applications and benefits of FMS, problems in implementing FMS.

Unit - VII
Computer Aided Process planning: Importance, generative and

retrieval systems, advantages and disadvantages, Generation of route sheets, selection of optimal machining parameters, methods.

Unit – VIII

Computer aided quality control and testing: Coordinate measuring machines, over view, contact and non contact inspection principles, Part programming coordinate measuring machines, In-cycle gauging.

TEXT BOOKS:

1. Automation, Production systems and Computer Integrated Manufacturing System – Mikell P. Groover

2. The design and operation of FMS –Dr. Paul Ranky Nort –Holland Publishers

REFERENCES:

1. Flexible Manufacturing systems in practice by Joseph talvage and roger G. Hannam, Marcel Dekker Inc., Newyork

2. Hand book of FMS – Nand Jha .K.

3. FMS and control of machine tools - V. Ratmirov, MIR publications

4. Flexible Manufacturing – David J. Parrish

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IV Year B.Tech. MC - I Sem

L	T/P/D	C
3	1/-/-	3

(57094) ADVANCED KINEMATICS AND DYNAMICS OF MACHINERY (ELECTIVE – II)

UNIT-I:

Geometry of motion-Grublers Criterion for plain and spatial mechanisms- Grashoff's law for planar and spatial mechanisms, Kutn Batch criterion for planar and spatial mechanisms

UNIT-II

Velocity and acceleration analysis, use of computers in analysis. Velocity and accelerations analysis of complex mechanisms. Auxiliary point method, Goodman's analysis.

UNIT-III:

Coupler curves, Robert's Chebychev spacing method. Cognate linkages. Path curvature- Polodes- Euler Savery equation -Bobiller and Hartman's Construction- Equivalent mechanisms.

UNIT- IV:

Space mechanisms and mobility equations: Positional problems. Vector analysis of velocity and accelerations,

UNIT-V:

Theorem of angular velocities and accelerations –computer aided analysis.

UNIT-VI:

Static force analysis of plane and spatial mechanisms: Inertia forces and torques. Dynamic force analysis, application of computer animation and simulation of motion studies.

UNIT-VII:

Dynamic Motion Analysis: Quinn's energy distribution method, the equivalent mass and force method. The rate of change of energy method, dynamic motion simulation.

UNIT-VIII:

Synthesis of linkages: Two position synthesis. Properties of rotopole,

Chebychev spacing. Optimization of the transmission angles. The overlay method; Three-position synthesis; point position reduction; synthesis of dwell mechanisms; synthesis using complex numbers and matrices, Freudenstain equation. Computer aided kinematic synthesis.

Codes / Tables: No table/code books required for examination

TEXTBOOKS:

1. Kinematics and Dynamics and design of machinery, Waldron, Wiley Publishers.
2. Shigley : J.E. Kinematic Analysis of mechanism, McGraw '11.

REFERENCE FOR BOOKS

1. Hirschcom : J.K.. KinciBcs and Dynamics of Plane Mechanisms . Mc.Graw Hill.
2. Holewenko, A.R. Dynamics of machinery, John Wiley & Sons.

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IV Year B.Tech. MC - I Sem	L	T/P/D	C
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(57619) MICROPROCESSORS AND MICROCONTROLLERS LAB

List of Experiments: The Following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

1. Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes).
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/ Counter in 8051.
12. Program and verify interrupt handling in 8051
13. UART Operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/ Keyboard to 8051.
17. Data Transfer from Peripheral to Memory through DMA controller 8237 / 8257.

Note: Minimum of 12 experiments to be conducted. Microprocessors and Micro controllers Lab-ECE syll

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(57620) MOTION CONTROL DESIGN AND CNC & ROBOTICS LAB

Note: Any six from each laboratory

MOTION CONTROL DESIGN LAB

1. Study the following valves :
   a. Relief Valve
   b. Flow Control Valves
   c. Directional Control Valves
   d. Pressure control Valves
2. Circuits for reciprocating motion of a single acting and double acting pneumatic cylinders.
3. Circuits for reciprocating motion of hydraulic cylinders
4. Circuits for speed control of a
   (a) double acting pneumatic cylinder.
   (b) Double acting hydraulic Cylinder.
5. Circuits for semi automatic and automatic operation of a double acting pneumatic cylinders.
6. Circuits for semi automatic and automatic operation of a double acting hydraulic cylinders.
7. Circuits for sequencing motion of two pneumatic cylinder
   (a) by cascading
   (b) by using a sequence valve
8. Circuits for measurement of pressure of air/ oil in fluid power system
9. Design and simulation of pneumatic circuits using simulation software
10. Design and simulation of hydraulic circuits using simulation software

