ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

XVI

MECHANICAL (PRODUCTION) ENGINEERING

For

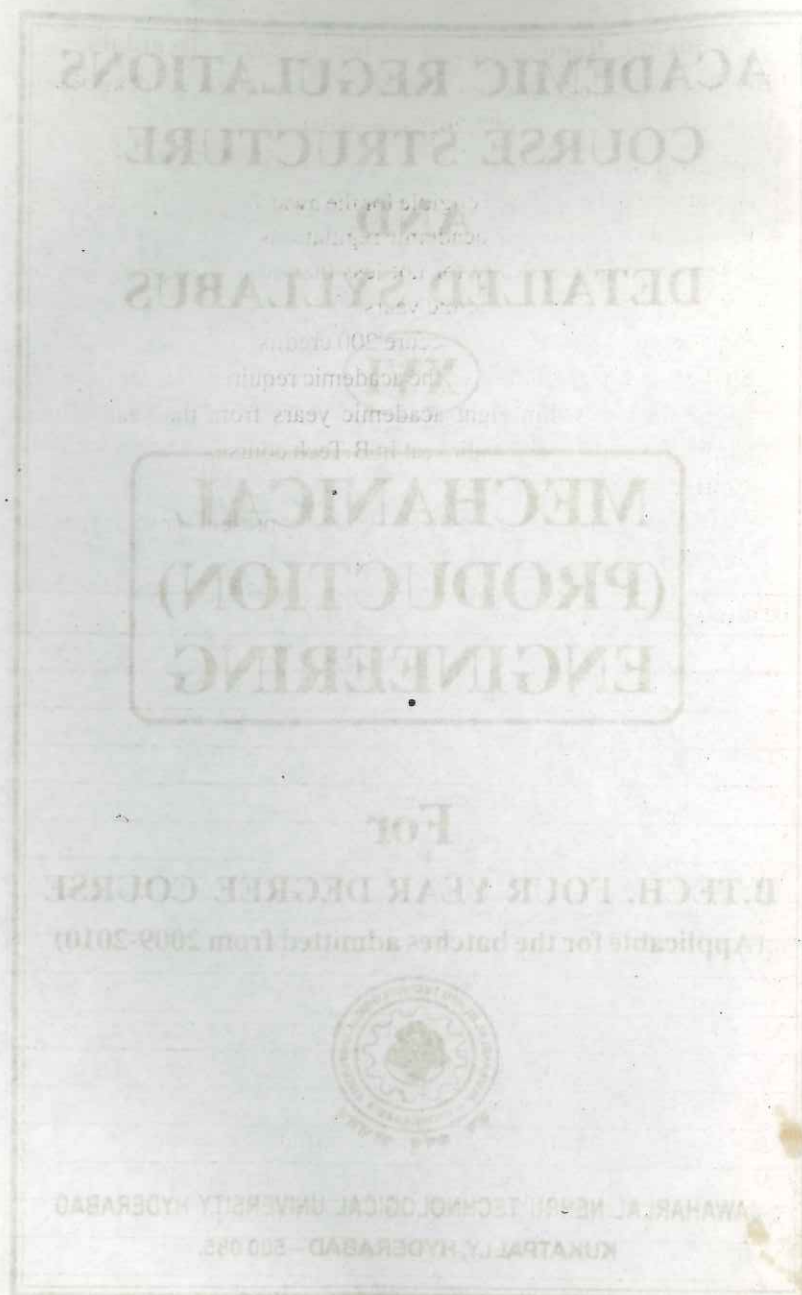# B.TECH. FOUR YEAR DEGREE COURSE
(Applicable for the batches admitted from 2009-2010)

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, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.

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

ix. Out of a total of 200 marks for the project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by the same committee appointed for industry oriented mini project. In addition the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be 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 examination 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 (PRODUCTION) 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
51652	Computer Programming Lab.	-	3	4
51653	Engineering Physics & Engineering Chemistry Lab	-	3	4
51654	English Language Communication Skills Lab.	-	3	4
51655	Engineering Workshop / IT Workshop	-	3	4
	Total	17	18	50

II YEAR I SEMESTER   COURSE STRUCTURE

Code	Subject	L	T/P/D	C
53013	Environmental Studies	3	0	3
53014	Probability and Statistics	3	1	3
53015	Electrical and Electronics Engineering	4	1	4
53016	Mechanics of Solids	3	1	3
53038	Thermal Sciences	4	1	4
53018	Metallurgy and Materials Science	4	1	4
53626	Electrical and Electronics Engineering Lab	0	3	2
53627	Metallurgy & Mechanics of Solids Lab	0	3	2
	Total	21	11	25

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

II YEAR II SEMESTER COURSE STRUCTURE

Code	Subject	L	T/P/D	C
54038	Foundry Technology	4	0	4
54014	Kinematics of Machinery	3	1	3
54039	Welding Technology	3	1	3
54016	Mechanics of Fluids and Hydraulic Machines	4	0	4
54017	Machine Drawing	0	6	4
54018	Numerical Methods	3	1	3
54630	Production Technology Lab	0	3	2
53631	Mechanics of Fluids & Hydraulic Machines 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
55065	Metrology & Quality Control	3	1	3
55017	Dynamics of Machinery	4	1	4
55018	Machine Tools	3	1	3
55019	Design of Machine Members – I	4	1	4
55066	Metal Forming	3	1	3
55627	Machine Tools & Metrology Lab	0	3	2
55628	Metal Forming Lab	0	3	2
	Total	21	11	25

III YEAR II SEMESTER COURSE STRUCTURE

Code	Subject	L	T/P/D	C
56016	Industrial Management	4	0	4
56017	Finite Element Method	3	1	3
56068	Tooling for Production	4	1	4
56019	Design of Machine Members – II	3	1	3
56020	Heat Transfer	4	1	4
	Open Elective	3	1	3
56021	Engineering Optimization			
56014	Nonotechnology			
56069	Composite Materials			
56632	Thermal & Heat Transfer Lab	0	3	2
56633	Advanced English Communication Skills Lab	0	3	2
	Total	21	11	25

IV YEAR I SEMESTER COURSE STRUCTURE

Code	Subject	L	T/P/D	C
57022	Operations Research	4	1	4
57109	Mechatronics & its applications	3	1	3
57024	CAD/CAM	4	1	4
57025	Instrumentation and Control Systems	4	0	4
	ELECTIVE – I	3	1	3
57026	Robotics			
57110	Computer Integrated Manufacturing			
57031	CNC Technology			
57111	Machine Tool Design			
	ELECTIVE – II	3	1	3
57030	Unconventional Machining Processes			
57112	Advanced Manufacturing Systems			
57032	Automation in Manufacturing			
57013	Design for Manufacturing & Assembly			
57627	Computer Aided Design & Manufacturing Lab	0	3	2
57628	Production Drawing Practice and Instrumentation Lab	0	3	2
	Total	21	11	25

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

Code	Subject	L	T/P/D	C
58015	Production Planning and Control	3	1	3
	ELECTIVE – III	3	1	3
58016	Artificial Neural Networks			
58017	Reliability Engineering			
58018	Maintenance and Safety Engineering			
58019	Plant Layout & Material Handling			
	ELECTIVE – IV	3	0	3
58085	Flexible Manufacturing Systems			
58086	Advanced Manufacturing Processes			
58087	Total Quality Management			
58088	Product Design and Development			
58654	Industry Oriented Mini Project	0	0	2
58655	Seminar	0	6	2
58656	Project Work	0	15	10
58657	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

I Year B.Tech. M.P.	L	T/P/D	C
	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, $e^{ax} V(x)$, $x^n V(x)$, 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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(51652) 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/sec²). 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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(51653) 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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(51654) 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- -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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(51655) 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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(53013) 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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(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 (σ 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 χ^2 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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II Year B.Tech. M.PI-Sem	L	T/P/D	C
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(53015) ELECTRICAL AND ELECTRONICS ENGINEERING

UNIT - I

ELECTRICAL CIRCUITS: Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchhoff's Laws, Inductive networks, capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations.

UNIT - II

DC MACHINES : Principle of operation of DC Generator – emf equation - types – DC motor types – torque equation – applications – three point starter.

UNIT - III

TRANSFORMERS : Principle of operation of single phase transformers – emf equation – losses –efficiency and regulation

UNIT - IV

AC MACHINES : Principle of operation of alternators – regulation by synchronous impedance method – Principle of operation of induction motor – slip – torque characteristics – applications.

UNIT - V

INSTRUMENTS : Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

UNIT - VI

DIODE AND IT'S CHARACTERISTICS : P-n junction diode, symbol, V-I Characteristics, Diode Applications, Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems)

UNIT - VII

TRANSISTORS : PNP and NPN Junction transistor, Transistor as an amplifier, SCR characteristics and applications

UNIT - VIII

CATHODE RAY OSCILLOSCOPE : Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, Electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

TEXT BOOKS:

1. Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David Irwin/Pearson.

2. Principles of Electrical and Electronics Engineering by V.K.Mehta, S.Chand & Co.

REFERENCES:

1. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.

