

2007-2008

ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

AUTOMOBILE
ENGINEERING

For

B.TECH. FOUR YEAR DEGREE COURSE
(Applicable for the batches admitted from 2007-2008)



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KUKATPALLY, HYDERABAD - 500 085.


JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

HYDERABAD - 500 085

Academic Regulations 2007
for
B. Tech (Regular)

(Effective for the students admitted into I year
from the Academic Year 2007-2008 and 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:

- Pursued a course of study for not less than four academic years and not more than eight academic years.
- Registered for 224 credits and secured 216 credits with compulsory subjects as listed in Table-1.

Table 1: Compulsory Subjects

Sl. No.	Subject Particulars
1.	All the first year subjects
2.	All practical subjects
3.	Industry oriented mini project
4.	Comprehensive Viva-Voce
5.	Seminar
6.	Project work

- 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.	Computer Science and Systems Engineering.
IX.	Electrical and Electronics Engineering.
X.	Electronics and Communication Engineering.
XI.	Electronics and Computer Engineering.
XII.	Electronics and Control Engineering.
XIII.	Electronics and Instrumentation Engineering.
XIV.	Electronics and Telematics Engineering.

XV. Information Technology.
Instrumentation and Control Engineering.
Mechanical Engineering (Mechatronics).
Mechanical Engineering (Production).
Mechanical Engineering.
Metallurgical Engineering.
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 / Week	Credits	Periods / Week	Credits
Theory	03	06	04	04
	02	04		
	04	08	—	—
Practical	03	04	03	02
	06	08	06	04
Drawing	03	04	03	02
	06	08	06	04
Mini Project	—	—	—	02
Comprehensive Viva Voce	—	—	—	02
Seminar	—	—	—	02
Project	—	—	—	12

5. Distribution and Weightage of Marks

- 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.
- For theory subjects the distribution shall be 20 marks for Internal Evaluation and 80 marks for the End-Examination.
- For theory subjects, during the semester there shall be 4 tests, which include, 2 objective type tests each for duration of 20 minutes each and 2 subjective type tests each for duration of 90 minutes each. One objective type test and one subjective test to be conducted in 1-4 units and one objective type test and one subjective type test are to be conducted in 5-8 units of each semester. The best 3 tests will be considered for awarding 20 sessional marks. For the I year class which shall be on yearly basis, there shall be 6 tests which include, 3 objective type tests and 3 subjective type tests with the same duration and weightage for each test as mentioned above. However, the performance in the best 4 tests will be considered for awarding 20 sessional marks. The distribution of syllabus for the conduct of objective and subjective type tests in the first year shall be as follows:

1 - 2 Units	one Objective type and one Subjective type test.
3 - 5 Units	one Objective type and one Subjective type test.
6 - 8 Units	one Objective type and one Subjective type test.

 Each objective test question paper shall contain 20 objective type questions

- III
- for 20 marks. Each subjective type test question paper shall contain 5 questions out of which any 3 questions need to be answered. The subjective type question paper should also be for 20 marks. Though the test pattern is different, all the tests (objective and subjective type tests) have equal weightage.
- iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Of the 25 marks for internal, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and another member of the staff of the same department.
- v. For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 20 marks for internal evaluation (10 marks for day-to-day work and 10 marks for internal tests) and 80 marks for end examination. There shall be two internal tests in a Semester and the better of the two shall consider for the award of marks for internal tests. However in the I year class, there shall be three tests and the 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 evaluate 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 valued 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, 40 marks shall be for Internal Evaluation and 160 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 felt desirable. 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 departments as per the University norms and shall be produced to the Committees of the University as and when they ask for.
6. **Attendance Requirements:**
- i. A student shall be eligible to appear for University examinations if acquires a minimum of 75% of attendance in aggregate of all the subjects.
 - ii. 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.
 - iii. 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.
 - iv. Shortage of Attendance below 65% in aggregate shall in NO case be condoned.
 - 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 42 credits from one regular and one supplementary examinations of I year, and one regular examinations 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 70 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 224 credits and earn the 216 credits. Marks obtained in the best 216 credits shall be considered for the calculation of percentage of marks.
 - v. Students who fail to earn 216 credits as indicated in the course structure including compulsory subjects as indicated in Table-1 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.
- iii. 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 /she 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	From the aggregate marks secured from the best 216 Credits.
First Class with Distinction	70% and above	
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 95/180 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.

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.



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

HYDERABAD - 500 085

Academic Regulations for B. Tech. (Lateral Entry Scheme)

(Effective for the students getting admitted into II year from the Academic Year 2008-2009 and onwards)

1. The Students have to acquire 160 credits from II to IV year of B.Tech. Program (Regular) for the award of the degree. Registered for 168 credits and secured 160 credits with compulsory subjects as listed in Table-1.

Table 1: Compulsory Subjects

Sl. No.	Subject Particulars
1.	All practical subjects
2.	Industry oriented mini project
3.	Comprehensive Viva-Voce
4.	Seminar
5.	Project work

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 42 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:

First Class with Distinction	70% and above	From the aggregate marks secured from the best 160 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)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

B.TECH. AUTOMOBILE ENGINEERING

I YEAR
COURSE STRUCTURE

CODE	SUBJECT	T	P/D	C
07A1BS01	English	2+1*	0	4
07A1BS02	Mathematics-I	3+1*	0	6
07A1BS06	Mathematical Methods	3+1*	0	6
07A1BS03	Engineering Physics	2+1*	0	4
07A1BS07	Engineering Chemistry	2	0	4
07A1EC03	Classical Mechanics	2+1*	0	4
07A1EC04	Computer Programming	2+1*	0	4
07A12491	Engineering Graphics	0	6	8
07A12492	Engineering Physics and Fuels and Lubricants Lab	0	3	4
07A12493	English Language Communication Skills Lab	0	3	4
07A12494	Computer Programming Lab	0	3	4
07A12495	Engineering Work Shop Practice	0	3	4
Total		22	18	56

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

B.Tech. AUTOMOBILE ENGINEERING

II Year
COURSE STRUCTURE

CODE	SUBJECT	T	P/D	C
07A3EC05	Production Technology	4+1*	0	4
07A3EC07	Mechanics of Solids	4+1*	0	4
07A3EC06	Object Oriented Programming	4+1*	0	4
07A3EC08	Thermodynamics	4+1*	0	4
07A3EC09	Metallurgy and Material Science	4+1*	0	4
07A3EC01	Electrical and Electronics Engineering	4+1*	0	4
07A32491	Electrical and Electronics Engineering Lab	0	3	2
07A32492	Object Oriented Programming Lab	0	3	2
Total		30	6	28

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

B.Tech. AUTOMOBILE ENGINEERING

II Year
COURSE STRUCTURE

CODE	SUBJECT	T	P/D	C
07A4BS01	Probability and Statistics	4+1*	0	4
07A42401	Automotive Engines	4+1*	0	4
07A4EC06	Machine Drawing	0	6	4
07A4EC04	Kinematics of Machinery	4+1*	0	4
07A4EC01	Environmental Studies	4+1*	0	4
07A4EC05	Thermal Engineering-I	4+1*	0	4
07A42491	Metallurgy and Mechanics of Solids Lab	0	3	2
07A42492	Thermal Engineering Lab	0	3	2
Total		25	12	28

III Year
COURSE STRUCTURE

CODE	SUBJECT	T	P/D	C
07A5HS01	Managerial Economics and Financial Analysis	4+1*	0	4
07A50107	Fluid Mechanics and Hydraulic Machinery	4+1*	0	4
07A5EC06	Heat Transfer	4+1*	0	4
07A5EC03	Dynamics of Machinery	4+1*	0	4
07A50305	Design of Machine Elements	4+1*	0	4
07A50306	Thermal Engineering-II	4+1*	0	4
07A52491	Automobile Engineering Lab-I	0	3	2
07A52492	Advanced English Communication Skills Lab	0	3	2
Total		30	6	28

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD
B.TECH. AUTOMOBILE ENGINEERING

III Year

COURSE STRUCTURE

Semester II

CODE	SUBJECT	T	P/D	C
07A6HS02	Industrial Management	4+1*	0	4
07A60308	Machine Tools and Metrology	4+1*	0	4
07A62401	Vehicle Dynamics	4+1*	0	4
07A6EC04	CAD/CAM	4+1*	0	4
07A60309	Robotics	4+1*	0	4
07A62402	Automotive Electrical and Autotronics	4+1*	0	4
07A62491	Metrology and Machine Tools Lab	0	3	2
07A62492	Automobile Engineering Lab-II and CAD/CAM Lab	0	3	2
Total		30	6	28

IV Year

COURSE STRUCTURE

I Semester

CODE	SUBJECT	T	P/D	C
07A7EC03	Operations Research	4+1*	0	4
07A72401	Alternative Energy sources for Automobiles	4+1*	0	4
07A72402	Automotive Chassis and Suspension	4+1*	0	4
07A7EC06	Instrumentation and Control Systems	4+1*	0	4
Elective-I		4+1*	0	
07A72403	Automotive Pollution and Control			
07A72404	Vehicle Body Engineering and Safety			
07A72405	Auto Air Conditioning			
07A7EC10	Advanced Data Structures and Algorithms			
Elective-II		4+1*	0	4
07A7EC43	Micro Processors and Micro Controllers			
07A7EC08	Computational Fluid Dynamics			
07A7EC05	Finite Element Methods			
07A7EC12	Unix and Shell programming			
07A72491	Hydraulic Machines Lab and Production Technology Lab	0	3	2
07A72492	Auto Scanning and Vehicle Testing Lab	0	3	2
Total		30	6	28

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD
B.Tech. AUTOMOBILE ENGINEERING

IV Year

COURSE STRUCTURE

II Semester

CODE	SUBJECT	T	P/D	C
07A82402	Vehicle Transport Management	4+1*	0	4
Elective-III		3+1*	0	3
07A82401	Tribology			
07A81403	Product Design and Assembly Automation			
07A8EC04	Automation in Manufacturing			
07A8EC03	Computer Organization and Architecture			
Elective-IV		3+1*	0	3
07A8HS01	Principles of Entrepreneurship			
07A8EC02	Neural Networks and Fuzzy Logic Systems			
07A8EC05	Interactive Computer Graphics			
07A8EC06	Operating System Concepts			
07A82491	Heat Transfer and Instrumentation Lab	0	3	2
07A82494	Industry Oriented mini project	0	0	2
07A82493	Seminar	0	0	2
07A82492	Project Work	0	0	10
07A82495	Comprehensive Viva	0	0	2
Total		13	3	28

T - Theory

P - Practical/Drawing

C - Credits

*- Tutorial

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

I Year B.Tech AME

T	P	C
2+1*	0	4

(07A1BS01) 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. LEARNING ENGLISH: A Communicative Approach, Hyderabad: Orient Longman, 2006.
(Six Selected Lessons)

For Non-detailed study

2. WINGS OF FIRE: An Autobiography - APJ Abdul Kalam, Abridged version with Exercises, Universities Press (India) Pvt. Ltd., 2004.