CNC & ROBOTICS LAB

1. Study and Operation of CNC Lathe
2. Study and Operation of CNC Milling machine

3. Preparation of typical part programs on CNC trainer
4. Preparation of typical part programs on CNC milling machine
5. Exercises using CAM software
6. Communicating within Flexible manufacturing cell-cell computer to machine, cell computer to robot, Machine-to-machine interlinking
7. Part program generation through G & M codes for turning, contouring, drilling, reaming and milling
8. Development of tool path simulation by setting tool offsets for multi operations
9. Machining of various components by generation of CNC code by CAM software
10. Robot programming for a given path

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(58066) MEMS DESIGN

UNIT – I

Introduction, Integrated circuits, MEMS, Microsensors, Microactuators, Microelectronics Fabrication, Micromachining, Mechanical MEMS, Thermal MEMS, MOEMS, Magnetic MEMS, RF MEMS, Microfluid systems, Bio and Chemo-devices, Nanotechnology, Modelling and Simulation.

UNIT – II

Micromachining: Introduction, Photolithography, Structural and Sacrificial Materials, Other Lithography methods, Thin film deposition, Impurity doping, Etching, Problems with Bulk Micro Machining, Surface Micro machining, Bulk vs. Surface micromachining.

UNIT – III

System Modeling and Properties of Material: Introduction, Need for modeling, System types, Basic modeling elements in mechanical systems, Electrical systems, Fluid systems and Thermal systems, Translational pure mechanical system with spring, damper and mass-Rotational pure mechanical system with spring, damper and mass.

UNIT – IV

Passive Components and Systems: Introduction, System-On-A-Chip, Passive electronic systems, Passive mechanical systems

UNIT – V

Mechanical Sensors and Actuators: Introduction, Principles of sensing and actuation, Beam and Cantilever, Microplates, Capacitive Effects, Piezo electric material as sensing and actuating elements, Strain measurement, Pressure measurement, Flow measurement using integrated paddle-cantilever structure.

UNIT – VI

Thermal Sensors and Actuators: Introduction, Thermal energy basics and Heat transfer processes, Thermistors, Thermodevices, Thermocouple, Micromachined thermocouple probe, Peltier effect heat

pumps, Thermal flow sensors, Micro hot plate gas sensors, Shape memory Alloys, U-shaped horizontal and vertical Electrothermal Actuator, Thermally activated MEMS Relay.

UNIT – VII

Micro-opto-Electromechanical systems: Introduction, fundamental principle of MOEMS Technology, Review on properties of Light, Light modulators, Beam splitter, Microlens, Micro mirrors, Digital micro mirror device, Light detectors, Grating Light Valve, Optical switch, Waveguide and tuning, Shear- Stress measurement

Magnetic Sensors and Actuators:

UNIT – VIII

Radio Frequency MEMS: Introduction, Review of RF-based communication systems, RF MEMS, MEMS Inductors, Varactors, Tuner/Filter, Resonator, Clarification of Tuner, Filter, Resonator, MEMS Switches, Phase Shiffter, Microfluididic Systems, Introduction, Applications.

TEXT BOOKS :

1. MEMS, Nitaigour Premchand Mahalik, TMH.
2. MEMS & MICROSYSTEMS Design and Manufacture, Tai-Ran Hsu, TMH, 2006

REFERENCES:

1. Mechatronics Systems Fundamevntals – Rolf Isermann – Sprnger international Edition
2. The Science and Engineering of Microelectronic Fabrication, 2 Ed. By S.A.Cambell, Published by Oxford University Press(2001)
3. Fundamentals of Micro fabrication: The Science of Miniaturization, 2 ed. By M.J.Madou, Published by CRC Press (2002)
4. Introductory MEMS : Fabrication and Applications by Adams, Thomas M., Layton, Richard A., 1st Edition, 2010, ISBN: 978-0-387-09510-3, Springer

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IV Year B.Tech. MC - II Sem	L	T/P/D	C
	3	-/-/-	3

(58067) AUTOMATION IN MANUFACTURING
(ELECTIVE – III)

UNIT – I

Introduction: Automation principles and strategies; Manufacturing industries, products and operations; product variety and quantity relationship; Automation and control technologies and levels in the production system.