2. Basic Electrical Engineering by Kothari and Nagarath, TMH Publications, 2nd Edition.

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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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II Year B.Tech. M.P 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 – S.S. Ramalingam, Scitech.
2. Thermal Engineering - Rajput / Lakshmi Publications
3. Thermal Engineering & Heat Engines – Vol-1 & 2 – Yadav

REFERENCES:

1. Thermal Engineering – R.S. Khurmi & J.S.Gupta / S.Chand Pub.
2. Thermal Sciences – Merle C. Potter & Elaine P. Scott, Brooks/cole
3. Fundamentals of Classical Thermodynamics – G. Van Wylan & R.E. Sonntag – John Wiley Pub.
4. Engineering Thermodynamics – Jones & Dugan
5. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles /TMH
6. Thermodynamics – J.P.Holman / McGrawHill
7. An introduction to Thermodynamics / YVC Rao / New Age

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II Year B.Tech. M.P. I-Sem

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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. M.P. I-Sem	L	T/P/D	C
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(53626) ELECTRICAL AND ELECTRONICS ENGINEERING LAB

Section A: Electrical Engineering: The following experiments are required to be conducted as compulsory experiments :

1. Swinburne's test on D.C. Shunt machine. (Predetermination of efficiency of a given D.C. Shunt machine working as motor and generator).

2. OC and SC tests on single phase transformer (Predetermination of efficiecy and regulation at given power factors)

3. Brake test on 3-phase Induction motor (Determination of performance characteristics)

4. Regulation of alternator by Synchronous impedance method. In addition to the above four experiments, any one of the experiments from the following list is required to be conducted:

5. Speed control of D.C. Shunt motor by
   a) Armature Voltage control b) Field flux control method

6. Brake test on D.C Shunt Motor

Section B: Electronics Engineering :

1. Transistor CE Characteristics (Input and Output)

2. Full wave Rectifier with and without filters.

3. CE Amplifiers.

4. RC Phase Shift Oscillator

5. Class A Power Amplifier

6. Micro Processor

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(53627) METALLURGY AND MECHANICS OF SOLIDS LAB

(A) 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.

(B) 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

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

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(54038) FOUNDRY TECHNOLOGY

UNIT I

Scope and development of Foundry. Types of foundries. PATTERNS: Materials for patterns, types of patterns; functions and pattern allowance. MOULDING MATERIALS: Moulding sands, properties and selection of materials and additives used.

UNIT II

CASTING PROCESSES AND EQUIPMENT: Green and dry sand moulding; shell moulding, CO2 moulding. Core moulds and cores. Plaster mould casting, composite mould casting, Investment casting.

UNIT III:

Permanent mould casting, pressure die-casting, Gravity die-casting and centrifugal casting, Types of moulding equipment.

UNIT IV:

GATING AND RISERING: Gate nomenclature, gate types and types of risers.

UNIT V:

SOLIDIFICATION OF METALS: Nucleation crystal growth. Freezing of metals and alloys. Dendritic freezing. Coring and segregation, ingot defects, Flow of metals in moulds.

UNITI VI

MELTING OF FERROUS ALLOYS: Melting of Gray iron and cupola. Cupola operation and control. Effect on chemical composition, carbon equivalent and effect of alloying elements on foundry characteristics. Melting of non-ferrous alloys: Melting of Aluminium and copper alloys production processes: Production of Gray Iron, ductile iron, Malleable iron castings.

UNIT VII

MODERN DEVELOPMENTS: Recently developed processes - v- forming

full mould process - Furon-no-bake sand moulds and cores. Continuous casting. Cold setting and self-setting processes.

UNIT VIII

CASTING DEFECTS: Casting defects arising due to moulding, coring melting and poring practice.

TEXT BOOKS:

1. Principles of Metal Casting by Heine, Loper and Rosenthal.

2. Foundry Technology – Dhuvendra Kumar & S.K.Jain

REFERENCES:

1. Metals Handbook Vol. 5 published by ASM, Ohio.

2. Foundry Technology-Jain

3. Foundry Technology Principle -T.V.Rama Rao

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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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(54039) WELDING TECHNOLOGY

UNIT I : The principles and theory, mechanism and key variables of different welding processes, types of tooling and equipment.

UNIT II : Microstructure of fusion and heat affected zone, welding stresses, pre and post treatments.

UNIT-III : Advantages, disadvantages and field of application of the welding with reference to the following welding processes Gas welding, Arc welding, submerged arc welding, TIG, MIG, Plasma arc welding.

UNIT IV : Electron Beam welding (including EMPOR) spot-welding, Laser welding, diffusion welding.

UNIT-V : Welding of structural steel, welding of cast iron, welding of stainless steel and other high-alloyed steels.

UNIT-VI : Welding of copper and its alloys, welding of aluminum and its alloys, joining of dissimilar alloys.

UNIT VII : Welding defects and remedies.

UNIT VIII : Mechanism, Techniques and scope of brazing, soldering and adhesive bonding processes.

TEXT BOOK:

1. Welding Technology-R.S.Parmar.

REFERENCES:

1. JF Lancaster: Welding Metallurgy
2. Little : Welding and Welding Technology
3. Agarwal Manghmani: Welding Engineering
4. BE Rossi: Welding Engineering

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(54016) MECHANICS OF FLUIDS AND HYDRAULIC MACHINES

UNIT I

Fluid statics : Dimensions and units: physical properties of fluids-specific gravity, viscosity, surface tension- vapour pressure and their influence on fluid motion- atmospheric, gauge and vacuum pressures – measurement of pressure- Piezometer, U-tube and differential manometers.

UNIT II

Fluid kinematics : Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform & non uniform, laminar & turbulent, rotational & irrotational flows-equation of continuity for one dimensional flow and three dimensional flows.

Fluid dynamics : Surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT III

Closed conduit flow: Reynold's experiment- Darcy Weisbach equation-Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line.

Measurement of flow: pitot tube, venturimeter, and orifice meter, Flow nozzle

UNIT IV

BOUNDARY LAYER CONCEPTS : Definition, thicknesses, characteristics along thin plate, laminar and turbulent boundary layers (No derivation) boundary layer in transition, separation of boundary layer, submerged objects – drag and lift.

UNIT V

Basics of turbo machinery : Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

UNIT VI

Hydraulic Turbines : Classification of turbines, Heads and efficiencies, 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 VII

Performance of hydraulic turbines : Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

UNIT VIII

Centrifugal pumps : Classification, working, work done – barometric head- losses and efficiencies specific speed- performance characteristic curves, NPSH.

Reciprocating pumps : Working, Discharge, slip, indicator diagrams.

TEXT BOOKS :

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH.
2. Fluid Mechanics and Hydraulic Machines by Rajput.

REFERENCES :

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International.
3. Hydraulic Machines by Banga & Sharma, Khanna Publishers.

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(54017) MACHINE DRAWING

Machine Drawing Conventions : Need for drawing conventions – introduction to IS 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 & their liberal usage

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

I. **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.

II. **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 BOOKS :

1. Machine Drawing – Ajeet Singh, TMH Publications
2. Machine Drawing –K.L.Narayana, P.Kannaiah & K. Venkata Reddy / New Age/ Publishers
3. Machine Drawing – N.D. Bhatt.

REFERENCES :

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

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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- III 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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(54630) PRODUCTION TECHNOLOGY LAB

Minimum of 12 Exercises need to be performed

I. METAL CASTING LAB :

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

II WELDING LAB :

1. ARC Welding Lap & Butt Joint - 2 Exercises
2. Spot Welding - 1 Exercise
3. TIG Welding - 1 Exercise
4. Plasma welding and Brazing - 2 Exercises (Water Plasma Device)

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 and other operations

IV PROCESSING OF PLASTICS

1. Injection Moulding
2. Blow Moulding

REFERENCE BOOK:

1. Dictionary of Mechanical Engineering – G.H.F. Nayler, Jaico Publishing House.

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(54631) MECHANICS OF FLUIDS AND HYDRAULIC MACHINES 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. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Multi Stage Centrifugal Pump.
7. Performance Test on Reciprocating Pump.
8. Calibration of Venturimeter.
9. Calibration of Orifice meter.
10. Determination of friction factor for a given pipe line.
11. Determination of loss of head due to sudden contraction in a pipeline.
12. Verification of Bernoulli's Theorems

Note : Any 10 of the above 12 experiments are to be conducted.

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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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(55065) METROLOGY AND QUALITY CONTROL

UNIT – I

Systems of limits and fits: Introduction, normal size, tolerance limits, deviations, allowance, fits and their types – unilateral and bilateral tolerance system, hole and shaft basis systems – interchangeability and selective assembly. Indian standard Institution system – British standard system, International Standard system for plain and screwed work. Linear measurement Length standard, line and end standard, slip gauges – calibration of the slip gauges, Dial indicator, micrometers.

UNIT – II

Measurement Of Angles And Tapers: Different methods – Bevel protractor – angle slip gauges – spirit levels – sine bar – Sine plate, rollers and spheres used to determine the tapers.

Limit Gauges : Taylors principle – Design of go and No go gauges, plug ring, snap, gap, taper, profile and position gauges.

Optical Measuring Instruments: Tool maker's microscope and its uses – collimators, optical projector – optical flats and their uses, interferometer.