STUDY MATERIAL :

Unit - I

1. Travel and Transport from LEARNING ENGLISH: A Communicative Approach, Orient Longman, 2005.

2. Chapters 1-4 from Wings of Fire: An Autobiography - APJ Abdul Kalam, an abridged version with Exercises, Universities Press (India) Pvt. Ltd., 2004

Unit - II

3. Humour from LEARNING ENGLISH: A Communicative Approach, Orient

- Longman, 2005.
4. Chapters 5-8 from **Wings of Fire: An Autobiography** - APJ Abdul Kalam, an abridged version with Exercises, Universities Press (India) Pvt. Ltd., 2004
- Unit - III**
5. Environment from **LEARNING ENGLISH: A Communicative Approach**, Orient Longman, 2005.
 6. Chapters 9-12 from **Wings of Fire: An Autobiography** - APJ Abdul Kalam, an abridged version with Exercises., Universities Press (India) Pvt. Ltd., 2004
- Unit - IV**
7. Inspiration from **LEARNING ENGLISH: A Communicative Approach**, Orient Longman, 2005.
 8. Chapters 13-16 from **Wings of Fire: An Autobiography** - APJ Abdul Kalam, an abridged version with Exercises, Universities Press (India) Pvt. Ltd., 2004
- Unit - V**
9. Human Interest from **LEARNING ENGLISH: A Communicative Approach**, Orient Longman, 2005.
 10. Chapters 17-20 from **Wings of Fire: An Autobiography** - APJ Abdul Kalam, an abridged version with Exercises, Universities Press (India) Pvt. Ltd., 2004.
- Unit - VI**
11. Media from **LEARNING ENGLISH : A Communicative Approach**, Orient Longman, 2005.
 12. Chapters 21-24 from **Wings of Fire: An Autobiography** - APJ Abdul Kalam, an abridged version with Exercises, Universities Press (India) Pvt. Ltd., 2004.
- * **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. **Strengthen Your English**, Bhaskaran & Horsburgh, Oxford University Press
 2. **Basic Communication Skills for Technology**, Andrea J. Rutherford, Pearson Education Asia.
 3. **Murphy's English Grammar with CD**, Murphy, Cambridge University Press
 4. **English Skills for Technical Students** by Orient Longman
 5. **Everyday Dialogues in English** by Robert J. Dixon, Prentice-Hall of India Ltd., 2006.
 6. **English For Technical Communication**, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
 7. **A Hand book of English for Engineers & Technologists** by Dr. P. Eliah, B. S. Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

I Year B.Tech AME

T	P	C
3+1*	0	6

(07A1BS02) MATHEMATICS - I

UNIT - I

Differential equations of first order and first degree - exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

UNIT - II

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$, $xV(x)$, method of variation of parameters.

UNIT - III

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 - IV

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

UNIT - V

Applications of integration to lengths, volumes and surface areas in Cartesian and polar coordinates multiple integrals - double and triple integrals - change of variables - change of order of integration.

UNIT - VI

Sequences - series - Convergences and divergence - Ratio test - Comparison test - Integral test - Cauchy's root test - Raabe's test - Absolute and conditional convergence

UNIT - VII

Vector Calculus: Gradient- Divergence- Curl and their related properties of sums-products- Laplacian and second order operators. Vector Integration - Line integral - work done - Potential function - area- surface and volume integrals. Vector integral theorems: Green's theorem-Stoke's and Gauss's Divergence Theorem (With out proof). Verification of Green's - Stoke's and Gauss's Theorems.

UNIT - VIII

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 Partial fractions-Heaviside's Partial fraction expansion theorem.

Text Books:

1. A text Book of Engineering Mathematics, Vol-1 T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. A text Book of Engineering Mathematics, C. Sankaraiah, V. G. S. Book Links.
3. A text Book of Engineering Mathematics, Shahnaz Bathul, Right Publishers.
4. A text Book of Engineering Mathematics, P. Nageshwara Rao, Y. Narasimhulu & N. Prabhakar Rao, Deepthi Publications.

References:

1. A text Book of Engineering Mathematics, B. V. Ramana, Tata Mc Graw Hill.
2. Advanced Engineering Mathematics, Irvin Kreyszig, Wiley India Pvt. Ltd.
3. A text Book of Engineering Mathematics, Thomson Book Collection.

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(07A1BS06) MATHEMATICAL METHODS

UNIT - I

Matrices and Linear systems of equations: Elementary row transformations-Rank-Echelon form, Normal form - Solution of Linear Systems - Direct Methods- LU Decomposition- LU Decomposition from Gauss Elimination -Solution of Tridiagonal Systems-Solution of Linear Systems

UNIT - II

Eigen values, eigen vectors - properties - Cayley-Hamilton Theorem - Inverse and powers of a matrix by Cayley-Hamilton theorem - Diagonolization of matrix. Calculation of powers of matrix - Modal and spectral matrices.

UNIT - III

Real matrices - Symmetric, skew - symmetric, orthogonal, Linear Transformation - Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary - Eigen values and eigen vectors of complex matrices and their properties. Quadratic forms- Reduction of quadratic form to canonical form - Rank - Positive, negative definite - semi definite - index - signature - Sylvester law.

UNIT - IV

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

Interpolation: Introduction- Errors in Polynomial Interpolation - Finite differences- Forward Differences- Backward differences -Central differences - Symbolic relations and separation of symbols-Differences of a polynomial-Newton's formulae for interpolation - Central difference interpolation Formulae - Gauss Central Difference Formulae -Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

UNIT - V

Curve fitting: Fitting a straight line -Second degree curve-exponential curve-power curve by method of least squares. Numerical Differentiation and Integration-Trapezoidal rule - Simpson's 1/3 Rule -Simpson's 3/8 Rule.

UNIT - VI

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- Moulton Method -Milne's Method.

UNIT - VII

Fourier Series: Determination of Fourier coefficients - Fourier series - even and odd functions - Fourier series in an arbitrary interval - even and odd periodic continuation - Half-range Fourier sine and cosine expansions. Fourier integral theorem (only statement)- Fourier sine and cosine integrals. Fourier transform - Fourier sine and cosine transforms - properties - inverse transforms - Finite Fourier transforms.

UNIT - VIII

Formation of partial differential equations by elimination of arbitrary constants and

arbitrary functions -solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations. Method of separation of variables. z-transform - inverse z-transform - properties - Damping rule - Shifting rule - Initial and final value theorems. Convolution theorem - Solution of difference equation by z-transforms.

Text Books:

1. Mathematical Methods, Vol-1 T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. Mathematical Methods, C. Sankaraiah, V. G. S. Book Links.
3. A text book of Mathematical Methods, V. Ravindranath, A. Vijayalakshmi, Himalaya Publishers.
4. A text book of Mathematical Methods, Shahnaz Bathul, Right Publishers.

References:

1. A text Book of Engineering Mathematics, B. V. Raman, Tata Mc Graw Hill.
2. Advanced Engineering Mathematics, Irvin Kreyszig, Wiley India Pvt. Ltd.
3. Numerical Methods for Scientific and Engineering Computation, M. K. Jain, S. R. K. Iyengar & R. K. Jain, New Age International Publishers.
4. Elementary Numerical Analysis, Atkinson & Han, Wiley India, 3rd Edition, 2006

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(07A1BS03) ENGINEERING PHYSICS

UNIT I

OPTICS : Interference - Superposition of waves - Young's double slit experiment - Coherence - Interference in thin films by reflection - Newton's rings - Diffraction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction at a Single slit - Double slit - Diffraction grating - Grating spectrum - Resolving power of a grating - Rayleigh's criterion for resolving power - Polarization - Types of Polarization - Double refraction - Nicol prism.

UNIT II

ULTRASONICS : Introduction - Production of ultrasonic waves - Magnetostriction method - Piezo electric method - Detection of ultrasonic waves - Properties of ultrasonic waves - Use of ultrasonics for nondestructive testing - Applications of ultrasonics.

ACOUSTICS OF BUILDINGS: Basic requirement of acoustically good hall - Reverberation and time of reverberation - Sabine's formula for reverberation time - Measurement of absorption coefficient of a material - Factors affecting the architectural acoustics and their remedy.

UNIT III

MAGNETIC PROPERTIES: Permeability - Magnetization - Origin of magnetic moment - Classification of magnetic materials - Dia, para and ferro magnetism - Hysteresis curve - Soft and hard magnetic materials.

SUPERCONDUCTIVITY: General properties - Meissner effect - Penetration depth - Type I and Type II superconductors - Flux quantization - DC and AC Josephson effect - BCS Theory - Applications of superconductors.

UNIT IV

CRYSTAL STRUCTURES AND X-RAY DIFFRACTION: Introduction - Space lattice - Basis - Unit cell - Lattice parameter - Bravais lattices - Crystal systems - Structure and packing fractions of Simple cubic - Body centered cubic - Face centered cubic crystals - Directions and planes in crystals - Miller Indices - Separation between successive [h k l] planes - Diffraction of X-rays by crystal planes - Bragg's law - Laue method - Powder method.

UNIT V

LASERS : Introduction - Characteristics of lasers - Spontaneous and stimulated emission of radiation - Einstein's coefficients - Population inversion - Ruby laser - Helium-Neon laser - CO₂ laser - Semiconductor laser - Applications of lasers in industry, scientific and medical fields.

UNIT VI

FIBER OPTICS AND HOLOGRAPHY: Introduction - 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 - Basic principles of holography - Construction and reconstruction of

image on hologram - Applications of holography.

UNIT VII

DIELECTRIC PROPERTIES: Introduction - Dielectric constant - Electronic, ionic and orientational polarizations - Internal fields in solids - Clausius - Mossotti equation - Dielectrics in alternating fields - Frequency dependence of the polarizability - Ferro and Piezo electricity.

THERMAL PROPERTIES : Introduction - Specific Heat of Solids - Einstein Model - Debye Model - Lattice Vibrations - Phonons - Thermal Conductivity.

UNIT VIII

SCIENCE & TECHNOLOGY OF NANOMATERIALS: Introduction to Nano materials - Basic principles of Nanoscience & Technology - Fabrication of nano materials - Physical & chemical properties of nanomaterials - Carbon nanotubes - Applications of nanotechnology.

TEXT BOOKS :

1. **Physics Volume 2** by Halliday, Resnick and Krane; John Wiley & Son.
2. **Applied Physics 2nd Edition** by Dr. P. Appala Naidu & Dr. M. Chandra Shekar, V.G.S. Book links.
3. **Engineering Physics** by R.K.Gaur & S.L. Gupta; Dhanpat Rai and Sons.

REFERENCES:

1. **Nanotechnology** by Mark Ratner and Daniel Ratner, Pearson Education.
2. **Introduction to solid state physics** by C. Kittel; Wiley Eastern Ltd.
3. **Materials Science and Engineering** by V. Raghavan; Prentice-Hall India.
4. **Engineering Physics** by Dr. M. Arumugam; Anuradha Agencies.
5. **Nanomaterials** by A.K. Bandyopadhyay; New Age International Publishers.
6. **Engineering Physics** by M.N. Avadhanulu & P.G. Kshirasagar; S. Chand & Company Ltd.

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(07A1BS07) ENGINEERING CHEMISTRY

UNIT I

Water Technology-I : Introduction, Effect of Water on Rocks and Minerals, Types of impurities in Water, Hardness of Water - Temporary and Permanent hardness. Units and Inter conversions of Units. Estimation of hardness by EDTA Methods. Problems on Temporary and Permanent hardnesses. Analysis of Water - Alkalinity, Chlorides and Dissolved Oxygen, Disadvantages of Hard Water. Methods of Treatment of Water for Domestic Purposes-Sedimentation, Coagulation, Filtration, Disinfection - Sterilization, Chlorination, Break - point Chlorination, Ozonation.