UNIT – II

Automated production lines : System configurations, workpart transfer mechanisms, storage buffers, control of production line, Applications, Analysis with and without internal buffer storage.

UNIT – III

Automated Assembly Systems: System configurations, parts delivery at workstations, Applications, Quantitative analysis of assembly systems.

UNIT – IV

Assembly system and line balancing : Assembly process and systems, assembly line, line balancing methods, ways of improving line balance, flexible assembly lines.

UNIT – V

Automated material handling : Types of equipment, functions, analysis and design of material handling Systems, conveyor systems, automated guided vehicle systems.

UNIT -VI

Automated storage systems: Automated storage and retrieval systems; work in process storage, interfacing handling and storage with manufacturing.

UNIT – VII

Adaptive control systems : Introduction, adaptive control with optimization, Adaptive control with constraints, Application of A.C. in

Machining operations. Use of various constraints such as cutting force, Temperatures, vibration and acoustic emission.

UNIT – VIII

Business process Re-engineering: Introduction to BPE logistics, ERP, Software configuration of BPE, concurrent Engineering, Techniques of Rapid Proto typing.

TEXT BOOK :

1. Automation, Production Systems and Computer Integrated Manufacturing : M.P. Groover./ PE/PHI

REFERENCES:

1. Computer control of Manufacturing Systems by Yoram koren.
2. CAD / CAM/ CIM by Radhakrishnan.
3. Automation by W. Buekinsham.

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IV Year B.Tech. MC - II Sem

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3	-/-/-	3

(58015) PRODUCTION PLANNING AND CONTROL
(ELECTIVE - III)

UNIT-I

Introduction: Definitions – objectives of production planning and control- functions of production planning and control-elements of production control- types of production- organization of production planning and control – internal organizations department

UNIT-II

Forecasting – Importance of forecasting – types of forecasting, their uses- general principles of forecasting techniques- Qualitative methods and quantitative methods.

UNIT-III

Inventory management – Functions inventory- Relevant inventory cost- ABC analysis- VED Analysis- EOQ model – Inventory control systems – P- Systems and Q – Systems

UNIT – IV

Introduction to MRP And ERP, LOB(Line of balance), JIT inventory, Japanese concepts.

UNIT- V

Routing – Definition – routing procedure- Route sheets – Bill of material- factors affecting routing procedure. Schedule – definition – difference with loading.

UNIT-VI

Scheduling polices – techniques, standard scheduling methods- job shop, flow shop,.

UNIT-VII

Line balancing, aggregate planning- methods for aggregate planning- Chase planning, expediting, control aspects.

UNIT-VIII

Dispatching – Activities of dispatcher- Dispatching procedure - follow

up – definition – reasons for existence of functions – types of follow up, applications of computer in production planning control

TEXT BOOKS:

1. Production Planning and Control – M.Mahajan- Dhanpati rai & Co
2. Production Planning and Control- Jain & Jain – Khanna publications

REFRENCE BOOKS :

1. Production Planning and Control- Text & cases/ SK Mukhopadhyaya /PHI.
2. Production and operations Management – R.Panneer Selvam – PHI.
3. Operations Management by Chase/PHI
4. Management Science – A R Aryasri- 4e –TMH
5. Operations management – Heizer- Pearson

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IV Year B.Tech. MC - II Sem	L	T/P/D	C
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(58068) CONCURRENT ENGINEERING (ELECTIVE – III)

UNIT – I : **Introduction:** Development of Concurrent Engineering. The mean and activity concepts and principles. Examples.

UNIT – II : **Concurrent Engineering Tools and Technologies:** Changes in to Technologies, Tasks, Talents and times into well managed resources product developments.

UNIT – III : **Research in Engineering design and manufacturing:** Theory applications using the concurrent Engineering concepts and Principles.

UNIT-IV : Simultaneous design and all related processes of a product.

UNIT – V : **The mission and vision of C.E:** Computer optimized manufacturing (COM). The next generation of computer integrated manufacturing (CIM).