UNIT – III

Flat Surface Measurement: Measurement of flat surfaces – instruments used – straight edges – surface plates – optical flat and auto collimator.

Surface Roughness Measurement: Differences between surface roughness and surface waviness – Numerical assessment of surface finish – CLA, R, R.M.S Values – R_z values, R_z value, Methods of measurement of surface finish – profilograph, Talysurf

UNIT – IV

Measurement Through Comparators: Comparators – Mechanical, Electrical and Electronic Comparators, pneumatic comparators and their uses in mass production.

Screw Thread Measurement: Element of measurement – errors in screw threads – measurement of effective diameter, angle of thread and thread pitch, profile thread gauges.

UNIT -V

Machine Tool Alignment Tests: Requirements of Machine Tool Alignment Tests, Alignment tests on lathe, milling, drilling machine tools.. Preparation of acceptance charts.

UNIT- VI

Gear Measurement: Gear measuring instruments, Gear tooth profile measurement. Measurement of diameter, pitch pressure angle and tooth thickness.

UNIT – VII

Quality control: Concept of Quality, values of quality, Statistical Quality Control – Mean and Standard Deviation. Process Capability. Capability. Control Charts for variables and Attributes X-, R- charts.

UNIT – VIII

Acceptance Sampling Plan. Single, Double and Sequential Sampling, AQL, LTPD concept of AOQL and Rectification Plans.

TEXT BOOKS:

1. Engineering Metrology / I C Gupta./ Danpath Rai
2. Engineering Metrology / R.K. Jain / Khanna Publishers

REFERENCE BOOKS:

1. BIS standards on Limits & Fits, Surface Finish, Machine Tool Alignment etc.
2. Fundamentals of Dimensional Metrology 4e / Connie Dotson / Thomson

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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.Beven, Pearson Education
2. Theory of Machines by SS Ratan, Mc Graw Hill

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 and Mechanisms by Uicker, Pennock and Shigley, Oxford

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(55018) MACHINE TOOLS

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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(55019) DESIGN OF MACHINE MEMBERS - I

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.

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

BOLTED JOINTS: Design of bolts with pre-stresses – Design of joints under eccentric loading – bolt of uniform strength, Cylinder cover joints.

UNIT – V

AXIALLY LOADED JOINTS: 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.

UNIT – VI

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 – VII

SHAFT COUPLING : Rigid couplings – Muff, Split muff and Flange couplings. Flexible couplings – Pin – Bush coupling.

UNIT – VIII

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.

TEXT BOOKS :

1. Mechanical Engineering Design by Bahl and Goel, Standard Publications
2. Machine Design by R.L.Norton, Mc Graw Hill

REFERENCES :

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. MP - I Sem

	L	T/P/D	C
	3	1/-/-	3

(55066) METAL FORMING

UNIT-I

Plasticity – True stress –strain diagrams in simple tension – deviation from engineering stress – strain curves. Three dimensional stress systems, strain tensor and yield criteria of metals.

UNIT-II

Fundamentals of metal forming – classification of forming processes – cold working – recovery – recrystalization and grain growth, hot working strain rate effects – work of plastic deformation

UNIT-III

Flow stress curves- Super plasticity in materials – hot working and cold working operations- relative merits and applications.

UNIT-IV

Sheet metal working: Standard die sets, simple, compound, combination progressive transfer dies- process parameters and estimation of loads in shearing, bending, deep drawing, shear spinning operations. Mechanical and hydraulic presses, relative merits and applications- constructional features and operations.

UNIT-V

Forging: Open die and Closed die forging, Machine forging, upset forging etc, forging loads, forging die design. Estimation of forging loads for rectangular cylindrical slugs. Forge ability tests. Defects in forging, forging equipment- constructional features and operations- problems involving in flow stress.

UNIT-VI

Rolling: Principles of rolling, processes parameters, estimation of rolling loads by consideration of stresses, [principles of roll pass design for various product shapes. Principles of ring rolling. Processing maps and their applications in metal working operation. Rolling mills- their constructional features and operations, problems in rolling, rolling load and torque.

UNIT-VII

Extrusion: Classification of extrusion processes, Extrusion equipment. Hot Extrusion. Deformation and defects in Extrusion. Analysis of the Extrusion processes, cold Extrusion. Extrusion of tubing and production seamless pipe and tubing. problems involving in flow stress.

UNIT-VIII

Drawing of rods, wires and tubes: Road and wire drawing, tube drawing processes, residual stress in rod , wire and tubes, problems in flow stress.

TEXT BOOK:

1. Mechanical Metallurgy – G.H.Dieter – McGrawhill

REFERENCE BOOKS:

1. "An introduction to the Principles of Metal Working" by Geofrry W. Rowe.
2. "Sheet working of metal" by Eary and Reads.
3. "Manufacturing sciences" by Amitabh Ghosh and Mallik
4. "Manufacturing Technology " P.N Rao
5. Production Technology by PC Sharma- S Chand

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III Year B.Tech. MP - I Sem

	L	T/P/D	C
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(55627) MACHINE TOOLS AND METROLOGY LAB

1. Introduction of general purpose machines – Lathe, Drilling machine, Milling machine, Shaper, Planning machine, slotting machine, Cyl. Grinder, surface grinder. And tool and cutter grinder.
2. Step turning and taper turning on lathe machine
3. Thread cutting and knurling on – lathe machine
4. Drilling and Tapping
5. Shaping, Planning and Slotting
6. Milling
7. Measurement of length, height diameters by vernier calipers, micrometers etc.
8. Measurement of bores by internal micrometers and dial bore indicators.
9. Use of gear teeth, vernier calipers and checking the chordal addendum and height of spur gear.
10. Machine tool alignment of test on the lathe.
11. Machine tool alignment test on milling machine.
12. Tool makers microscope and its application
13. Angle and taper measurement by Bevel protractor, Sine bars, etc.
14. Use of spirit level in finding the flatness of surface plate.
15. Thread measurement by tool makers Microscope / two wire, there wire method.
16. Surface roughness measurement by Taly Surf.

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

(55628) METAL FORMING LAB

1. Evaluation of True – Stress and Tue – Strain characteristics of Ferrous and Non-Ferrous test specimens in a tensile elongation.
2. Study of normal anisotropy characteristics of materials.
3. Evaluation of formability of sheet specimens in Ericson Cupping Test.
4. Study of simple dies and performing blanking & piercing operations using mechanical press
5. Measurement of forces in blanking operation using mechanical press and comparing with the theoretical loads.
6. Study of compound die and production of typical component using mechanical press.
7. Study of progressive die and production of typical component using the mechanical press.
8. Study of combination die and production of typical component using the mechanical press.
9. Computer simulation of typical forming operation using forming softwares.
10. Computer simulation of typical forging operation using 3D forge softwares.

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III Year B.Tech. MP -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: $\overline{X}$ 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. MP -II Sem

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(56017) FINITE ELEMENT METHODS

UNIT -1:

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 -2:

One Dimensional problems: Stiffness equations for a axial bar element in local co-ordinates using Potential Energy approach and Virtual energy principle - 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 - properties of stiffness matrix.

UNIT -3:

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 -4:

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

UNIT -5:

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

Unit – 6:

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

UNIT -7:

Scalar field problems: 1-D Heat conduction – 1D fin elements – 2D

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

UNIT -8:

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. MP -II Sem	L	T/P/D	C
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(56068) TOOLING FOR PRODUCTION

UNIT – I

Tooling materials and heat treatment: Properties of materials, ferrous, nonferrous, non metallic, tooling materials, heat treating.

UNIT - II

Design of single point cutting tools: Single point, cutting tools-various systems of specifications, geometry and their inter relation, theories of formation of chip and their effect.

UNIT – III

Design of multipoint cutting tools: Drill geometry, Design of Drills, Rake & Relief angles of twist drill, speed, feed and depth of cut, machining time, forces, Milling cutters, cutting speeds and feed-machining times-design-form cutters.

UNIT-IV

Design of jigs and fixtures: Basic principles of location and clamping, locating, methods and devices, jigs, definitions, types, general consideration in the design of jigs, drills bushing, methods of construction, fixtures-vice fixtures milling, boring, and lathe grinding fixtures.

UNIT-V

Design of sheet metal blanking and piercing: Fundamentals of die cutting operating, power press types, General press information, Material handling equipment, cutting action in punch and die operation. Die clearance, and types of Die construction. Die design fundamentals-blanking and piercing die construction, pilots, striper and pressure pads presswork material, strip layout, short run tooling for piercing.

UNIT-VI

Design of sheet metal bending, forming and drawings die: Bending dies, drawing dies, forming dies, drawing operations, variables that effect metal flow during drawing. Determination of blank size, drawing force, single and double action draw dies.

UNIT-VII

Tool life and tool wear: theories of tool wear-adhesion, abrasive and diffusion wear mechanisms forms of wear, tool life criteria and Mach inability index.

UNIT-VIII

Using plastics as tooling materials: introduction, plastics commonly used as tooling material application of epoxy plastic tools construction methods of plastic tooling metal forming operations with Urethane dies. Calculating forces for urethane pressure pads.