UNIT II

Water Technology-II : Water for Industrial purposes - Water for Steam Making - Boiler Troubles - Carry Over - Priming and Foaming, Boiler Corrosion, Scales and Sludges, Caustic Embrittlement. Water Treatment: - Internal Treatment - Colloidal, Phosphate, Calgon, Carbonate, Sodium aluminate Conditioning of Water. External Treatment - Lime-Soda Process, Zeolite Process, Ion-Exchange Process; - Numerical Problems.

UNIT III

Science of Corrosion : Definition, Examples - Types of Corrosion: Theories of Corrosion and Mechanism - Dry Corrosion, (Direct Chemical attack), Wet Corrosion, (Electro Chemical Theory) Principles of Corrosion, Galvanic Series, Galvanic Corrosion, Concentration Cell Corrosion, Mechanism of Wet Corrosion - Hydrogen evolution type, Oxygen absorption type. Factors Influencing Corrosion. Control of Corrosion - Proper Design, Use of pure metal and metal alloys, Passivity, Cathodic Protection - Sacrificial anode and Impressed Current. Modifying the Environment, use of Inhibitors.

UNIT IV

Protective Coatings and their applications :

Surface Preparation: (1) Solvent Cleaning (2) Alkali Cleaning (3) Pickling and Etching (4) Sand Blasting (5) Mechanical Cleaning. Types Of Protective Coatings: Metallic Coatings - Anodic Coatings, Galvanization, Cathodic Coatings - Tinning, Metal Cladding, Electroplating Ex: Chromium Plating, Metal Spraying, Cementation-Sheradizing, Colourizing, Chromizing, Chemical Conversion Coatings: (1) Phosphate (2) Chromate (3) Anodized Coatings. Organic Coatings: Paints - Constituents and their functions

UNIT V

Polymer Science and Technology : Polymerization Reactions - Basic concepts. Types of Polymerization - Addition and Condensation Polymerizations. Plastics - Thermosetting and Thermoplastics - Differences: Compounding and Moulding of Plastics - Compression, Injection, Transfer, and Extrusion moulding methods. Preparation, Properties and Engineering Uses of the Following: Polyethylene, PVC, Teflon, Bakelite, Nylon, Polyester, Polyurethanes and Silicone Resins. Rubber - Processing of Natural Rubber, Vulcanization and Compounding. Elastomers - Buna S, Buna N, Thiokol.

UNIT VI

Refractories and Insulators : Refractories - Definition, Classification With Examples;

Criteria of a Good Refractory Material; Causes for the failure of a Refractory Material; Insulators - Definition and Classification with Examples; Characteristics of Insulating Materials; Thermal Insulators, Electrical Insulators - Their Characteristics and Engineering Applications.

UNIT VII

LUBRICANTS : Principles and function of lubricants - Types of Lubrication and Mechanism - Thick Film or Hydrodynamic Lubrication, Thin Film or Boundary Lubrication, Extreme Pressure Lubrication. Classification and properties of lubricants - Viscosity, flash and fire points, cloud and pour points, aniline point, Neutralisation Number and Mechanical Strength.

UNIT VIII

Fuels and Combustion : Definition and Classification.

1. Solid Fuels - Coal - Proximate and Ultimate Analysis of Coal and Significance of the Constituents - Metallurgical Coke - Characteristics & Manufacture.
2. Liquid Fuels - Petroleum - Refining - Knocking - Octane and Cetane Numbers - Synthetic Petrol Cracking- Bergius Process, Fischer- Tropsch Process.
3. Gaseous Fuels Natural gas, Coal gas - Calorific Value of Fuels - Bomb Calorimeter - Junker's Gas Calorimeter.
4. Combustion - Analysis of Flue Gas by Orsat's Apparatus ; Problems.

TEXT BOOKS:

1. Text Book of Engineering Chemistry by Jain & Jain. Dhanpat Rai Publishing Company, New Delhi (2004).
2. Text Book of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, and Andra Naidu & B.S. Publications, Hyd (2005).

REFERENCES:

1. A Text Book of Engineering Chemistry by S.S. Dara. S.Chand & Co, New Delhi (2006) (15th Edition).
2. Engineering Chemistry by J C Kuriacose and J. Rajaram, Tata McGraw-Hill Co, New Delhi (2004).
3. A Text Book of Engineering Chemistry by Balaram Pani, Galgotia Publications, New Delhi (2004).
4. A Text Book of Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company, New Delhi (2004).
5. Industrial Chemistry by O.P.Veeramani and A.K.Narula, Galgotia Publications, New Delhi (2004).
6. Advanced Engineering Chemistry by Senapati and Mohanty, Laxmi Publications, New Delhi (2002).
7. Engineering Chemistry by R. Gopalan, D. Venkappaya and S.Nagarajan, Vikas Publishing House, New Delhi (2004).
8. Engineering Chemistry by R.V. Gadag A.N. Tyanand Shortly IK. International Publishing house Pvt. Ltd. New Delhi.

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(07A1EC03) CLASSICAL MECHANICS

UNIT - I

Introduction to Engg. 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. Lami's 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 basic principles), centre of gravity of composite bodies, Pappus theorem.

UNIT - IV

Area moments 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

Mechanical Vibrations : Definitions, Concepts - Simple Harmonic Motion - Free vibrations, simple and Compound Pendulums and its Applications -

TEXT BOOKS:

1. Engg. Mechanics / Irving. H. Shames Prentice - Hall.
2. Engg. Mechanics / S.S. Bharati & J.G. Rajasekharappa

REFERENCES:

1. Engineering Mechanics / Ferdinand . L. Singer / Harper - Collins.
2. Engg. Mechanics / Timoshenko & Young.
3. Engg. Mechanics Umesh Regi / Tayal.
4. Engg. Mechanics / R.V. Kulkarni & R.D. Askhekar
5. Engg. Mechanics/Khurmi/S.Chand.
6. Engg. Mechanics / KL Kumar / Tata McGraw Hill.

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(07A1EC04) COMPUTER PROGRAMMING

UNIT - I

Algorithm / pseudo code, flowchart, program development steps, structure of C program, A Simple C program, identifiers, basic data types, operators, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation.

UNIT - II

Input-output statements, statements and blocks, if and switch statements, loops-while, do-while and for statements, break, continue, goto and labels, programming examples.

UNIT - III

Designing structured programs, Functions, basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C preprocessor, example c programs.

UNIT - IV

Arrays- concepts, declaration, definition, accessing elements, storing elements, arrays and functions, two-dimensional and multi-dimensional arrays, applications of arrays, pointers- concepts, initialization of pointer variables, pointers and function arguments, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments, c program 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, bitfields, C program examples.

UNIT - VI

Input and output - concept of a file, text files and binary files, streams, standard I/O, Formatted I/O, file I/O operations, error handling, C program examples.

UNIT - VII

Introduction to data structures-Stacks and Queues, representing stacks and queues in C using arrays and linked lists. Implementation of Searching and sorting in C- Linear and binary search methods, sorting - Bubble sort, Quick Sort, merge sort.

UNIT - VIII

Trees- Binary trees, representation, traversals (Recursive) implemented in C, graphs-terminology, representation and basic operations on graphs.

TEXT BOOKS:

1. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.

2. DataStructures Using C - A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson education.

REFERENCES:

1. C & Data structures - P. Padmanabham, B.S. Publications.
2. The C Programming Language, B.W. Kernighan, 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. Data Structures and Program Design in C, R.Kruse, C.L. Tondo, BP Leung, Shashi M, Second Edition, Pearson Education.

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(07A12491) ENGINEERING GRAPHICS

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) Helices

UNIT - II

DRAWING OF PROJECTIONS OR VIEWS ORTHOGRAPHIC PROJECTION IN FIRST ANGLE PROJECTION ONLY : Principles of Orthographic Projections - Conventions - First and Third Angle Projections 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. Sections and Sectional views of Right Regular Solids - Prism, Cylinder, Pyramid, Cone - Auxiliary views.

UNIT - IV

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

UNIT - V

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 - VI

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

UNIT - VII

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

UNIT - VIII

Introduction to Computer aided Drafting: Generation of points, lines, curves, polygons, simple solids, dimensioning.

TEXT BOOK :

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishes
3. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.

REFERENCES :

1. Engineering Drawing and Graphics, Venugopal / New age.
2. Engineering Drawing- Johle/Tata Macgraw Hill.

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(07A12492) ENGINEERING PHYSICS AND FUELS AND LUBRICATION LAB

(A) ENGINEERING PHYSICS LAB:

Any Ten of the following experiments are to be performed during the Academic year.

SI.No. Name of the Experiment

1. Determination of Refractive Index of the material of a Prism - Spectrometer.
2. Dispersive power of the material of a Prism - Spectrometer.
3. Determination of wavelength of a source - Diffraction Grating.
4. Determination of thickness of a thin object using parallel fringes.
5. Newton's Rings; Radius of Curvature of plano-convex lens.
6. Determination of Rigidity modulus of a material in the form of a wire - Torsional pendulum.
7. Melde's Experiment - Transverse and Longitudinal modes.
8. Time constant of R-C Circuit.
9. L-C-R Circuit.
10. Verification of laws of stretched string - Sonometer.
11. Calculation of Frequency of A.C. mains - Sonometer.
12. Magnetic field along the axis of a current carrying coil - Stewart and Gee's method.

(B) FUELS AND LUBRICANTS LAB :

1. Determination of Flash and Fire points of Liquid Fuels / Lubricants: Abels apparatus , Pensky martens apparatus
2. Carbon Residue Test : Solid/ Liquid Fuels
3. Determination of Viscosity : Liquid Lubricants & Fuels : Saybolt viscometer, Redwood Viscometer, Engler Viscometer.
4. Determination of Calorific Value: Solid/Liquid/Gaseous Fuels : Bomb Calorimeter.
5. Grease Penetration Test. : Junker Calorimeter.

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(07A12493) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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

Objectives:

- To make students recognise the sounds of English through Audio-Visual aids and Computer Software.
- To help them overcome their inhibitions and self-consciousness while speaking in English and to build their confidence. *The focus shall be on fluency rather than accuracy.*
- To enable them to speak English correctly with focus on stress and intonation.

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
- iii) Internet connectivity

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- The Rosetta Stone English Library

- Clarity Pronunciation Power
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- Language in Use, Foundation Books Pvt Ltd with CD.
- Learning to Speak English - 4 CDs
- Microsoft Encarta with CD
- Murphy's English Grammar, Cambridge with CD

Books to be procured 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. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
2. English Pronouncing Dictionary Daniel Jones Current Edition with CD.
3. Spoken English- R. K. Bansal and J. B. Harrison, Orient Longman 2006 Edn.
4. 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.
5. A text book of English Phonetics for Indian Students by T.Balasubramanian (Macmillan)
6. English Skills for Technical Students, WBSCTE with British Council, OL

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Paper:

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

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(07A12494) COMPUTER PROGRAMMING LAB

Objectives:

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

Recommended Systems/Software Requirements:

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

UNIT- I:

- Write a C program to find the sum of individual digits of a positive integer.
- 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.
- Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

UNIT- II:

- Write a C program to calculate the following Sum:

$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- Write a C program to find the roots of a quadratic equation.