UNIT-VI : Global competitiveness and development of high quality product, Offline reliability

UNIT – VII : **Managing the concurrent Engineering:** Contemporary Issues - modern Tools and methods. Use of Computers and decision making, Re-engineering concepts

UNIT-VIII : Automated Quality Control Application of CMM, Basic concepts, Zero defect, 6 sigma concept, Tolerancing, Examples, DFMA, Rapid Prototyping

TEXT BOOK:

1. Concurrent Engineering: Tools and Technologies for Mechanic Systems Design – Edward, J. Haug.

REFERENCES :

1. Research in Engineering Design : Theory, applications, and concurrent engineering : Vol. 7, No. 1, 1995.

2. Managing Concurrent Engineering. – Jon Turino.

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IV Year B.Tech. MC - II Sem	L	T/P/D	C
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(58069) PLANT ENGINEERING AND MAITEINANCE
(ELECTIVE – III)

UNIT-I:

Introduction: Need for Maintenance, Facts and Figures, Modern Maintenance, Problem and Maintenance Strategy for the 21st Century, Engineering Maintenance Objectives and Maintenance in Equipment Life Cycle, Terms and Definitions

UNIT-II:

Maintenance Management And Control: Maintenance Manual, Maintenance, Facility Evaluation, Functions of Effective Maintenance Management, Maintenance Project Control Methods, Maintenance Management Control Indices.

UNIT-III:

Types of maintenance: preventive maintenance, Elements of Preventive, Maintenance Program, Establishing Preventive Maintenance Program, PM Program Evaluation and Improvement, PM Measures, PM Models, CORRECTIVE MAINTENANCE, Corrective Maintenance Types, Corrective Maintenance Steps and Downtime Components, Corrective Maintenance Measures, Corrective Maintenance Models

UNIT-IV:

Inventory Control In Maintenance: Inventory Control Objectives and Basic Inventory Decisions, ABC Inventory Control Method, Inventory Control Models Two-Bin Inventory Control and Safety Stock, Spares Determination Factors, Spares Calculation Methods

UNIT-V:

Quality And Safety In Maintenance: Needs for Quality Maintenance Processes Maintenance Work Quality, Use of Quality Control Charts in Maintenance Work Sampling, Post Maintenance Testing, Reasons for Safety Problems in Maintenance Guidelines to Improve Safety in Maintenance Work, Safety Officer's Role in Maintenance Work, Protection of Maintenance Workers

UNIT-VI:

Maintenance Costing: Reasons for Maintenance Costing, Maintenance Budget Preparation Methods and Steps, Maintenance Labor Cost Estimation, Material Cost Estimation, Equipment Life Cycle Maintenance Cost Estimation, Maintenance Cost Estimation Models

UNIT-VII:

Reliability, Reliability Centered Maintenance: RCM Goals and Principles, RCM Process and Associated Questions, RCM Program Components Effectiveness Measurement Indicators, RCM Benefits and Reasons for Its Failures, Reliability Versus Maintenance and Reliability in Support Phase, Bathtub Hazard Rate Concept, Reliability Measures and Formulas, Reliability Networks, Reliability Analysis Techniques.

UNIT-VIII:

Maintainability: Maintainability Importance and Objective, Maintainability in Systems Life Cycle, Maintainability Design Characteristics, Maintainability Functions and Measures, Common Maintainability Design Errors,

TEXT BOOKS

1. Engineering Maintenance a modern approach B.S Dhallon 2002 C.R.R publishers
2. Maintenance Engineering and management – K. Venkataraman - PHI

REFERENCES:

1. Reliability Engineering- Balaguruswamy
2. Relaibility Engineering – L.S.Srinath
3. Industrial Safety Management L.M.Deshmukh- TMH

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IV Year B.Tech. MC - II Sem	L	T/P/D	C
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(58016) ARTIFICIAL NEURAL NETWORKS
(ELECTIVE – IV)

UNIT I

Introduction - what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

UNIT II

Learning Process – error Correction learning, Memory based learning, Hebbian learing, Competitive, Boltzmann learning, Credit Asssignment Problem, Memory, Adaption, Statistical nature of the learning process

UNIT III

Single layer perceptrons – Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perceptron –convergence theorem, Relation between perceptron and Bayes classifier for a Gaussian Environment

UNIT IV

Multilayer Perceptron – Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Comuter experiment, feature detection

UNIT V

Back Propagation – back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning.

UNIT VI

Self Organization Maps – Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification

UNIT VII

Neuro Dynamics – Dynamical systems, stability of equilibrium states, attractors, neurodynamical models, manipulation of attractors as a recurrent network paradigm

UNIT VIII

Hopfield models – Hopfield models, computer experiment

TEXT BOOK:

1. . Neural networks A comprehensive foundations, Simon Hhaykin, PHI edition.