TEXT BOOKS:

1. Donaldson, Leain and Goold, Tool Design, Tata Mc Graw Hill/
2. Tool Design – Mehta

REFERENCES:

1. Surendra Kenav and Umesh Chandra, Production Engineering Design (Tool Design) Satyaprakashan, New Delhi 1994.
2. Amitabha Battacharya and Inyong Ham, Design of cutting Tools. Use of Metal Cutting Theory. ASTME publication Michigan USA., 1969.
3. A Bhattacharya, Principles of Metal cutting, New Central Book Agency, Calcutta.

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III Year B.Tech. MP -II Sem	L	T/P/D	C
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(56019) DESIGN OF MACHINE MEMBERS – II

UNIT – I

Sliding contact BEARINGS: Types of Journal bearings – basic modes of Lubrication – Bearing construction - bearing design - bearing materials – Selection of lubricants.

UNIT – II

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.

UNIT – III

Design of IC ENGINE PARTS: Connecting Rod : Thrust in connecting rod – stress due to whipping action on connecting rod ends – Cranks and Crank shafts, strength and proportions of over hung and center cranks – Crank pins, Crank shafts. Pistons, Forces acting on piston – Construction Design and proportions of piston., Cylinder, Cylinder liners,

UNIT – IV

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 – V

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

UNIT – VI

HELICAL AND BEVEL GEAR DRIVES: Helical and Bevel gears – Load concentration factor – Dynamic load factor. Surface compressive strength – Bending strength – Design analysis of Helical and Bevel gears – Estimation of centre distance, module and face width, check

for plastic deformation. Check for dynamic and wear considerations.

UNIT – VII

DESIGN OF POWER SCREWS: Design of screw, Square ACME , Buttress screws, design of nut, compound screw, differential screw, ball screw-possible failures.

UNIT – VIII

DESIGN OF WORM GEARS: Worm gears – Properties of worm gears – Selection of materials – Strength and wear rating of worm gears – Force analysis – Friction in worm gears- thermal considerations.

TEXT BOOK:

1.   Design of Machine Elements Kulakarni, Mc Graw Hill
2.   Machine Design, by T.V.Sundararajan Murthy and N.Shanmugam – Anuradha Publications.
3.   Design Data Books - P.S.G. College of Technology - Mahadevan

REFERENCES:

1.   Machine Design by V.Bandari, Tmh Publishers
2.   Machine Design / R.N. Norton
3.   Mech. Engg. Design / JE Shigley
4.   Design of machine elements by Pandya and Sha

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

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(56020) HEAT TRANSFER

UNIT – I : Introduction: Modes and mechanisms of heat transfer – Basic laws of heat transfer –General discussion about applications of heat transfer.

Conduction HeatTransfer : Fourier rate equation – General heat conduction equation in Cartesian, Cylindrical and Spherical coordinates.

UNIT – II : Simplification and forms of the field equation – steady, unsteady and periodic heat transfer – Initial and boundary conditions.

One Dimensional Steady State Conduction Heat Transfer: Homogeneous slabs, hollow cylinders and spheres – overall heat transfer coefficient – electrical analogy – Critical radius of insulation.

One Dimensional Steady State Conduction Heat Transfer: Variable Thermal conductivity – systems with heat sources or Heat generation. Extended surface (fins) Heat Transfer – Long Fin, Fin with insulated tip and Short Fin, Application to error measurement of Temperature.

UNIT III : One Dimensional Transient Conduction Heat Transfer: Systems with negligible internal resistance – Significance of Biot and Fourier Numbers - Chart solutions of transient conduction systems- Concept of Functional Body

UNIT – IV : Convective Heat Transfer: Classification of systems based on causation of flow, condition of flow, configuration of flow and medium of flow – Dimensional analysis as a tool for experimental investigation – Buckingham Pi Theorem and method, application for developing semi – empirical non- dimensional correlation for convection heat transfer – Significance of non-dimensional numbers – Concepts of Continuity, Momentum and Energy Equations.

Forced convection: External Flows: Concepts about hydrodynamic and thermal boundary layer and use of empirical correlations for convective heat transfer -Flat plates and Cylinders.

Internal Flows : Concepts about Hydrodynamic and Thermal Entry

Lengths – Division of internal flow based on this –Use of empirical relations for Horizontal Pipe Flow and annulus flow.

UNIT – V : Free Convection: Development of Hydrodynamic and thermal boundary layer along a vertical plate – Use of empirical relations for Vertical plates and pipes.

UNIT VI : Heat Transfer with Phase Change: Boiling: – Pool boiling – Regimes Calculations on Nucleate boiling, Critical Heat flux and Film boiling.

Condensation: Film wise and drop wise condensation –Nusselt's Theory of Condensation on a vertical plate - Film condensation on vertical and horizontal cylinders using empirical correlations.

UNIT VII : 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.

UNIT VIII : Radiation Heat Transfer: Emission characteristics and laws of black-body radiation – Irradiation – total and monochromatic quantities – laws of Planck, Wien, Kirchoff, Lambert, Stefan and Boltzmann– heat exchange between two black bodies – concepts of shape factor – Emissivity – heat exchange between grey bodies – radiation shields – electrical analogy for radiation networks.

TEXT BOOKS:
1. Heat Transfer / HOLMAN/TMH
2. Heat Transfer – P.K.Nag/ TMH

REFERENCE BOOKS:
1. Fundamentals of Engg. Heat and Mass Transfer / R.C.SACHDEVA / New Age International
2. Heat Transfer – Ghoshdastidar – Oxford University Press – II Edition
3. Heat and Mass Transfer –Cengel- McGraw Hill.
4. Heat and Mass Transfer – R.K. Rajput – S.Chand & Company Ltd.
5. Essential Heat Transfer - Christopher A Long / Pearson Education
6. Heat and Mass Transfer – D.S.Kumar / S.K.Kataria & Sons
7. Heat and Mass Transfer-Kondandaraman
8. Fundamentals of Heat Transfer & Mass Transfer- Incropera & Dewitt / John Wiley Pub.

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III Year B.Tech. MP -II Sem

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	3	1/-/-	3

(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. MP -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 1992

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III Year B.Tech. MP -II Sem	L	T/P/D	C
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(56069) COMPOSITE MATERIALS
(OPEN ELECTIVE)

Unit-I

Introduction to Composite Materials: Introduction ,Classification: Polymer Matrix Composites. Metal Matrix Composites, Ceramic Matrix Composites, Carbon–Carbon Composites, Fiber. Reinforced Composites and nature-made composites, and applications

Unit-II

Reinforcements: Fibres-Glass, Silica, Kevlar,carbon, boron, siliconcarbide,and born carbide. fibres. Particulate composites, Polymer composites, Thermoplastics, Thermostats, Metal matrix and ceramic composites.

Unit-III

Manufacturing methods: Autoclave, tape production, moulding methods, filament winding, man lay up, pultrusion, RTM.

Unit-IV

Macromechanical Analysis of a Lamina: Introduction ,Definitions: Stress, Strain ,Elastic Moduli,Strain Energy. Hooke's Law for Different Types of Materials, Hooke's Law for a Two Dimensional Unidirectional Lamina, Plane Stress Assumption, Reduction of Hooke's Law in Three Dimensions to Two Dimensions, Relationship of Compliance and Stiffness Matrix to Engineering Elastic Constants of a Lamina.

Unit-V

Hooke's Law for a Two-Dimensional Angle Lamina, Engineering Constants of an Angle Lamina. Invariant Form of Stiffness and Compliance Matrices for an Angle Lamina Strength Failure. Envelopes, Maximum Strain Failure Theory ,Tsai–Hill Failure Theory, Tsai–Wu Failure Theory Comparison of Experimental Results with Failure Theories. Hygrothermal Stresses and Strains in a Lamina: Hygrothermal Stress–Strain Relationships for a Unidirectional

Lamina, Hygrothermal Stress–Strain Relationships for an Angle Lamina

Unit-VI

Micromechanical Analysis of a Lamina: Introduction, Volume and Mass Fractions, Density, and Void Content, Evaluation of the Four Elastic Moduli, Strength of Materials Approach, Semi Empirical Models ,Elasticity Approach, Elastic Moduli of Lamina with Transversely Isotropic Fibers, Ultimate Strengths of a Unidirectional Lamina, Coefficients of Thermal Expansion, Coefficients of Moisture Expansion

UNIT-VII

Macro-mechanical Analysis of Laminates: Introduction, Laminate Code, Stress–Strain Relations for a Laminate, In-Plane and Flexural Modulus of a Laminate , Hygrothermal Effects in a Laminate, Warpage of Laminates

UNIT-VIII

Failure Analysis and Design of Laminates: Introduction , Special Cases of Laminates, Failure Criterion for a Laminate, Design of a Laminated Composite, Other Mechanical Design Issues

TEXT BOOKS:

1. Engineering Mechanics of Composite Materials by Isaac and M Daniel, Oxford University Press, 1994.
2. R. M. Jones, Mechanics of Composite Materials, Mc Graw Hill Company, New York, 1975.