UNIT- III:

- Write C programs that use both recursive and non-recursive functions
 - To find the factorial of a given integer.
 - To find the GCD (greatest common divisor) of two given integers.
 - To solve Towers of Hanoi problem.

UNIT- IV:

- The total distance travelled by vehicle in 't' seconds is given by distance = $ut + \frac{1}{2}at^2$ 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'.
- 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)

UNIT- V:

- Write a C program to find both the largest and smallest number in a list of integers.
- Write a C program that uses functions to perform the following:
 - Addition of Two Matrices
 - Multiplication of Two Matrices

UNIT- VI:

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

- i) 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

UNIT- VII:

- 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.

UNIT- VIII:

- a) Write a C program to generate Pascal's triangle.
 b) Write a C program to construct a pyramid of numbers.

UNIT- IX:

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

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

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 without computing the sum. Are any values of 'x' also illegal? If so, test for them too.

UNIT- X:

- 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.

UNIT- XI:

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.)

UNIT- XII:

- 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.)

UNIT- XIII:

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

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

UNIT- XVI:

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

- i)Creation ii)Insertion iii) Deletion iv) Traversal in both ways

UNIT- XV:

Write C programs that implement stack (its operations) using
 i)Arrays ii)Pointers

UNIT- XVI:

Write C programs that implement Queue (its operations) using
 i)Arrays ii)Pointers

UNIT- XVII:

Write a C program that uses Stack operations to perform the following:
 i)Converting infix expression into postfix expression
 ii)Evaluating the postfix expression

UNIT- XVIII:

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

- i)Creating a Binary Tree of integers
- ii)Traversing the above binary tree in preorder, inorder and postorder.

UNIT- XIX:

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

UNIT- XX:

Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:

- i)Bubble sort ii) Quick sort

UNIT- XXI:

Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:

- i)Insertion sort ii)Merge sort

UNIT- XXII:

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

UNIT- XXIII:

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

UNIT- XXIV:

Write C programs to implement Trapezoidal and Simpson methods.

Text Books

- 1.C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Data Structures: A pseudo code approach with C, second edition R.F. Gilberg and B.A. Forouzan
- 3.Programming in C, P.Dey & M. Ghosh, Oxford Univ.Press.
- 4.C and Data Structures, E Balaguruswamy, TMH publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

I Year B.Tech AME

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(07A12495) ENGINEERING WORKSHOP PRACTICE

1. TRADES FOR EXERCISES :

At least two exercises from each trade:

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

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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

II Year B.Tech. AME I Semester

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(07A3EC05) PRODUCTION TECHNOLOGY

UNIT - I

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

UNIT - II

Solidification of casting - Concept - Solidification of pure metal and alloys, short & long freezing range alloys.

Risers - Types, function and design, casting design considerations, special casting processes 1) Centrifugal 2)Die, 3) Investment.

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

UNIT - III

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

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

UNIT - IV

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

UNIT - V

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

UNIT - VI

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

UNIT- VII

EXTRUSION OF METALS : Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion - Impact extrusion Hydrostatic extrusion. **Forging processes:** Principles of forging - Tools and dies - Types Forging - Smith forging, Drop Forging - Roll forging - Forging hammers : Rotary forging - forging defects.

UNIT - VIII

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

TEXT BOOKS :

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

REFERENCES :

1. Production Technology / R.K. Jain
2. Process and materials of manufacturing -Lindberg/PE
3. Principles of Metal Castings / Roenthal.
4. Welding Process / Paramar /
5. Production Technology /Sarma P C /
6. Production Engineering - Suresh Dalela & Ravi Shankar / Galgotia Publications Pvt. Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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II Year B.Tech. AME I Semester

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(07A3EC07) 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 by Bhavikatti, Lakshmi publications.
2. Solid Mechanics, by Popov

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
5. Strength of Materials, by Andrew Pytel and Ferdinand L. Singer Longman.

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II Year B.Tech. AME I Semester

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(07A3EC06) OBJECT ORIENTED PROGRAMMING

UNIT-I

Object oriented thinking :- Need for oop paradigm, A way of viewing world - Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

UNIT-II:-

Java Basics History of Java, Java buzzwords, datatypes, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, classes and objects - concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-III:-

Inheritance - Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes.

UNIT-IV:-

Packages and Interfaces : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring packages - Java.io, java.util.

UNIT-V:-

Exception handling and multithreading - Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT-VI:-

Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels - scrollpane, dialogs, menubar, graphics, layout manager - layout manager types - boarder, grid, flow, card and grid bag.

UNIT-VII:-

Applets - Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Swing - Introduction, limitations of AWT, MVC architecture, components, containers,

exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons - The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

UNIT-VIII:-

Networking - Basics of network programming, addresses, ports, sockets, simple client server program, multiple clients, Java .net package
Packages - java.util,

TEXT BOOKS:

1. Java; the complete reference, 7th edition, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.

REFERENCES:

1. An Introduction to Programming and OO design using Java, J.Nino and F.A. Hosch, John Wiley & Sons.
2. An Introduction to OOP, second edition, T. Budd, Pearson Education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, Pearson Education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson-Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education

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(07A3EC08) THERMODYNAMICS

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, Causes of Irreversibility - Energy in State and in Transition, Types, Work and Heat, Point and Path function.

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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.

UNIT - III

Limitations of the First Law - Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, 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 - Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations - Elementary Treatment of the Third Law of Thermodynamics.

UNIT IV

Pure Substances, p-V-T- surfaces, T-S and h-s diagrams, Mollier Charts, Phase Transformations - Triple point at critical state properties during change of phase, Dryness Fraction - Clausius - Clapeyron Equation Property tables, Mollier charts - Various Thermodynamic processes and energy Transfer - Steam Calorimetry.

UNIT - V

Perfect Gas Laws - Equation of State, specific and Universal Gas constants - various Non-flow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy - Throttling and Free Expansion Processes - Flow processes - Deviations from perfect Gas Model - Vander Waals Equation of State - Compressibility charts - variable specific Heats - Gas Tables.

UNIT - VI

Mixtures of perfect Gases - Mole Fraction, Mass fraction, Gravimetric and volumetric Analysis - Dalton's Law of partial pressure, Avogadro's Laws of additive volumes - Mole fraction, Volume fraction and partial pressure, Equivalent Gas const. And Molecular Internal Energy, Enthalpy, sp. Heats and Entropy of Mixture of perfect Gases and Vapour, Atmospheric air - Psychrometric Properties - Dry bulb Temperature, Wet Bulb Temperature, Dew point Temperature, Thermodynamic Wet Bulb Temperature, Specific Humidity, Relative Humidity, saturated Air, Vapour pressure, Degree of saturation - Adiabatic Saturation, Carrier's Equation - Psychrometric chart.

UNIT - VII

Power Cycles : Otto, Diesel, Dual Combustion cycles, Sterling Cycle, Atkinson Cycle, Ericsson Cycle, Lenoir Cycle - Description and representation on P-V and T-S diagram.

Thermal Efficiency, Mean Effective Pressures on Air standard basis - comparison of Cycles.

UNIT VIII

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

TEXT BOOKS :

1. Engineering Thermodynamics / PK Nag /TMH, III Edition
2. Fundamentals of Thermodynamics - Sonntag, Borgnakke and van Wylen / John Wiley & sons
(ASIA) Pte Ltd.

REFERENCES :

1. Engineering Thermodynamics - Jones & Dugan
2. Thermodynamics - An Engineering Approach - Yunus Cengel & Boles /TMH
3. Thermodynamics - J.P.Holman / McGrawHill
4. An introduction to Thermodynamics / YVC Rao / New Age
5. Engineering Thermodynamics - K. Ramakrishna / Anuradha Publishers.

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II Year B.Tech. AME I Semester

T	P	C
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(07A3EC09) 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, Cu-Sn and Fe-Fe3C.

UNIT - IV

Cast Irons and Steels : Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheroidal 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, cermets, 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD (A.P.)

II Year B.Tech. AME I Semester

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(07A3EC01) 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 Nagrath, TMH Publications, 2nd Edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD (A.P.)

II Year B.Tech. AME I Semester

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(07A32491) 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 efficiency 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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

II Year B.Tech. AME I Semester

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(07A32492) OBJECT ORIENTED PROGRAMMING LAB

Objectives:

- To make the student learn a object oriented way of solving problems.
- To teach the student to write programs in Java to solve the problems

Recommended Systems/Software Requirements:

- Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space
- JDK Kit. Recommended

Week 1

a) Write a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

b) The Fibonacci sequence is defined by the following rule:

The fist two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non

recursive functions to print the nth value in the Fibonacci sequence.

Week 2

a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.

b) Write a Java program to multiply two given matrices.

c) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

Week 3

a) Write a Java program that checks whether a given string is a palindrome or not.

Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order.

c) Write a Java program to make frequency count of words in a given text.

Week 4

a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file, and the length of the file in bytes.

b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

c) Write a Java program that displays the number of characters, lines and words in a text file.

Week 5

a) Write a Java program that:

- i) Implements stack ADT.
- ii) Converts infix expression into Postfix form
- iii) Evaluates the postfix expression

Week 6

a) Develop an applet that displays a simple message.

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

Week 7

a) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result.

Week 8

a) Write a Java program for handling mouse events.

Week 9

a) Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.

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

Week 10

a) Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box.

Week 11

a) Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console.

For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle. (Use java.net)

Week 12

a) Write a java program that simulates a traffic light. The program lets the user select one of three lights : red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.

b) Write a Java program that allows the user to draw lines, rectangles and ovals.

Week 13

a) Write a java program to create an abstract class named Shape that contains an empty method named `numberOfSides()`. Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method `numberOfSides()` that shows the number of sides in the given geometrical figures.

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

TEXT BOOKS:

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Introduction to Java programming, Sixth edition, Y.Daniel Liang, Pearson Education
3. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Private Limited.

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II Year B.Tech. AME II Semester

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(07A4BS01) PROBABILITY AND STATISTICS

UNIT-I

Probability: Sample space and events - Probability - The axioms of probability - Some Elementary theorems - Conditional probability - Baye's theorem.

UNIT-II

Random variables - Discrete and continuous - Distribution - Distribution function. Distribution

UNIT-III

Binomial and poison distributions Normal distribution - related properties.

UNIT-IV

Sampling distribution: Populations and samples - Sampling distributions of mean (known and unknown) proportions, sums and differences.

UNIT-V

Estimation: Point estimation - interval estimation - Bayesian estimation.

UNIT-VI

Test of Hypothesis - Means- Hypothesis concerning one and two means- Type I and Type II errors. One tail, two-tail tests.

UNIT-VII

Tests of significance - Student's t-test, F-test, χ^2 test. Estimation of proportions.

UNIT-VIII

Queuing Theory: Pure Birth and Death Process M/M/1 Model and Simple Problems.

Text Books:

1. Probability & Statistics, T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. A text book of Probability & Statistics, Shahnaz Bathul, V. G. S. Book Links.

References:

1. Probability & Statistics, Arnold O. Allen, Academic Press
2. Probability & Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India.
3. Probability & Statistics, Menden Hall, Beaver Thomson Publishers.
4. Probability & Statistics, D. K. Murugeson & P. Guru Swamy, Anuradha Publishers.

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II Year B.Tech. AME II Semester

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(07A42401) Automotive Engines

Unit-I

Introduction: Historical development of Automobiles, Different Types of Automotive Power plants, principles of I.C engine operation and classification of engines, supercharging and turbo charging.