REFERENCES:

1. Artifical neural networks - B.Vegnanarayana Prentice,Halll of India P Ltd 2005

2. Neural networks in Computer intelligence, Li Min Fu TMH 2003

3. Neural networks James A Freeman David M S kapura pearson education 2004

4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

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IV Year B.Tech. MC - II Sem	L	T/P/D	C
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(58070) MATHEMATICAL MODELING AND SIMULATION
(ELECTIVE – IV)

Unit – I:

Art of Modeling, Types of models, mathematical models – solution methods – analytical, Numerical and Heuristic. L.P.P. – Formulation – Graphi al Method, simplex method, dual simplex method and application.

Unit – II:

Transportation models – Assignment models, Integer programming, Non-linear programming.

Unit – III:

Deterministic Inventory models: General Inventory model, Static E.O.Q. Models, Dynamic Inventory model, Probabilistic Inventory models, continuous Review models, single period model and multiple period model.

Unit – IV:

Selective Inventory control: ABC, VED, FSN Analysis. Inventory systems – Fixed order quantity system, two bin system, periodic review systems, Optional Replenishment system and M R P.

Unit – V:

Queuing Theory: Basic Structure of Queuing Models, Role of Exponential Distribution, Birth-and-Death Process, Queuing Models Based on the Birth-and-Death Process, Queuing Models involving Non-exponential Distributions, Priority-Discipline Queuing Models and Queuing Networks. Applications of Queuing Theory – Decision Making, Formulation of Waiting – Cost Function and Decision Models.

Unit – VI:

CPM and PERT: Network Representation, Critical path calculation, construction of Time schedule.

Unit – VII:

Simulation: Introduction, General principles, Random-Number

Generation, Random-Variate Generation, Simulation Software.

Unit – VIII:

Input modeling, verification and validation of simulation models, Output Analysis for a single model, Comparison and Evaluation of Alternative System Designs, Simulation of Computer Systems.

TEXT BOOKS:

1. Introduction to Operations Research, Frederick S Hiller and Gerald J Lieberman, 7" Edition, Tata McGrawHill, 2001 (Chapters 17 and 18 for Unit-III).

2. Discrete-Event System Simulation, Jerry Banks, John S Carson II, Barry L. Nelson and David M. Nicol, 3" edition, PHI/Pearson Education (Chapters1,3,4,7 and 8 for Unit-IV; Chapters 9,10,11,12 and 14 for Unit-V).

REFERENCE BOOKS:

1. Operation Research – S.K.Jain and D. M. Mehta, Galgotia.

2. Introductory Operations Research: Theory & Applications, Kasana, Springer.

3. Applied Simulation Modelling – Seila, Ceric and Tadikamalla

4. Simulation Modeling and Analysis – Averill M law - TMH

5. Operations Research – An Introduction, 7" edition, Prentice-Hall of India, 1999 (Chapter 1 to 5 for Unit-I and Chapters 11 and 16 for Unit II, Section 6.7 for Unit-IV).

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IV Year B.Tech. MC - II Sem	L	T/P/D	C
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(58071) PRINCIPLES OF ENTERPRENEURSHIP
(ELECTIVE – IV)

Unit I:

Introduction to Entrepreneurship - The Entrepreunrial Process, What is Entrepreneurship, Why Become an Entrepreneur, Entrepreneurship's Importance, Economic Impact of Entrepreneurial Firms, Recognizing Opportunities and Generating Ideas, Techniques for Generating Ideas, Encouraging and Protecting New Ideas.

Unit II:

Feasibility Analysis – Industry / Market Feasibility Analysis, Organizational Feasibility Analysis, Financial Feasibility Analysis, importance of Industry and Firm – Specific Factors, Developing Effective Business Models - Partnering for Success.

Unit III:

Moving from an Idea to an Entrepreneurial Firm – Building a new venture team, Assessing a new venture's Financial Strength and Viability, Financial Statements and Forecasts, Pro Forma Financial Statements, Preparing the proper Ethical and legal foundation, Choosing a Form of Business Organization, The Legal Environment of the Internet, Procedure for SSI Registration.

Unit IV:

Writing a Business Plan - What is Business Plan, Why Business Plan is important, Outline of Business Plan, Business Planning Process, Implementing the Business Plans – Marketing Plan, Financial Plan and Organisational Plan.

Unit V:

Sources of Finance – Sources of Equity Funding, Sources of Debt Financing, Creative Sources of Financing and Funding, Capital Structure, Venture Capital Industry – an overview.