REFERENCES:

1. Ever J. Barbero, Finite Element Analysis of Composite Materials, CRC Press, 2007.
2. L. R. Calcote, Analysis of Laminated Composite Structures, Van Nostrand Rainfold, New York, 1969.
3. Madhujit Mukhopadhyay, Mechanics of Composite Materials and Structures, University Press, 2009.
4. Krishan K. Chawla, Composite Materials Science and Engineering, Springer, 2009, Ed.
5. B. D. Agarwal and L. J. Broutman, Analysis and performance of fibre Composites, Wiley- Interscience, New York, 1980.
6. Mechanics of Composite Materials, Second Edition (Mechanical Engineering), By Autar K. Kaw, Publisher: CRC

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

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(56632) THERMAL AND HEAT TRANSFER LAB
(Performance in Any 12)

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 and natural convection apparatus.
8. Parallel and counter flow heat exchanger.
9. Emissive apparatus.
10. Stefan Boltzman Apparatus.
11. I.C. Engines Valve / Port Timing Diagrams
12. I.C. Engines Performance Test(4 -Stroke Diesel Engines)
13. I.C. Engines Performance Test on 2-Stroke Petrol
14. Evaluation of Engine friction by conducting Morse test on 4-Stroke Multi cylinder Petrol Engine
15. Evaluate of engine friction by conducting motoring /retardation test on 4 stroke diesel Engine.
16. Heat balance on IC Engines.
17. Determination of A/F Ratio and Volumetric Efficiency on IC Engines.
18. Determine of Economical speed test for fixed load on 4-stroke Engine.
19. Determine optimum cooling water temperature on IC Engine

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

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(56633) 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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(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 infinite 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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(57109) MECHATRONICS AND ITS APPLICATIONS

UNIT – I

Introduction : Definition – Trends - Control Methods: Standalone , PC Based (Real Time Operating Systems, Graphical User Interface , Simulation) - Applications: SPM, Robot, CNC, FMS, CIM.

UNIT – II

Signal Conditioning : Introduction – Hardware - Digital I/O , Analog input – ADC , resolution , sped channels Filtering Noise using passive components – Resistors, capacitors - Amplifying signals using OP amps – Software - Digital Signal Processing – Low pass , high pass , notch filtering

UNIT – III

Precision Mechanical Systems : Pneumatic Actuation Systems - Electro-pneumatic Actuation Systems - Hydraulic Actuation Systems - Electro-hydraulic Actuation Systems - Timing Belts – Ball Screw and Nut - Linear Motion Guides - Linear Bearings - Harmonic Transmission - Bearings- Motor / Drive Selection.

UNIT – IV

Electronic Interface Subsystems : TTL, CMOS interfacing - Sensor interfacing - Actuator interfacing – solenoids , motors Isoation schemes- opto coupling, buffer IC's - Protection schemes – circuit breakers , over current sensing , resetable fuses , thermal dissipation - Power Supply - Bipolar transistors / mosfets

UNIT – V

Electromechanical Drives : Relays and Solenoids - Stepper Motors - DC brushed motors - DC brushless motors - DC servo motors - 4-quadrant servo drives , PWM's - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.

UNIT – VI

Microcontrollers Overview : 8051 Microcontroller , micro processor

structure – Digital Interfacing - Analog Interfacing - Digital to Analog Convertors - Analog to Digital Convertors - Applications. Programming –Assembly , C (LED Blinking , Voltage measurement using ADC).

UNIT – VII

Programmable Logic Controllers : Basic Structure - Programming : Ladder diagram - Timers, Internal Relays and Counters - Shift Registers - Master and Jump Controls - Data Handling - Analog input / output - PLC Selection - Application.

Unit – VIII

Programmable Motion Controllers : Introduction - System Transfer Function – Laplace transform and its application in analysing differential equation of a control system -,Feedback Devices : Position , Velocity Sensors - Optical Incremental encoders - Proximity Sensors : Inductive , Capacitive , Infrared - Continuous and discrete processes – Control System Performance & tuning - Digital Controllers - P , PI , PID Control - Control modes – Position , Velocity and Torque - Velocity Profiles – Trapezoidal - S. Curve - Electronic Gearing - Controlled Velocity Profile - Multi axis Interpolation , PTP , Linear , Circular - Core functionalities – Home , Record position , Go to Position - Applications : SPM, Robotics.

TEXT BOOKS :

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton, Pearson Education Press, 3rd edition, 2005.
2. Mechatronics/M.D.Singh/J.G.Joshi/PHI.

REFERENCES :

1. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.
2. Mechatronics – N. Shanmugam / Anuradha Agencies Publisers.
3. Mechatronics System Design / Devdas shetty/Richard/Thomson.

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(57024) 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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(57025) INSTRUMENTATION 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.

Pre-Requisite: Objective: This subject provide in site into the different mechanical measurement systems and working and testing procedures

TEXT BOOKS :

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

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

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. Mechanical Measurements / Sirohi and Radhakrishna / New Age

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

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(57026) ROBOTICS
(ELECTIVE – I)

UNIT – I

Introduction: Automation and Robotics,– An over view of Robotics – classification by coordinate system and control systems - **Components of the Industrial Robotics:** Degrees of freedom – End effectors: Mechanical gripper – Magnetic – Vacuum cup and other types of grippers – General consideration on gripper selection and design.

UNIT – II

Motion Analysis: Basic rotation matrices – Composite rotation matrices – Euler Angles – Equivalent Angle and Axis – Homogeneous transformation – Problems.

UNIT – III

Manipulator Kinematics: D-H notations - Joint coordinates and world coordinates - Forward and inverse kinematics – problems.

UNIT – IV

Differential Kinematics : Differential Kinematics of planar and spherical manipulators - Jacobians – problems.

UNIT – IV

Robot Dynamics: Lagrange – Euler formulations – Newton-Euler formulations – Problems on planar two link manipulators.

UNIT VI

Trajectory planning: Joint space scheme – cubic polynomial fit – Avoidance of obstacles – **Types of motion:** Slew motion - joint interpolated motion – straight line motion – problems.

UNIT VII

Robot actuators and Feed back components: Actuators: Pneumatic and Hydraulic actuators. **Electric Actuators:** DC servo motors - stepper motors. **Feedback components:** position sensors – potentiometers, resolvers and encoders – Velocity sensors – Tactile sensors.

UNIT VIII

Robot Application in Manufacturing: Material handling - Assembly and Inspection.

TEXT BOOKS :

1. Industrial Robotics / Groover M P /Pearson Edu.
2. Introduction to Robotic Mechanics and Control by JJ Craig, Pearson, 3rd edition.

REFERENCES :

1. Robotics / Fu K S/ McGraw Hill.
2. Robotic Engineering / Richard D. Klafter, Prentice Hall
3. Robot Analysis and Intelligence / Asada and Slotine / Wiley Inter-Science.
4. Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Pte Ltd.
5. Robotics and Control / Mittal R K & Nagrath I J / TMH

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IV Year B.Tech. MP -I Sem	L	T/P/D	C
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(57110) COMPUTER INTEGRATED MANUFACTURING
(ELECTIVE – I)

UNIT – I : CIM system, Basic concepts and evaluation, manufacturing automation protocol(MAP),Technical office protocol, Island of automation, challenges and trends.

UNIT – II : Basic layouts, product and process layout, Block and relation ship diagram, line balancing, opitz and micas coding system.

UNIT – III : Flexible manufacturing system; major elements of FMS and its problems, ERP, cell technology and FMS,Automated storage and retrieval system.

UNIT-IV : Computer aided process planning, planning for production, scheduling, quality control, computer aided process planning, variant and generative process planning

UNIT – V : Lean production, Historical development, JIT Kenbaan Concepts of supply chain, characteristics and benefits.

UNIT-VI : Cim data model, open manufacturing systems and its feature, networks ,protocols and standards,databasing Cim

UNIT – VII : Programmable logic control operation counter, timer applications, case studies.

UNIT-VIII : Concurrent engineering need & it's importance, evaluation risks of concurrent engineering integrated product development, product life cycle management

TEXT BOOKS:

1. Integrated manufacturing A.Alavudeen ,N.Venkateshwaran

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. MP -I Sem	L	T/P/D	C
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(57031) CNC TECHNOLOGIES
(ELECTIVE – I)

UNIT I:

Features of NC Machines Fundamentals of numerical control, advantage of NC systems, classification of NC systems, point to point, NC and CNC, incremental and absolute, open and closed loop systems, Features of N/C Machine Tools, design consideration of NC machine tool, methods of improving machine accuracy.

UNIT II:

CNC Machines Elements: Machine Structure- Guide ways - feed drives-spindles - spindle bearings - measuring systems-Tool monitoring systems.

UNIT III:

Tooling for CNC Machines: Interchangeable tooling system, preset and qualified tools, coolant fed tooling system, modular fixturing, quick change tooling system, automatic head changers.

UNIT IV:

NC Part Programming: Manual programming-Basic concepts, Point to Point contour programming, canned cycles, parametric programming.

UNIT V:

Compute-Aided Programming: General information, APT programming, Examples Apt programming problems (2D machining only). NC programming on CAD/CAM systems, the design and implementation of post processors .Introduction to CAD/CAM software, Automatic Tool Path generation.