Unit-II

Two stroke and four stroke engines: different types of scavenging systems for 2stroke engines, scavenging efficiency. Relative merits and demerits in comparison to four stroke engines. Valve and Port timing diagrams, special types of I.C engines like Sterling, Wankle rotary, variable compression ratio engines and Variable valve timing engines.

Unit-III

Automobile Engine Components: Classification, Function, Materials, Constructional details and Manufacturing process of engine components. Cylinder head, cylinder block, cylinder liner, piston, piston ring, connecting rod, crankshaft, camshaft, Bearings, Gudgeon pin, Valve & Valve gear, valve mechanisms, Inlet and Exhaust manifolds, crankcase, flywheel, oil sump and crank case.

Unit-IV

Carburetion: Mixture requirements in SI Engines, fundamental of carburetion flow characteristics of carburetion, methods of mixture correction, calculation of throat and jet sizes of a carburetor, Types of carburetors, simple, S.U. carburetor, zenith carburetor etc. Means of compensation during starting, idling and acceleration. Carburetor adjustments, field and lab tests. Fuel feed pumps, Petrol Injection: Disadvantages of carburetion.

Unit-V

Advantages of petrol injection, need to have a close control over air fuel ratio in SI Engines for emission reduction, cylinder port and manifold injection systems, timed and continuous injection systems, multipoint fuel injection systems, Gasoline direct injection.

Unit VI

Fuel injection in CI Engines: Fuel filters, transfer pumps, injection pumps. Injection nozzles, their functions. Diesel fuel pumps: principle Delivery characteristics of fuel pumps, characteristic injection lag effect of injection, pressure waves in fuel lines, rotary distributor pumps.

Unit - VII

Governors: Maximum and minimum speed governors. Mechanical and pneumatic governors. Fuel spray characteristics: Types of injection nozzles and their characteristics, Multihole, pintle and Pintaux nozzles. Unit injectors.

Unit - VIII

Lubrication Systems: Functions of the lubrication system, classification of lubricating oils, lubricating systems -wet sump lubrication - dry sump lubrication, oil filters, oil pumps, crankcase ventilation, oil additives. Air and water cooling systems, thermo syphon and forced water cooling systems.

Text Books:

1. K Newton and Steeds -The Motor Vehicle, SAE Publications
2. ML Mathur & RPSharma -A course in Internal combustion Engines - Dhanpat Rai
3. V Ganesan, I.C Engines.

References Books:

1. Bosch Gasoline Engines management - Bosch Publications
2. Bosch Diesel Engine management - Bosch Publication
3. B.P. Obert I C Engines & Air Pollution - Harper & Row Publications
5. Heinz Heistler, Internal Combustion Engines, SAE Publications
6. Richard Stone, Introduction to Internal Combustion Engines, MacMillan UK

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(07A4EC06) MACHINE DRAWING

Machine Drawing Conventions :

Need for drawing conventions - introduction to ISI conventions

- Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.
- Types of sections - selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.
- Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.
- Title boxes, their size, location and details - common abbreviations & their liberal usage.
- 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.

- Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
- Keys, cotter joints and knuckle joint.
- Riveted joints for plates.
- Shaft coupling, spigot and socket pipe joint.
- 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.

- Engine parts - stuffing boxes, cross heads, Eccentrics, Petrol Engine connecting rod, piston assembly.
- Other machine parts - Screws jacks, Machine Vices Plummer block, Tailstock.
- 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 :

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

REFERENCES :

- Machine Drawing - P.S.Gill.
- Machine Drawing - Luzzader
- Machine Drawing - Rajput

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(07A4EC04) 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 Russel - 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 and Mechanisms-S.S.Rattan, Tata McGraw Hill

Publishers

2. Theory of Machines R.S Khurmi & J.K Gupta

REFERENCES:

1. Theory of Machines by Thomas Bevan/ CBS
2. Theory of Machines / R.K Bansal
3. Theory of Machines Sadhu Singh Pearson Edn
4. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age
5. The theory of Machines /Shiegley/ Oxford.
6. Theory of machines - PL. Balaney/khanna publishers.

(07A4EC01) ENVIRONMENTAL STUDIES

UNIT - I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance - Need for Public Awareness.

UNIT - II

Natural Resources : Renewable and non-renewable resources - Natural resources and associated problems - Forest resources - Use and over-exploitation, deforestation, case studies - Timber extraction - Mining, dams and other effects on forest and tribal people - Water resources - Use and over utilization of surface and ground water - Floods, drought, conflicts over water, dams - benefits and problems

- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, 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, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT - III

Ecosystems : Concept of an ecosystem. - Structure and function of an ecosystem - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem:

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT - IV

Biodiversity and its conservation : Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels. - India as a megadiversity nation - Hot-spots of biodiversity. - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity.

UNIT - V

Environmental Pollution : Definition, Cause, effects and control measures of :

- a. Air pollution
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution

g. Nuclear hazards

Solid waste Management : Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT - VI

Social Issues and the Environment : From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, watershed management -Resettlement and rehabilitation of people; its problems and concerns.
Case Studies -Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. -Consumerism and waste products. - Environment Protection Act - Air (Prevention and Control of Pollution) Act - Water (Prevention and control of Pollution). -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT - VII

Human Population and the Environment : Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. -Case Studies.

UNIT - VIII

Field work : Visit to a local area to document environmental assets River /forest grassland/hill/mountain -Visit to a local polluted site-Urban/Rural/Industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOK:

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

REFERENCE:

- 1 Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.

UNIT - I

Actual Cycles and their Analysis: Introduction, Comparison of Air Standard and Actual Cycles, Time Loss Factor, Heat Loss Factor, Exhaust Blowdown-Loss due to Gas exchange process, Volumetric Efficiency, Loss due to Rubbing Friction, Actual and Fuel-Air Cycles Of CI Engines.

UNIT-II

I.C. ENGINES : Classification - Working principles, Valve and Port Timing Diagrams, Air - Standard, air-fuel and actual cycles - Engine systems - Fuel, Carburetor, Fuel Injection System, Ignition, Cooling and Lubrication.

UNIT - III

Combustion in S.I. Engines : Normal Combustion and abnormal combustion - Importance of flame speed and effect of engine variables - Type of Abnormal combustion, pre-ignition and knocking (explanation of) - Fuel requirements and fuel rating, anti knock additives - combustion chamber - requirements, types.

UNIT IV

Combustion in C.I. Engines : Four stages of combustion - Delay period and its importance - Effect of engine variables - Diesel Knock- Need for air movement, suction, compression and combustion induced turbulence - open and divided combustion chambers and nozzles used - fuel requirements and fuel rating.

UNIT - V

Testing and Performance : Parameters of performance - measurement of cylinder pressure, fuel consumption, air intake, exhaust gas composition, Brake power - Determination of frictional losses and indicated power - Performance test - Heat balance sheet and chart.

UNIT - VI

COMPRESSORS - Classification -positive displacement and roto dynamic machinery - Power producing and power absorbing machines, fan, blower and compressor - positive displacement and dynamic types - reciprocating and rotary types.

Reciprocating : Principle of operation, work required, Isothermal efficiency volumetric efficiency and effect of clearance, stage compression, undercooling, saving of work, minimum work condition for stage compression.

UNIT VII

Rotary (Positive displacement type) : Roots Blower, vane sealed compressor, Lysholm compressor - mechanical details and principle of working - efficiency considerations.

Dynamic Compressors : Centrifugal compressors: Mechanical details and principle of operation - velocity and pressure variation. Energy transfer-impeller blade shape-losses, slip factor, power input factor, pressure coefficient and adiabatic coefficient - velocity diagrams - power.

UNIT-VIII

Axial Flow Compressors : Mechanical details and principle of operation - velocity triangles and energy transfer per stage degree of reaction; work done factor - isentropic efficiency- pressure rise calculations - Polytropic efficiency.

TEXT BOOKS:

1. I.C. Engines / V. GANESAN- TMH
2. Thermal Engineering / Rajput / Lakshmi Publications.

REFERENCES:

1. IC Engines - Mathur & Sharma - Dhanpath Rai & Sons.
2. Engineering fundamentals of IC Engines - Pulkarabek / Pearson /PHI
3. Thermal Engineering / Rudramoorthy - TMH
4. Thermodynamics & Heat Engines / B. Yadav/ Central Book Depot., Allahabad
5. I.C. Engines / Heywood /McGrawHill.
6. Thermal Engineering - R.S. Khurmi & J.K.Gupta - S.Chand
7. IC Engines/ Ramalingam/ Scitech publishers

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(07A42491) METALLURGY AND MECHANICS OF SOLIDS LAI

(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. Hardenability of steels by Jominy End Quench Test.
7. To find out the hardness of various treated and untreated steels.

(B) MECHANICS 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

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(07A42492) THERMAL ENGINEERING LAB

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

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(07A5HS01) 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 Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.
5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.
6. Dominick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson.
7. Narayanaswamy: Financial Accounting-A Managerial Perspective, PHI.
8. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech.
9. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas.
10. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley.
11. Dwivedi:Managerial Economics, 6th Ed., Vikas.

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(07A50107) FLUID MECHANICS AND HYDRAULIC MACHINERY

UNIT I

Fluid statics : Dimensions and units: physical properties of fluids- specific gravity, viscosity surface tension- vapor pressure and their influence on fluid motion, atmospheric gauge and vacuum pressure - 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, and irrotational flows-equation of continuity for one dimensional flow.

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: pilot tube, venturimeter, and orifice meter, Flow nozzle, Turbine flow meter (Ref.4)

UNIT IV

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 V

Hydroelectric power stations : Elements of hydro electric power station-types-concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies.

UNIT VI

Hydraulic Turbines : Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies -hydraulic design -draft tubetheory- 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 - manometric head- losses and efficiencies-specific speed- pumps in series and parallel-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.
4. Instrumentation for Engineering Measurements by James W. Dally, William E. Riley, John Wiley & Sons Inc. 2004 (Chapter 12 - Fluid Flow Measurements).

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(07A5EC06) HEAT TRANSFER

UNIT - I

Introduction : Modes and mechanisms of heat transfer - Basic laws of heat transfer -General discussion about applications of heat transfer.

Conduction Heat Transfer : 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
7. Heat and Mass Transfer - D.S.Kumar / S.K.Kataria & Sons
8. Heat and Mass Transfer-Kondadaraman
9. Fundamentals of Heat Transfer & Mass Transfer- Incropera & Dewitt / John Wiley Pub.

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(07A5EC03) 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. Static and dynamic force analysis of planar mechanisms.

UNIT - II

FRICITION : Inclined plane, friction of screw and nuts, pivot and collar, uniform pressure, uniform wear, friction circle and friction axis : lubricated surfaces, boundary friction, film lubrication.

UNIT - III

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 - IV

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 - V

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

UNIT - VI

BALANCING : Balancing of rotating masses Single and multiple - single and different planes.

UNIT - VII

Balancing of Reciprocating Masses: Primary, Secondary, and higher balancing of reciprocating masses. Analytical and graphical methods. Unbalanced forces and couples - examination of "V" multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing - Hammer blow, Swaying couple, variation of tractive efforts.