Unit VI:

Institutional Framework Small Industries Development Bank of India (SIDBI), The National Institute for Entrepreneurship and Small Business Development (NISBUD), National Small Industries

Corporation Ltd (NSIC), Entrepreneurship Development Institute of India, National Bank for Agriculture & rural Development (NABARD), The Indian Institute of Entrepreneurship (IIE), Small Scale Industries Board, Industrial Development Bank of India, Khadi and Village Industries Commission. National Institute of Micro, Small & Medium Enterprises (NIMSME).

Unit VII:

Organizing and Management – Working Capital Management, Purchasing and Inventory Management, Production and Operation Management, Issues in Small Business Marketing, Channels of Distribution, Profit Planning and Budgeting.

Unit VIII:

Labour legislation - Salient Provisions under Indian Factories Act. Industrial Disputes Act, Employees State Insurance Act, Workmen's Compensation Act and Payment of Bonus Act.

TEXT BOOKS:

1. Bruce R. Barringer, Entrepreneurship, Pearson Education, 2009.
2. Madhurima Lall & Shikha Sahai, entrepreneurship, Excel Books, 2nd Edition, 2008

REFERENCE BOOKS:

1. Vasant Desai, Fundamentals of Entrepreneurship and Small Business Management, Himalaya Publishing House, 2010.
2. K.Ramachandran, Entrepreneurship Development, TMH, 2010.
3. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2009.
4. Robert D Hisrich, Michael P Peters, Dean A Shepherd, Entrepreneurship, TMH, Sixth Edition, 2009.
5. Poornima M Charantimath, Entrepreneurship Development Small Business Entreprises, Pearson Education, Fourth Impression, 2009
6. A Sahay & V Sharma, Entrepreneurship and New Venture Creation, Excel Books, 2008
7. Agarwal: Indian Economy, Wishwa Prakashan 2009.
8. Dutt & Sundaram: Indian Economy,S.Chand, 2010
9. Srivastava: Industrial Relations & Labour Laws, Vikas, 2009.
10. Essential of entrepreneurship and small business management by Thomas W.Zimmerer & Norman M.Searborough, PHI-2010.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. MC - II Sem	L	T/P/D	C
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(58072) OPERATING SYSTEMS
(ELECTIVE – IV)

UNIT - I

Operating Systems Overview- Operating systems functions, Overview of computer operating systems, protection and security. distributed systems, special purpose systems, operating systems structures- operating system services and systems calls, system programs, operating system structure, operating systems generation

UNIT - II

Process Management – Process concepts, threads, scheduling-criteria, algorithms, their evaluation, Thread scheduling. case studies UNIX. Linux, Windows

UNIT - III

Concurrency - Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case studies UNIX, Linux, Windows

UNIT - IV

Memory Management - Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging,page-replacement,algorithms,Allocation of frames,Thrashing case studies UNIX, Linux, Windows

UNIT - V

Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock.

UNIT - VI

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, case studies. UNIX, Linux, Windows

UNIT - VII

Mass-storage structure- overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure. I/O systems- Hardware, application I/o interface, kernel I/O subsystem, Transforming I/O requests to Hardware operations, STREAMS, performance.

UNIT - VIII

Protection - Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection,

Security- The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer –security classifications, case studies UNIX, Linux, Windows

TEXT BOOKS :

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne,8th edition, John Wiley.
2. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH

REFERENCES :

1. Operating Systems – Internals and Design Principles, Stallings, sixth Edition–2009, Pearson education.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition PHI.
4. Principles of Operating Systems , B.L.Stuart, Cengage learning, India Edition.
5. Operating Systems, A.S.Godbole,2nd Edition, TMH
6. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
7. Operating Systems,G.Nutt,N.Chaki and S.Neogy,3rd Edition,Pearson Education.
8. Operating Systems, R.Elmasri,A.G.Carrick and D.Levine,Mc Graw Hill.
9. Operating Systems,S.Haldar,A.A.Aravind,Pearson education.

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IV Year B.Tech. MC - II Sem	L	T/P/D	C
	0	-/-/-	2

(58637) INDUSTRY ORIENTED MINI PROJECT

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	0	-/6/-	2

(58638) SEMINAR

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(58639) PROJECT WORK

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IV Year B.Tech. MC - II Sem	L	T/P/D	C
	0	-/-/-	2

(58640) COMPREHENSIVE VIVA