UNIT VI:

DNC Systems and Adaptive Control: Introduction, type of DNC systems, advantages and disadvantages of DNC, adaptive control with optimization, Adaptive control with constraints, Adaptive control of machining processes like turning, grinding.

UNIT VII:

Micro Controllers: Introduction, Hardware components, I/O pins, ports, external memory, counters, timers and serial data I/O interrupts. Selection of Micro Controllers, Embedded Controllers, Applications and Programming of Micro Controllers.

UNIT VIII:

Programming Logic Controllers (PLC's): Introduction, Hardware components of PLC, System, basic structure, principle of operations, Programming mnemonics timers, Internal relays and counters, Applications of PLC's in CNC Machines.

TEXT BOOKS:

1. Computer Control of Manufacturing Systems / Yoram Koren / Mc Graw Hill Int. 1983.
2. CAD/CAM – Michel P.Groover, TMH

REFERENCE BOOKS:

1. Machining Tools Hand Book Vol 3, (Automation & Control)/ Manfred Weck / John Wiley and Sons, 1984.
2. Mechatronics – HMT, TMH.

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IV Year B.Tech. MP -I Sem	L	T/P/D	C
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(57111) MACHINE TOOL DESIGN
(ELECTIVE-I)

UNIT – I

Introduction to Machine Tool Drives and Mechanisms : General Principles of Machine Tool Design: Working and Auxiliary Motions in Machine Tools. Parameters Defining Working Motions of a Machine Tool. Machine Tool Drives. Hydraulic Transmission and its Elements. Mechanical Transmission and its Elements. Techno-Economical Prerequisites for Undertaking the Design of New Machine Tool. General Requirements of Machine Tool Design. Engineering Design Process Applied to Machine Tools. Layout of Machine Tool.

UNIT – II

Regulation of Speed and Feed Rates: Aim of speed and feed rate regulation. Stepped regulation of Speed: Design of speed box. – Design of Feed Box – Machine Tool Drives using Multiple Speed Motions – Special Cases of Gear Box Design – General Recommendations for Developing the Gearing Diagram – Stepless Regulation of Speed and Feed Rates.

UNIT-III

Design of Machine Tool Structures: Function of Machine Tool Structures and their requirements – Design criteria for machine tool structures – Materials of machines Tools structures – Static and Dynamic stiffness – Profiles of machine tool structure – Basic Design procedures of machine tool structures – Design of Beds – Design of Columns – Design of Housings – Design of Bases and Tables – Design of Cross Rails, Arms, Saddles and carriages – Design of Rams – Model Technique in design in machine tool structures.

UNIT-IV

Design of Guideways and Power Screws: Functions and types of Guideways – Design of Slideways – Design criteria and calculations for slideways – Guideways operative under liquid friction conditions – Design of Aerostatic slideways – Design of Anti-Friction Guideways –

Combination Guideways – Protecting devices for slideways – Design of power screws.

UNIT-V

Design of Spindles and Spindle Supports : Functions of Spindle Unit and requirements – Materials of Spindles – Effect of machine tool compliance on machining accuracy - Design calculations of spindles – Anti friction bearing – Sliding bearings.

UNIT-VI

Dynamics of Machine tools: Machine tool elastic system-cutting process closed-loop system – general procedure for assessing dynamic stability of EES –cutting process closed-loop system – Dynamic characteristics of elements and systems - Dynamic characteristics of the equivalent elastic systems - Dynamic characteristics of the cutting process – Stability analysis – Forced vibrations of machine tools.

UNIT – VII

Control systems in machine tools : Functions, requirements and classification – Control systems for changing speeds and Feeds – Control systems for executing forming and Auxiliary motions – Manual control system – Automatic control systems – Adaptive control system.

UNIT-VIII

Numerical Control of Machine Tools : Fundamental concepts, classification and structure of numerical control systems – Manual part programming – Computer Added part programming. Various elements of a CNC machines – Drives used and their selection.

TEXT BOOKS :

1. Mehta N.K. Machine Tool Design, TMII.
2. Sen G.S. & Bhattacharya, Principles of Machine Tools, New Central Book Agency, Calcutta – 1986.

REFERENCES:

1. Acherkan N, Machine Tool Design, Vol. 2 & 3 Mir publishers, Moscow, 1968.
2. Basu S.K., Design of Machine Tools, Allied Publisher, 1989
3. Koenigs Berger & Tlusty, Design of Machine Tools, Pergaman Press 1970
4. Russe W. Henke, Introductionto Fluid Power Circuits and systems, Addison Wesley, 1970

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(57030) UNCONVENTIONAL MACHINING PROCESSES
(ELECTIVE – II)

UNIT – I

Introduction: Need for non-traditional machining methods-Classification of modern machining processes – considerations in process selection. Materials. Applications.

UNIT II

Ultrasonic machining – Elements of the process, mechanics of metal removal process parameters, economic considerations, applications and limitations, recent development.

UNIT – III

Abrasive jet machining, Water jet machining and abrasive water jet machine : Basic principles, equipments, process variables, mechanics of metal removal, MRR, application and limitations.

UNIT - IV

ELECTRO – CHEMICAL PROCESSES : Fundamentals of electro chemical machining, electrochemical grinding, electro chemical honing and deburring process, metal removal rate in ECM, Tool design, Surface finish and accuracy economic aspects of ECM – Simple problems for estimation of metal removal rate. Fundamentals of chemical, machining, advantages and applications.

UNIT - V

Thermal Metal Removal Processes : General Principle and applications of Electric Discharge

Machining, Electric Discharge Grinding and electric discharge wire cutting processes – Power circuits for EDM, Mechanics of metal removal in EDM, Process parameters, selection of tool electrode and dielectric fluids, methods surface finish and machining accuracy, characteristics of spark eroded surface and machine tool selection. Wire EDM, principle, applications.

UNIT – VI

Generation and control of electron beam for machining, theory of electron beam machining, comparison of thermal and non-thermal processes –General Principle and application of laser beam machining – thermal features, cutting speed and accuracy of cut.

UNIT-VII

Application of plasma for machining, metal removal mechanism, process parameters, accuracy and surface finish and other applications of plasma in manufacturing industries. Chemical machining-principle-maskants –etchants- applications.

UNIT – VIII

Magnetic abrasive finishing, Abrasive flow finishing, Electrostream drilling, Shaped tube electrolytic machining.

TEXT BOOK :

1. Advanced machining processes/ VK Jain/ Allied publishers.

2. Manufacturing Engineering and Technology, Serope Kalpakjian and Steven R. Schmid, Ed. 4, Pearson Publications, 2001

REFERENCES :

1. Modern Machining Process / Pandey P.C. and Shah H.S./ TMH.

2. New Technology / Bhattacharya A/ The Institution of Engineers, India 1984.

3. Unconventional Machining Processes/ C. Elanchezhian, B. Vijaya Ramnath and M Vijayan/ Anuradha Publications/ 2005

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(57112) ADVANCED MANUFACTURING SYSTEMS
(ELECTIVE – II)

Unit-I

Adaptive Process Control: Basic concepts, sensing techniques and devices, tool condition, monitoring, workpiece monitoring, machine performance monitoring, multiplexers and demultiplexers

Unit-II

Computer-Aided Process Planning: Introduction, Basic concepts and applications, Manual, workbook, Variant, Generative and Semi-Generative approaches

Unit-III

Rapid Prototyping (RP) Systems: Working principles and applications of RP techniques- Stereolithography, Fused Deposition Modelling (FDM), Three-Dimensional printing (3DP), Solid ground curing, Multi Jet Modelling (MJM), Ballastic Particle Manufacturing (BPM), Laminated Object Manufacturing (LOM) system

Unit-IV

Cellular Manufacturing Systems: Evolution of Cellular Manufacturing systems, Part families, Parts Classification and coding, Production flow analysis, Quantitative analysis in cellular manufacturing

Unit-V

Product Design and CAD/CAM in the Manufacturing System: Product design and CAD, CAD system hardware, CAM, CAD/CAM and CIM

Unit-VI

Quality Control in Manufacturing Systems: Quality in Design and Manufacturing, Traditional and Modern Quality Control, Process variability and process capability, Statistical process control, Six Sigma-DMAIC procedure, Taguchi method in Quality Engineering, ISO 9000

Unit-VII

Just-In-Time (JIT) and Lean Manufacturing: Lean Manufacturing and waste in manufacturing, JIT Manufacturing systems – Pull system of

Control setup time reduction for small batch sizes, other requirements

Unit-VIII

Flexible Manufacturing Systems: Introduction, Components, Applications and benefits, Planning and Implementation, Planning and Implementation issues, Quantitative analysis

TEXT BOOKS:

1. Manufacturing Systems/ George Chryssolouris/ 2e/ Springer
2. Automation, Production Systems and Computer Integrated Manufacturing/ MP Groover/ 2e/ PHI

REFERENCE BOOKS:

1. Computer Aided Manufacturing/ PN Rao, NK Tiwari and TK Kundra/ TMH/ 2009
2. Computer Aided Manufacturing/ Tien-Chon Chang/ Pearson/ 2009

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IV Year B.Tech. MP -I Sem	L	T/P/D	C
	3	1/-/-	3

(57032) AUTOMATION IN MANUFACTURING
(ELECTIVE – II)

UNIT – I

Introduction: Types and strategies of automation, pneumatic and hydraulic components circuits, Automation in machine tools. Mechanical feeding and too changing and machine tool control transfer the automaton.