UNIT - VIII

VIBRATION : Free Vibration of mass attached to vertical spring - oscillation of pendulums, centers of oscillation and suspension. Transverse loads, vibrations of beams with concentrated and distributed loads. Dunkerly's methods, Raleigh's method. Whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems. Simple problems on forced damped vibration. Vibration Isolation & Transmissibility

TEXT BOOKS :

1. Theory of Machines / S.S Ratan/ Mc. Graw Hill Publ.
2. Theory of Machines / Jagadish Lal & J.M.Shah / Metropolitan.

REFERENCES :

1. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age
2. Theory of Machines / Shierly / MGH
3. Theory of Machines / Thomas Bevan / CBS Publishers
4. Theory of machines / Khurmi/S.Chand.

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(07A50305) Design of Machine Elements

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 - Combined stresses - Torsional and bending stresses - impact stresses - stress strain relation - Various theories of failure - factors of safety - Design for strength and rigidity - preferred numbers. The concept of stiffness in tension, bending, torsion and combined situations - Static strength design based on fracture toughness.

UNIT - II

STRENGTH OF MACHINE ELEMENTS : Stress concentration - Theoretical stress Concentration factor - Fatigue stress concentration factor notch sensitivity - Design for fluctuating stresses - Endurance limit - Estimation of Endurance strength - Goodman's line - Soderberg's line - Modified goodman's line.

UNIT - III

Riveted and welded joints - Design of joints with initial stresses
Bolted joints - Design of bolts with pre-stresses - both of uniform strength.

UNIT - IV

SHAFTS, KEYS AND COTTERS:

SHAFTS : Design of solid and hollow shafts for strength and rigidity - Design of shafts for combines bending and axial loads - Shaft sizes - BIS code. Design of Keys-stresses in keys-cottered joints-spigot and socket, sleeve and cotter.

UNIT - V

Mechanical Springs:

Stresses and deflections of helical springs - Extension and DMM - I compression springs - Springs for fatigue loading - natural frequency of helical springs - Energy storage capacity - helical torsion springs - Co-axial springs, leaf springs.

UNIT - VI

BEARINGS : Types of Journal bearings - Lubrication - Bearing Modulus - Full and partial bearings - Clearance ratio - Heat dissipation of bearings, bearing materials - journal bearing design - Ball and roller bearings - Static loading of ball & roller bearings, Bearing life.

UNIT - VII

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.

UNIT - VIII

Pistons, Forces acting on piston - Construction Design and proportions of piston. Cylinder timers.

TEXT BOOKS :

1. Dr P. Kannaiah Scitech Publishers

2. Machine Design / Soundararaja Murthy and shanmugam
3. Machine design - Pandya & shah.

REFERENCE BOOKS :

1. Design of Machine Elements / V.M. Faires
2. Machine design / Schaum Series.
3. Mech. Engg. Design / JE Shigley
4. Machine Design / Sarma and Agarwal
5. Machine Design / V.V. Bhandari

Pre-requisite: Strength of materials, KOM

Objective: to provide design procedures of some basic mechanical elements only

Codes / Tables: Not permitted

Question Paper Pattern:

NOTE : Design Data books are not permitted in the Examinations. The design must not only satisfy strength criteria but also rigidity criteria.

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T	P	C
4+1*	0	4

(07A50306) THERMAL ENGINEERING - II

UNIT - I

Basic Concepts : Rankine cycle - Schematic layout, Thermodynamic Analysis, Concept of Mean Temperature of Heat addition, Methods to improve cycle performance - Regeneration & reheating.

Combustion: fuels and combustion, concepts of heat of reaction, adiabatic flame temperature, stoichiometry, flue gas analysis

UNIT II

Boilers : Classification - Working principles - with sketches including H.P.Boilers - Mountings and Accessories - Working principles, Boiler horse power, equivalent evaporation, efficiency and heat balance - Draught, classification - Height of chimney for given draught and discharge, condition for maximum discharge, efficiency of chimney - artificial draught, induced and forced.

UNIT - III

Steam Nozzles : Function of nozzle - applications - types, Flow through nozzles, thermodynamic analysis - assumptions -velocity of nozzle at exit-Ideal and actual expansion in nozzle, velocity coefficient, condition for maximum discharge, critical pressure ratio, criteria to decide nozzle shape: Super saturated flow, its effects, degree of super saturation and degree of under cooling - Wilson line.

UNIT - IV

Steam Turbines : Classification - Impulse turbine; Mechanical details - Velocity diagram - effect of friction - power developed, axial thrust, blade or diagram efficiency - condition for maximum efficiency. De-Laval Turbine - its features. Methods to reduce rotor speed-Velocity compounding and pressure compounding, Velocity and Pressure variation along the flow - combined velocity diagram for a velocity compounded impulse turbine.

UNIT V

Reaction Turbine : Mechanical details - principle of operation, thermodynamic analysis of a stage, degree of reaction -velocity diagram - Parson's reaction turbine - condition for maximum efficiency.

UNIT VI

Steam Condensers : Requirements of steam condensing plant - Classification of condensers - working principle of different types - vacuum efficiency and condenser efficiency - air leakage, sources and its affects, air pump- cooling water requirement.

UNIT - VII

Gas Turbines : Simple gas turbine plant - Ideal cycle, essential components - parameters of performance - actual cycle - regeneration, inter cooling and reheating -Closed and Semi-closed cycles - merits and demerits, Brief concepts about compressors, combustion chambers and turbines of Gas Turbine Plant.

UNIT - VIII

Jet Propulsion : Principle of Operation -Classification of jet propulsive engines - Working Principles with schematic diagrams and representation on T-S diagram - Thrust, Thrust Power and

Propulsion Efficiency - Turbo jet engines - Needs and Demands met by Turbo jet - Schematic Diagram, Thermodynamic Cycle; Performance Evaluation Thrust Augmentation - Methods.

Rockets : Application - Working Principle - Classification - Propellant Type - Thrust, Propulsive Efficiency - Specific Impulse - Solid and Liquid propellant Rocket Engines.

TEXT BOOKS :

1. Thermal Engineering / R.K. Rajput / Lakshmi Publications
2. Gas Turbines - V.Ganesan /TMH

REFERENCES:

1. Thermodynamics and Heat Engines / R. Yadav / Central Book Depot
2. Gas Turbines and Propulsive Systems - P.Khajuria & S.P.Dubey - /Dhanpatrai
3. Gas Turbines / Cohen, Rogers and Saravana Muttou / Addison Wesley - Longman
4. Thermal Engineering-R.S Khurmi/JS Gupta/S.Chand.
5. Thermal Engineering-P.L.Bellaney/ khanna publishers.
6. Thermal Engineering-M.L.Marthur & Mehta/Jain bros.

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(07A52491) AUTOMOBILE ENGINEERING LABORATORY -I

PART-A

1. Study of Hand power and measuring tools -sketching, materials used and their uses.

2. Writing technical specifications and descriptions of all types of automobile engines (petrol and diesel) -materials, functions with sketches.

3 i) Dismantling, Inspection for wear and tear, crack, material breakdown of different engines components. Servicing of engines by paraffin and degreasing methods, decarbonising procedure, Dismantling, Inspection and Assembly of different parts of two wheelers. 3 wheelers & 4 wheelers. Tractor & Heavy duty engines covering 2-stroke and 4 stroke, SI and CI engines using the concepts of torque and assembly diagrams.

ii) Measurement of dimensions of different components of the above engines and compare the same with standard specifications. Assembling the engines with using special tools, necessary adjustments of the engine components. Valve spring testing, connecting rod alignment, piston ring testing procedure for dismantling and assembling.

PART-B

4. Testing of I.C. Engines-Basic measurements -speed, fuel, flow, air consumption, measurement of BHP using different types of dynamometers, their working principles. Determination of IHP, BHP. Mech. efficiency, break thermal efficiency, indicated thermal efficiency, volumetric efficiency SFC. etc; Drawing head balance sheet for petrol and diesel engines.

5. Test on multi cylinder engines, morse test.

6. Valve and port timing diagrams-determination of compression ratio.

7. Tests on Fuel and Lubricants.

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(07A52492) 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.
- Group Discussion - dynamics of group discussion , intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- Interview Skills - concept and process, pre-interview planning, opening strategies; answering strategies, interview through tele and video-conferencing.
- Resume' writing - structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets, summary, formats and styles, letter-writing.
- Reading comprehension - reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading.
- Technical Report writing - Types of formats and styles, subject matter - organization, clarity, coherence and style, planning, data-collection, tools, analysis.

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:

- iv) P - IV Processor
- a) Speed - 2.8 GHZ
- b) RAM - 512 MB Minimum
- c) Hard Disk - 80 GB
- v) 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. Effective Technical Communication, M. Ashraf Rizvi, Tata Mc. Graw-Hill Publishing Company Ltd.
2. A Course in English communication by Madhavi Apte, Prentice-Hall of India, 2007.
3. Communication Skills by Leena Sen, Prentice-Hall of India, 2005.
4. Academic Writing- A Practical guide for students by Stephen Bailey, Routledge Falmer, London & New York, 2004.
5. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai
6. Body Language- Your Success Mantra by Dr. Shalini Verma, S. Chand, 2006.
7. DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice, New Age International (P) Ltd., Publishers, New Delhi.
8. Books on TOEFL/GRE/GMAT/CAT by Barron's/cup
9. IELTS series with CDs by Cambridge University Press.
10. Technical Report Writing Today by Daniel G. Riordan & Steven E. Pauley,

- Biztantra Publishers, 2005.
11. **Basic Communication Skills for Technology** by Andra J. Rutherford, 2nd Edition, Pearson Education, 2007.
 12. **Communication Skills for Engineers** by Sunita Mishra & C. Muralikrishna, Pearson Education, 2007.
 13. **Objective English** by Edgar Thorpe & Showick Thorpe, 2nd edition, Pearson Education, 2007.
 14. **Cambridge Preparation for the TOEFL Test** by Jolene Gear & Robert Gear, 4th Edition.
 15. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press.

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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(07A6HS02) INDUSTRIAL MANAGEMENT

UNIT I

Concepts of Management and Organisation - Functions of Management - Evolution of Management Thought : Taylor's Scientific Management, Fayol's Principles of Management, Douglas Mc-Gregor's Theory X and Theory Y, Mayo's Hawthorne Experiments, Herzberg's Two Factor Theory of Motivation, Maslow's Hierarchy of Human Needs - Systems Approach to Management.

UNIT II

Designing Organisational Structures : Basic concepts related to Organisation - Departmentation and Decentralisation, Types of mechanistic and organic structures of organisation (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

Plant location, definition, factors affecting the plant location, comparison of rural and urban sites-methods for selection of plant- Matrix approach. Plant Layout - definition, objectives, types of production, types of plant layout - various data analyzing forms-travel chart.

UNIT IV

Work study - Definition, objectives, method study - definition, objectives, steps involved- various types of associated charts-difference between micromotion and memomotion studies. Work measurement- definition, time study, steps involved-equipment, different methods of performance rating- allowances, standard time calculation. Work Sampling - definition, steps involved, standard time calculations, differences with time study.

UNIT V

Materials Management-Objectives, Inventory - functions, types, associated costs, inventory classification techniques-ABC and VED analysis. Inventory Control Systems- Continuous review system-periodical review system. Stores Management and Stores Records. Purchase management, duties of purchase of manager, associated forms.

UNIT VI

Introduction to PERT / CPM : Project management, network modeling-probabilistic model, various types of activity times estimation-programme evaluation review techniques- Critical Path-probability of completing the project, deterministic model, critical path method (CPM)-critical path calculation-crashing of simple of networks.