UNIT – II

Automated flow lines : Methods or work part transport transfer Mechanical buffer storage control function, design and fabrication consideration.

UNIT – III

Analysis of Automated flow lines: General terminology and analysis of transfer lines without and with buffer storage, partial automation, implementation of automated flow lines.

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

Fundamentals of Industrial controls: Review of control theory, logic controls, sensors and actuators, Data communication and LAN in Manufacturing

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 3e./PE/PHI, 2009

REFERENCES :

1. Computer Aided Manufacturing, Tien-Chien Chang, Richard A. Wysk and Hsu-Pin Wang, Pearson, 2009

2. Automation by W. Buekinsham.

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IV Year B.Tech. MP -I Sem	L	T/P/D	C
	3	1/-/-	3

(57113) DESIGN FOR MANUFACTURING AND ASSEMBLY
(ELECTIVE - II)

UNIT I:

Introduction : Design philosophy – Steps in Design process – General Design rules for Manufacturability – Basic principles of designing for economical production – Creativity in design.

UNIT II:

Materials: Selection of Materials for design – Developments in Material Technology – Criteria for material selection – Material selection interrelationship with process selection – process selection charts.

UNIT III:

MACHINING PROCESS: Overview of various machining processes – general design rules for machining - Dimensional tolerance and surface roughness – Design for Machining ease – Redesigning of components for machining ease with suitable examples, General design recommendations for machined parts

UNIT IV:

METAL CASTING: Appraisal of various casting processes, Selection of casting process, General design considerations for casting – casting tolerances – Use of Solidification Simulation in casting design – Product design rules for sand casting.

UNIT V:

METAL JOINING: Appraisal of various welding processes, Factors in design of weldments – General design guidelines – pre and post treatment of welds – Effects of thermal stresses in weld joints – Design of brazed joints.

UNIT VI:

FORGING – Design factors for Forging – Closed die forging design – parting lines of dies – Drop forging die design – General design recommendations

EXTRUSION, SHEET METAL WORK & PLASTICS: Design guidelines for Extruded sections - Design principles for Punching, Blanking, Bending, Deep Drawing – Keeler Goodman Forming Limit Diagram – Component Design for Blanking.

UNIT VII:

DESIGN FOR ASSEMBLY : General design guidelines for Manual Assembly- Development of Systematic DFA Methodology- Assembly Efficiency- Classification System for Manual handling- Classification System for Manual Insertion and Fastening- Effect of part symmetry on handling time-.

UNIT VIII:

Design for Automatic Assembly: feeding difficulties, analysis of Assembly, General rules for product design for automation, product design for robot assembly

TEXT BOOKS:

1. Product design for Manufacture and Assembly/ Geoffrey Boothroyd/ Marcel Dekker Inc. NY, 1994.

REFERENCE BOOKS:

1. Product design and Manufacturing / A.K Chitale and R.C Gupta / Prentice – Hall of India, New Delhi, 2003.

2. Design and Manufacturing / Surender Kumar & Goutham Sutradhar / Oxford & IBH Publishing Co. Pvt .Ltd., New Delhi, 1998.

3. Product Design/ Kevin Otto and Kristin Wood/ Pearson Education

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

(57627) COMPUTER AIDED DESIGN AND MANUFACTURING LAB

1. **Drafting** : Development of part drawings for various components in the form of orthographic and isometric. Representation of Dimensioning and tolerances scanning 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. a) Determination of deflection and stresses in 2D and 3D trusses and beams.
   b) Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axisymmetric components.
   c) Determination of stresses in 3D and shell structures (at least one example in each case)
   d) Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam.
   e) Steady state heat transfer Analysis of plane and Axisymmetric components.

4. a) Development of process sheets for various components based on tooling Machines.
   b) Development of manufacturing and tool management systems.
   c) Study of various post processors used in NC Machines.
   d) Development of CNC part program for turnig components and milling components.
   e) Machining of simple components on NC lathe and Mill by transferring NC Code / from a CAM package. Through RS 232.
   f) Quality Control and inspection.

Any Six Software Packages from the following: Use of Auto CAD, Micro Station, CATIA, Pro-E, I-DEAS, ANSYS, NISA, CAEFEM, Gibbs CAM, Master CAM etc.

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

(57628) PRODUCTION DRAWING PRACTICE AND INSTRUMENTATION LAB

a) **Production Drawing Practice**

UNIT – I

Conventional representation of Materials – conventional representation of parts – screw joints, welded joints, springs, gears, electrical, hydraulic and pneumatic circuits – methods of indicating notes on drawings.

UNIT – II

Limits and Fits : Types of fits, exercises involving selection / interpretation of fits and estimation of limits from tables.

UNIT – III

Form and Positional Tolerances : Introduction and indication of the tolerances of from and position on drawings, deformation of runout and total runout and their indication.

UNIT – IV

Surface roughness and its indication : Definitions – finishes obtainable from various manufacturing processes, recommended surface roughness on mechanical components.

UNIT – V

Heat treatment and surface treatment symbols used on drawings.

UNIT – VI

Detailed and Part drawings: Drawing of parts from assembly drawings with indications of size, tolerances, roughness, form and position errors etc.

UNIT – VII

Part drawing using computer aided drafting by CAD software

TEXT BOOKS :

1. Production and Drawing – K.L. Narayana & P. Kannaiah/ New Age
2. Machine Drawing with Auto CAD- Pohit and Ghosh, PE

REFERENCE :

1. Geometric dimensioning and tolerancing- James D. Meadows/ B.S Publications

2. Engineering Metrology, R.K. Jain, Khanna Publications

(b) INSTRUMENTATION LAB

1. Calibration of Pressure Gauges

2. Calibration of transducer for temperature measurement.

3. Study and calibration of LVDT transducer for displacement measurement.

4. Calibration of strain gauge for temperature measurement.

5. Calibration of thermocouple for temperature measurement.

6. Calibration of capacitive transducer for angular displacement.

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 roto meter for flow measurement.

10. Study and use of a Seismic pickup for the measurement of vibration amplitude of an engine bed at various loads.

11. Study and calibration of Mcleod gauge for low pressure.

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IV Year B.Tech. MP -II Sem

	L	T/P/D	C
	3	1/-/-	3

(53015) PRODUCTION PLANNING AND CONTROL

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 method.

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 - follw up – definition – reasons for existence of functions – types of follor up, applications of computer in production planning control

TEX BOOKS:

1. Production Planning and Control – M.Mahajan- Dhanpati rai & Co

2. Production Planning and Control- Jain & Jain – Khanna publications

RERENCE BOOKS :

1. Production Planning and Control- Text & cases/ SK Mukhopadhyaya /PHI.

2. Production and operations Management – R.Panner Selvam – PHI

3. Management Sciences – A R Aryasri- 4e –TMH

4. Operations Management – SN Chary

5. Operations management – Joseph Monks.

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IV Year B.Tech. MP -II Sem	L	T/P/D	C
	3	1/-/-	3

(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 learning, Competitive, Boltzmann learning, Credit Asssignment Problem, Memory, Adaption, Statistical nature of the leaning 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, Computer experiment, feature detection

UNIT V

Back Propagation - back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniues, Virtues and limitations of back propagation learning, Acceleated 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 classificaion

UNIT VII

Neuro Dynamics – Dynamical systems, stability of equilibrium states, attractors, neuro dynamical models, manipulation of attractors as a recurrent network paradigm

UNIT VIII

Hopfield models – Hopfield models, computer experiment

TEXT BOOK:

1. Neural networks: A comprehensive foundation, Simon Hhaykin, PHI edition.

REFERENCES:

1. Artificial neural networks - B.Vegnanarayana Prentice Hall 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. MP -II Sem	L	T/P/D	C
	3	1/-/-	3

(58017) RELIABILITY ENGINEERING
(ELECTIVE – III)

Unit - I

Basics concepts of reliability: Introduction, Reliability and quality ,Failures and failure modes ,Causes of failures and reliability, Maintainability and availability ,History of reliability ,reliability literature.

Unit-II

Reliability mathematics: Introduction, Random experiment , Probability , Random variables, Distribution functions, Discrete distribution ,Continuous distribution, Numerical characteristics of random variables , Laplace transform.

Unit-III

Component reliability and hazard models: Introduction, Component reliability from test data, Mean time to failure ,Time – dependent hazard models, Stress- Dependent hazard models , Derivation of reliability function using Markov, Treatment of field data.

Unit-IV

System reliability models: Introduction - Systems with component with in series - Systems with parallel components - k-out – of- m systems - Non series parallel systems - Systems with - mixed – mode failures - Fault- tree technique

Unit-V

Maintainability and availability concepts: Introduction - Maintainability function - Availability function - Frequency of failures- Two-unit parallel systems with repair - k-out-of-m systems - Preventive maintenance.