UNIT VII

Inspection and quality control, types of inspections - Statistical Quality Control-techniques-variables and attributes-assignable and non assignable causes- variable control charts, and R charts, attributes control charts, p charts and c charts. Acceptance sampling plan- single sampling and double sampling plans-OC curves. Introduction to TQM-Quality Circles, ISO 9000 series procedures.

UNIT VIII

Introduction to Human Resource Management, Functions of HRM, Job Evaluation, different types of evaluation methods. Job description, Merit Rating.- difference with job evaluation, different methods of merit ratings, wage incentives, different types of wage incentive schemes. Marketing, marketing vs selling, marketing mix, product life cycle.

TEXT BOOKS:

1. Amrine, Manufacturing Organization and Management, Pearson, 2nd Edition, 2004.
2. Industrial Engineering and Management O.P. Khanna Dhanpat Rai.

REFERENCES:

1. Stoner, Freeman, Gilbert, *Management*, 6th Ed, Pearson Education, New Delhi, 2005.
2. Panner Selvam, Production and Operations Management, PHI, 2004.
3. Dr. C. Nadha Muni Reddy and Dr. K. Vijaya Kumar Reddy, Reliability Engineering & Quality Engineering, Galgotia Publications, Pvt., Limited.
4. Ralph M Barnes, Motion and Time Studies, John Wiley and Sons, 2004.
5. Chase, Jacobs, Aquilano, Operations Management, TMH 10th Edition, 2003.
6. L.S.Srinath, PERT / CPM, affiliate East-West Press, New Delhi, 2000.
7. Gary Dessler, Human Resource Management, Pearson Education Asia, 2002.
8. Phillip Kotler, Marketing Management, Pearson, 2004.
9. A.R.Aryasri, Management Science for JNTU (B.Tech), Tata McGraw-Hill, 2002.

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T	P	C
4+1*	0	4

(07A60308) MACHINE TOOLS AND METROLOGY**Unit-I**

Elementary treatment of metal cutting theory -Element of cutting process -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.

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.

Unit-II

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 .

Milling machine -Principles of working -specifications -classifications of milling machines -Principal features of horizontal, vertical and universal milling machines -machining operations.

Unit-III

Shaping slotting and planing machines -Principles of working -Principal parts -specification classification, operations performed.

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.

Unit-IV

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.

Lapping, honing and broaching machines -comparison to grinding.

Unit-V

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.

Application of suitable limits and tolerances -for correct functioning and economic manufacture and control of size during manufacturing and inspection.

Unit-VI

LINEAR MEASUREMENT: Length standard, line and end standard, slip gauges -calibration of the slip gauges, Dial indicator, micrometers.

MEASUREMENT OF ANGLES AND TAPERS: Different methods -Bevel protractor- angle slip gauges -spirit levels -sine bar -Sifice 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.

Unit-VII

OPTICAL MEASURING INSTRUMENTS: Tool maker's microscope and its uses -collimators, optical projector -optical flats and their uses, interferometer.

FLAT SURFACE MEASUREMENT: Measurement of flat surfaces -instruments used -straight edges -surface plates -optical flat, auto collimator.

SURFACE ROUGHNESS MEASUREMENT: Differences between surface roughness and surface waviness -Numerical assessment of surface finish -CLA, R, R.M.8

Values -Rz values, R10 value, Methods of measurement of surface finish -profilograph. Talysurf, 181 symbols for indication of surface finish.

UNIT- V III

MEASUREMENT THROUGH COMPARATORS: Comparators - Mechanical, Electrical and Electronic Comparators, pneumatic comparators and their uses in mass production.

SCREWTHREAD MEASUREMENT: Element of measurement -errors in screw threads -measurement of effective diameter, angle of thread and thread pitch, profile thread gauges.

Machine Tool Alignment Tests: Brief Treatment of the subject

TEXT BOOKS

1. Production Technology by R.K. Jain and S.C. Gupta.
2. Manufacturing engineering and Technology / Kalpakjian / A8eis19n Wesley.

REFERENCEBOOKS:

1. BIS standards on Limits & Fits, Surface Finish, Machine Tool Alignment etc.
2. Precision Engineering in Manufacturing / RL Mithy / New Age .
3. Machine Tools - C.Elanchezian and M. Vijayan / Anuradha Agencies Publishers.
4. Production Technology by H.M.T. (Hindustan Machine Tools).
5. Engineering Metrology / R.K. Jain / Khanna Publishers

T	P	C
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(07A62401) VEHICLE DYNAMICS

Unit-I

Undamped free vibration: Single degree of freedom Systems, introduction, undamped free vibration -Natural frequency' of free vibration, Rayleigh's method, stiffness of spring elements, effects of spring mass, Energy method, Newton's method and D'Alembert's principle- problems.

Unit-II

Damped free vibration: Single degree of freedom systems, different types of damping, concept of critical damping and its importance, response study of viscous damped systems for cases of under damping and over damping, logarithmic decrement.

Unit-III

Forced vibration: Single degree of freedom systems, steady state solution with viscous damping due to harmonic force solution by complex algebra, concept of response, reciprocating and rotating unbalance, vibration isolation Transmissibility ratio, energy dissipated by damping equivalent.
viscous damping: Structural damping, sharpness or resonance, base excitation.

Unit-IV

Vibration measuring instruments -Accelerometers and vibrometers, whirling of shafts with and without air damping, discussion of speeds above and below critical speeds.

Unit-V

Systems with two degree of freedom : Introduction, principle modes and normal modes" co-ordinate coupling, generalised and principle co-ordinate, free vibrations in terms of natural conditions. Lagranges equation, semi-definite systems, forced oscillations. harmonic excitation.

Unit-VI

Vehicle vibrations: Vehicle vibration with single degree of freedom free vibration, forced vibration, vibration due to road roughness, vibration due to engine unbalance, transmissibility of engine mounting vibration with two degree of freedom, free vibration, compensated suspension systems forced vibration, vibration due to road roughness.

Unit-VII

Different types of tyres - Materials used: Tyre construction, physics of tyre traction on dry and wet surface, tyre traction on dry and wet surface, tyre forces and moments, SAE recommended terminologies of tyre road interaction.

Unit-VIII

Numerical methods for multi degree of freedom systems: Introduction, influence coefficients, Maxwell's reciprocal theorem, Dunkerley's equation, orthogonality principle, method of matrix iteration- method of determination of all the natural frequencies using sweeping matrix and orthogonality principle, Holzer's method for systems with free, fixed free and fixed ends.

TEXTBOOKS:

1. Mechanical Vibration -By G.K.Grover, Nernchand & Brothers
2. Vibration Theory & Applications -By William I Thomson, Prentice Hall
3. Theory & Problems of Mechanical Vibration -By William W. Seto, McGrawHill

- (schaum's outline series)
4. Problems in Automobile Mechanics-By N.K.Giri, Khanna Pub.
 5. Mechanics of Pneumatic Tyre -By S.K.Cark, Prentice Hall
 6. Mechanical Vibration Analysis -By PSrinivasan, TMH
 7. Mechanical Vibration -By Church. Wife) international

Prerequisites: Engineering mechanics, Mechanics of Solids, Kinematics of Machinery
Objectives: To import knowledge of vibrations due to different aspects like road construction and vibration measuring techniques to the students

Tables/Code: Nil

Question Paper Pattern: 5 Questions to be answered out of 8 Questions each questions should not have more than 3 bits

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(07A6EC04) 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. CAD / CAM / CIM / Radhakrishnan and Subramanian / New Age
3. Principles of Computer Aided Design and Manufacturing / Farid Amirouche / Pearson
4. CAD/CAM: Concepts and Applications/Alavalapati/ PHI
5. Computer Numerical Control Concepts and programming / Warren S Seames / Thomson.

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(07A60309) ROBOTICS

UNIT - I

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

UNIT - II

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

UNIT - III

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

UNIT - IV

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

UNIT - V

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

UNIT VI

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

UNIT VII

Robot actuators and Feed back components: Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors. Feedback components: position sensors - potentiometers, resolvers, encoders - Velocity sensors.

UNIT VIII

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

TEXT BOOKS :

1. Industrial Robotics / Groover M P /Pearson Edu.
2. Robotics and Control / Mittal R K & Nagrath I J / TMH.

REFERENCES :

1. Robotics / Fu K S/ McGraw Hill.
2. An Introduction to Robot Technology, / P. Coiffet and M. Chaironze / Kogam Page Ltd. 1983 London.
3. Robotic Engineering / Richard D. Klafter, Prentice Hall
4. Robot Analysis and Intelligence / Asada and Slotine / Wiley Inter-Science.
5. Introduction to Robotics / John J Craig / Pearson Edu.
6. Robot Dynamics & Control - Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Pte Ltd.

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(07A62402) AUTOMOTIVE ELECTRICAL AND AUTORONICS

Unit-I

Storage Battery: Principles of lead acid cells and their characteristics. construction and working of lead acid battery. types of batteries, testing of batteries, effect of temperature on capacity and voltage, battery capacity, voltage, efficiency, charging of batteries, sulphation and desulphation, maintenance and servicing. Fault diagnosis. New developments in electrical storage.

Unit-II

Ignition System: Conventional ignition system and study of its components. Types of ignition systems, spark advance and retarding mechanisms. Types of spark plugs, ignition timing, maintenance, servicing and fault diagnosis. Electronic ignition systems, programmed ignition, distributorless ignition.

Unit-III

a) Starter motor: Construction and working of series and shunt automotive starter motor, types of device arrangement, solenoid switches, starter motor troubles and repairs.

b) Electronic controls of carburetion: component of fuel injection systems, multipoint injection. Bosch L-variation electronic control diesel fuel injection.

Unit - IV

Charging system: Principle of generation of direct current. Principle, construction and working of alternator generating systems. Maintenance, servicing and trouble shooting. Bosch compact alternator.

Unit-V

Wiring for auto electrical Systems: Earth return and insulated return systems, six volt and twelve volt systems, fusing of circuits, low and high voltage automotive cables, wiring diagram for typical automotive wiring systems, maintenance and servicing.

Unit-VI

Dash board units and electrical accessories: Principle of automobile illumination, head lamp construction and wiring, horn, wind screen wiper signalling devices, fog lamps, auxiliary lighting , temperature gauge, oil pressure gauge, fuel gauge, speedometer, odometer.

Unit - VII

Number system codes and data representation: Binary numbers, number base conversion, decimal, octal and hexa-decimal numbers, BCD codes, memory representation of positive and negative integers, conversion real numbers, floating point notations and representations of floating point numbers, binary arithmetics, addition and subtraction of binary numbers, ones and two's complement method.

Unit - VIII

Logic gates, arithmetic circuits and introduction to microprocessors: Study of basic and universal logic gates, study of X-OR and X-NOR gates, flip flop, S-R, S-J flip flop and counters and shift resistance, half adders and subtractors.