Unit-VI

Reliability improvement: Introduction - Improvement components - Redundancy - Element redundancy - Unit redundancy - Stand by redundancy - Optimization - Reliability – cost trade – off .

Unit-VII

Economics of reliability engineering : Economic issues -

Manufacture's cost - Customer's cost - Reliability achievement cost - models - Reliability utility cost models - Depreciation cost models - Availability – cost – model of parallel systems.

Unit-VIII

Reliability management: Reliability programming - Management policies and decision - Reliability management by objectives - Reliability group - Reliability data : Acquisition and analysis - Managing people for reliability

TEXT BOOKS ;

1. Reliability Engineering – Balaguruswamy- TMH
2. Reliability Engineering- L.S.Srinath

REFERENCE BOOKS:

1. Reliability Engineering- Patrick DTO-Wiley Conor-India
2. Reliability Engineering and life testing –Naikan-PHI

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IV Year B.Tech. MP -II Sem	L	T/P/D	C
	3	1/-/-	3

(58018) MAINTENANCE AND SAFETY ENGINEERING
(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. Reliability, Maintenance and Safety Engineering by Dr. A.K.Guptha/ Laxmi Publications.
2. Industrial Safety Management by L.M. Deshmukh/TMH

REFERENCES:

1. Maintenance Engineering & Management by R.C.Mishra/ PHI
2. Reliability Engineering by Elsayed/ Pearson
3. Engineering Maintenance a modern approach, B.S Dhallon, 2002, C.R.R publishers

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IV Year B.Tech. MP -II Sem

	L	T/P/D	C
	3	1/-/-	3

(58019) PLANT LAYOUT AND MATERIAL HANDLING
(ELECTIVE - III)

UNIT – I : Introduction- Classification of Layout, Advantages and Limitations of different layouts, Layout design procedures, Overview of the plant layout.

UNIT – II : Process layout & Product layout: Selection, specification, implementation and follow up, comparison of product and process layout

UNIT – III : Heuristics for Plant layout – ALDEP, CORELAP, CRAFT

UNIT – IV : Group Layout, Fixed position layout-Quadratic assignment model. Branch and bound method

UNIT – V : Introduction, Material Handling systems, Material Handling principles, Classification of Material Handling Equipment, Relationship of material handling to plant layout

UNIT – VI : Basic Material Handling systems: Selection, Material Handling method- path, Equipment, function oriented systems

UNIT – VII : Methods to minimize cost of material handling- Maintenance of Material Handling Equipments, Safety in handling

UNIT – VIII : Ergonomics of Material Handling equipment. Design, Miscellaneous equipments

Text Books:

1. Operations Management/ PB Mahapatra/PHI

2. Aspects of Material handling/ Dr. KC Arora & Shinde, Lakshmi Publications

References:

1. Facility Layout & Location an analytical approach/ RL Francis/ LF Mc Linnis Jr, White/ PHI

2. Production and Operations Management/ R Panneerselvam/ PHI

3. Introduction to Material handling/ Ray, Siddhartha/ New Age

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IV Year B.Tech. MP -II Sem

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

(58085) FLEXIBLE MANUFACTURING SYSTEM
(ELECTIVE - IV)

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: Characteristics, Flexible Machining systems, achieving flexibility in machining systems, Machine cell design.

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.

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., New york
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. MP -II Sem

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

(58086) ADVANCED MANUFACTURING PROCESSES
(ELECTIVE - IV)

UNIT-I

Advances in Casting: Investment Casting, Vaccum Casting, Ceramic mold Casting, Squeeze Casting, Rapid Solidification (amorphous alloys), Design considerations for casting, castability, Design of gatting system and riser, shellmould casting.

UNIT-II

Advances in welding: weldability of stainless steel, caste iron and aluminium alloys, solid state welding processes:friction, diffusion, friction stir process, pulse welding, welding mettlurgy,heat affected zone , weld design and process selection.

UNIT-III

Advances in Bulk Forming: production of seamless tubing, continous casting and rolling, asymmetric rolling, forgeability, rotary swaging, hydrostatic and impact extrusion drawability defects residual stresses in bulk forming and their remedial measures deep drawing and reverse drawing.

UNIT-IV

Advanced and Sheet Metal Forming: Sheet metal Characteristics, test methods for formability of sheet metals, formability limit diagram,tube bending and forming, stretch forming, rubber forming,super plasticityforming, explosive, magnetic and pulse forming.

UNIT-V

Processing of ceramics: Properties and applications of ceramics, glass ceramics, shaping of ceramics and glasses, technics for strengthing and treating glass, processing of super conductors, design considerations for ceramics and glasses.

UNIT-VI

Processing of Composite Materials: Classification of Composites,

Processing of Elastomers, Reinforced plastics, metal matrics and ceramic matrix composite, design considerations.

UNIT-VII

Micro Fabrications: Rapid Prototyping operations, substractive and editive processes, virtual proto typing applications, Fabrication of microelectronic divises, wafer preparation, film depositon lithography, etching, diffusion and ion implantation, printed circuit boards, bonding and packaging.

UNIT-VIII

Competitive Aspects of Manufacturing: Selection of material and manufacturing process, Substitution of materials, process capabilities, manufacturing costs, value engineering.

TEXT BOOKS:

1. Manufacturing Engineering and Technology, Serope kalpakjain and Steven R. Schmid, Pearson Publications.

2. Welding processes by Parmer.

REFERENCE BOOKS:

1. Foundry Technology by Simha and Geol, Standard Publishers.

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

                                  3   -/-/-   3

(58087) TOTAL QUALITY MANAGEMENT
(ELECTIVE - IV)

UNIT-I

TQM: Introduction-concepts and philosophy-the acceptability of TQM – TQM: The essentials –TQM: contributions from international authorities.

UNIT-II

Principles and strategics: customer stastification-employee involvement –process approach –continuous process improvement-supplier partnership-performance measures.

UNIT-III

Statistical process control: the seven quality control tools and introduction to strategic control charts for improving process capability

UNIT-IV

Six sigma-seven new management tools.

UNIT-V

TQM tools: business process bench marking (BPB)

UNIT-VI

Quality function deployment (QFD)-Taguchi's Robust Design.

UNIT-VII

Total productive maintenance-failure mode effects analysis (FMEA).

UNIT-VIII

Quality System-ISO 9000 standard 21 environmental management system (EMS) -14001 Quality Awards.

TEXT BOOKS:

1. TQM –Besterfield/pearson

2. TQM-Subburaj Ram Swamy/MC Graw Hill

REFERENCE BOOKS:

1. TQM –planning ,design and implementation/V.K.Khanna and Vrat prem :Sahay, Shankar Ravi/New age international pvt Ltd.

2. TQM-Bhaskar /Anuradha

3. Quality control and management-Evans /Cangaga learning

4. TQM –Hubert k. Rampersad/springer

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

                                3   -/-/-   3

(58088) PRODUCT DESIGN AND DEVELOPMENT
(ELECTIVE -IV)

UNIT - I

Introduction: Need for IPPD – strategic importance of product development – integration of customer, designer, material supplier and process planner, Competitor and costumer – behavior analysis

UNIT - II

Understanding customer – promoting customer understanding – involve customer in development and managing requirements – Organization – process management and improvement – Plan and establish product specification

UNIT - III

Product planning process, Identify opportunities, Evaluate projects, Allocate resources and time, Reflect results and processes

UNIT - IV

Concept Generation And Selection: Task – Structured approaches – Clarification – Search – Externally and internally – explore systematically – reflect on the solutions and processes – concept selection – methodology – benefits

UNIT - V

Product Architecture: Implications – Product change – variety – component standardization – product performance – manufacturability

UNIT - VI

Product Development Management – establishing the architecture – creation – clustering – geometric layout development – fundamental and incidental interactions – related system level design issues – secondary systems – architecture of the chunks – creating detailed interface specifications.

UNIT - VII

Industrial Design : Integrate process design – Managing costs – Robust

design- Control factors–Need for industrial design – impact – design process

UNIT - VIII

Investigation of customer needs – conceptualization – refinement – management of the industrial design process – technology driven products – user – driven products – assessing the quality of industrial design.

TEXT BOOKS:

1. Product Design and Development / Kari T. Ulrich and Steven D. Eppinger /TMH, 2009.

REFERENCES:

1. Tool Design – Integrated Methodds for Successful Product Engineering / Staurt Pugh / Addison Wesley Publishing, Neyourk, NY, 1991, ISBN 0-202-41639-5.

2. Effective Product Design and Development / Stephen Rosenthal / Business One Orwin, Homewood, 1992, ISBN, 1-55623-603-4.

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IV Year B.Tech. MP -II Sem	L	T/P/D	C
	0	-/-/-	2

(58654) INDUSTRY ORIENTED MINI PROJECT

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. MP -II Sem	L	T/P/D	C
	0	-/6/-	2

(58655) SEMINAR

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. MP -II Sem	L	T/P/D	C
	0	-/15/-	10

(58656) PROJECT WORK

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. MP -II Sem	L	T/P/D	C
	0	-/-/-	2

(58657) COMPREHENSIVE VIVA