TEXTBOOKS:

1. Automotive Electrical auxiliary systems -By N. R. Khatawale
2. Digital Logic and Computer Design by Mano, Prentice hall of India

REFERENCES:

1. Automotive Electrical systems -By Young and Griffith, Butterworth
2. Basic automotive electrical systems -By C.P.Nakra, Dhanpat Rai.
3. Automotive mechanics -By William H. Grouse, TMH 5. Modern Electrical Equipments -By A. W. Judge,
4. Automotive Electrical Equipment -By P.I. Kohli, TMH

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(07A62491) METROLOGY AND MACHINE TOOLS LAB

Section A :

1. Measurement of lengths, heights, diameters by vernier calipers micrometers etc.
2. Measurement of bores by internal micrometers and dial bore indicators.
3. Use of gear teeth, vernier calipers and checking the chordal addendum and chordal height of spur gear.
4. Machine tool "alignment of test on the lathe.
5. Machine tool alignment test on milling machine.
6. Tool makers microscope and its application
7. Angle and taper measurements by Bevel protractor, Sine bars, etc.
8. Use of spirit level in finding the flatness of surface plate.
9. Thread measurement by Two wire/ Three wire method or Tool makers microscope.
10. Surface roughness measurement by Taly Surf.
11. Surface Wear Resistances Test using Electro Spark Coating Device.

Section B :

1. Introduction of general purpose machines -Lathe, Drilling machine, Milling machine, Shaper, Planing machine, slotting machine, Cylindrical 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 and Planing
6. Slotting
7. Milling
8. Cylindrical Surface Grinding
9. Grinding of Tool angles.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

III Year B.Tech. AME II Semester

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(07A62492) AUTOMOBILE ENGINEERING LAB-II AND CAD/CAM LAB

AUTOMOBILE ENGINEERING LAB II:

1. Dismantling and assembly of LMV components as following :
 - a) Gear box b) clutch assembly c) Propeller shaft d) differential gear box
 - e) rear axle f) suspension system g) steering mechanism.
2. Dismantling and assembly of door frames, door locks and window locks
3. Study of driver's seat layout in anyone LMV and anyone HMV.
4. Testing, servicing and charging of batteries
5. Servicing of generator, alternator and starter motor with dismantling, testing, inspection and assembly.
6. Servicing of ignition systems
7. Drawing of general electrical wiring diagrams of various vehicles { two and four wheelers }
8. Calibration of micrometer, measurement of plain plug, measurement of plain ring gauge, taper gauge
9. Measurement of taper using sine bar and other instruments.
10. Measurement of base circle diameter and tooth thickness of spur and helical gears
11. Use of slip gauges, measurement of screw threads using screw thread micrometer, use of comparators, experiments involving profile projectors.

Note: Driving practice of a geared two wheeler and anyone LMV for a minimum of 10 hours during 5th & 6th semester be provided .

Objective: To impart practical knowledge on automobile working, Servicing and maintenance of selected components.

Pre Requisite: Automobile Engines.

CAD/CAM 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, DXF 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 deflections component and principal and Von-mises stresses in plane 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. Study 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 defects and tool management systems.

UNIT - I

Development - Definition- Characteristics and Phases - Types of models - 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.

SEQUENCING - Introduction - Flow -Shop sequencing - n jobs through two machines - n jobs through three machines - Job shop sequencing - two jobs through 'm' machines.

UNIT - III

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 - 2 X 2 games - 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.

UNIT - VII

DYNAMIC PROGRAMMING : Introduction - Bellman's Principle of optimality - Applications of dynamic programming- capital budgeting problem - 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 - Simulation Languages.

- c) Study of various post processors used in NC Machines.
- d) Development of NC code for free form and sculptured surfaces using CAM packages.
- 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.

Packages : Use of Auto CAD, Micro Station, CATIA, Pro-E, I-DEAS, ANSYS, NISA, CAEFEM, Gibbs CAM, Master CAM etc,

TEXT BOOK:

1. Operations Research / S.D.Sharma-Kedarnath
2. Introduction to O.R/Hiller & Libermann (TMH).

REFERENCES:

1. Operations Research/A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson Education.
2. Operations Research: Methods & Problems / Maurice Saseini, Arthur Yaspan & Lawrence Friedman
3. Operations Research / R.Pannerselvam,PHI Publications.
4. Operations Research / Wagner/ PHI Publications.
5. Operation Research /J.K.Sharma/MacMilan.
6. O.R/Wayne L.Winston/Thomson Brooks/cole
7. Introduction to O.R /Taha/PHI

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. AME I Semester

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4+1*	0	4

(07A72401) ALTERNATIVE ENERGY SOURCES FOR AUTOMOBILES**Unit-I**

Introduction: Need for non-conventional energy sources. Energy alternative: solar, photo-voltaic, Hydrogen, Bio mass. Electrical - their merits and demerits.

UNIT -II

Solar photo-voltaic conversion, Collection and storage of solar energy, collection devices, flat plate collectors, concentrating type collectors, principles and working of photo-voltaic Conversion, Applications to automobiles.

Unit-III

Energy from Bio mass: Photosynthesis, photosynthetic oxygen production, energy plantation. Bio gas production from organic waste, description of Bio gas plant, types of Bio gas plants, problems involved in production and transportation. Application of Bio gas in engines as a single fuel and dual fuel modification - Merits and demerits performance characteristics and their comparison.

Unit-IV

Hydrogen Energy: Properties of Hydrogen, sources of Hydrogen, Thermodynamics of water splitting Production of Hydrogen, Electrolysis of water. Thermal decomposition of water. Thermo-chemical production, Biochemical production.

Unit - V

Hydrogen fuel; Storage and Transportation methods, Applications to engines modifications necessary, precautions and safety measures - Performance characteristics in Engine and their comparison.

Unit-VI

Electric Automobiles: Design considerations, limitations, opportunities for improvement Batteries, problems, future possibilities , capacities, types , material requirement.

Unit - VII

Applicability of electric cars, Driving requirements, cost of electric car, comparative use of fuel and energy. Availability of energy for recharging, impacts on use of fuel and energy .impact on urban air quality, impact on price, material requirement Traction motors and types.

Unit-VIII

Use of gas turbines in cars, arrangement, control merits and de- merits.
Design of turbochargers for automobiles, their usefulness on the performance.

Objective:

Ever increasing quality of life, demands decent transport facility, This phenomenon imposes high demand on conventional Fossil fuels. Hence search for alternate fuels is a continuous phenomenon. The student is given an overview of various alternate fuels along with their merits and limits.

Text Books :

1. G.D. Rai 'Non-conventional sources of energy Khamma Lab.
2. William Hamilton 'Electric Automobiles', PHI

Reference Books :

1. S.P. Sukhatme 'Solar Energy', Tata McGraw Hill
2. S. Rao & B.B. Larulekar 'Energy Technology', Khamma Lab
3. Frank Kreith & Jan F. Krieder 'Principles of Solar Engineering' McGraw Hill
4. J.A. Duffie & W.A. Beckman 'Solar Energy -thermal Process' McGrawHill
5. E, D ;Totta, 'Solar Hydrogeff Energy-Systems'
6. T.N. Veziroglu: Alternative energy sources
7. Mitsui E. Stal, Biological solar energy conversion

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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IV Year B.Tech. AME I Semester

T	P	C
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(07A72402) AUTOMOTIVE CHASSIS AND SUSPENSION

UNIT-I

Introduction to Chassis System:

Introduction: Requirements of an automobile with types of automobiles, layout of an automobile with reference to power plant, power required for propulsion, various resistances to motion of the automobile.

UNIT-II

Frames: Types of frames, materials, calculation of stresses on sections, constructional details, loading points, testing of frames.

Wheels and tyres: Types of wheels, construction, structure and function of tyres, static and function of tyres.

UNIT-III

Steering systems: types of steering gears, front axle, under steer and over steer, wheel alignment, power steering, steering geometry, wheel balancing, centre point steering, steerability.

UNIT-IV

Brakes: Necessity of brake, stopping distance and time, brake efficiency, weight transfer, brake shoe theory, determination of braking torque, braking systems - mechanical, hydraulic, disc, parking and emergency brakes, servo and electrical, details of hydraulic system, mechanical system and components, types of brakes, master cylinders, factors influencing operation of brakes such as operating temperature, lining, brake clearance, pedal pressure, linkages etc.

UNIT-V

Suspension: Types of suspension, leaf springs, materials, independent suspension, torsion bar, air bellows or pneumatic, suspension, hydraulic suspension, constructional details of telescopic shock absorbers, types, vibrations and riding comfort, role axis of spring suspension.

UNIT-VI

Front Wheel Mounting, Rear Wheel Mounting, Engine mounting, Various types of springs used in suspension system. Requirements and various types, Material.

UNIT-VII

Testing : Testing procedures, types of tests and chassis components, equipment for lab and road tests, preparation of test reports.

UNIT-VIII

Two and three wheelers : Classification of two and three wheelers, construction details, construction details of frames and forks, suspension systems and shock absorbers, different arrangement of cylinders. Carburetion system and operation.

TEXTBOOK:

1. Automotive chassis and body -P. L. Kohli, TMH

REFERENCE BOOKS

1. Introduction to automobile engineering -N.R. Khatawate, Khanna pub.
2. Automotive mechanics -Joseph I heintner, Affiliated East West Press
3. Problems in Automobile Engineering -N.K.Giri, Khanna Pub
4. Automotive Chassis -P.M. Heldt, Chilton & Co.
5. Automobile Engineering -T.R. Banga & Nathu Singh, Khanna

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IV Year B.Tech. AME I Semester

T	P	C
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(07A7EC06) 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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IV Year B.Tech. AME I Semester

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(07A72403) AUTOMOTIVE POLLUTION AND CONTROL
(ELECTIVE - I)

UNIT - I

Laws and Regulation : Historical background, regulatory test procedures (European cycles), exhaust gas pollutants(European rail road limits), particulate pollutants, European statutory values, inspection of vehicles in circulation (influence of actual traffic conditions and influence of vehicle maintenance)

Analysis of pollutants : Carbon and Nitrogen Compounds -(CO,CO₂, NOx); Ammonia and Amines; Hydrocarbons, volatile compounds, evaporative losses, analysis of particulates.

UNIT - II

Pollutants from SI engines, Mechanism & formation of HE, CO, and NOx in SI engines. Engine and operating variables affecting pollutants in SI engines.

UNIT - III

Pollution for CI engines; Mechanism of formation of He, CO, NOx, and root in CI engines. Factor affecting emissions in CI engines.

UNIT - IV

Lean burn & stratified charge engines. Multipoint fuel injection and Gasoline direct injection methods. Common rail fuel injection in diesel engines. Exhaust gas recirculation.

UNIT - V

Post combustion treatments: Introduction, exhaust gas composition before treatment, catalytic converters, oxidation and three way types thermal reactors, installation of catalysts in exhaust lines, NOx treatment in diesel engines, particulate traps for diesel engines, particulate trap regeneration.

UNIT - VI

Economic challenges: Introduction, cost of improvement to SI engines, cost of injection systems, cost of improvement in Diesel engines; economic consequences of introducing the catalyst, additional costs incurred by diesel traps, cost of periodic inspection of pollution control systems and evaporative control systems.

UNIT - VII

Instrumentation for pollution measurements: NDIR - analysers, thermal conductivity and flame ionization detectors, analysers for NOx, gas chromatograph, Orsat apparatus, smoke meters- spot sampling and continuous indication types like Bosch, Hartridge. Particulate measuring systems. Dilution tunnels - full flow and partial flow.

UNIT - VIII

SI and CI engine fuel requirements. Knock in SI and CI engines. Knock rating of SI and CI Engine fuels. Alternative fuel like Hydrogen, Natural gas, LPG, Vegetable oil and biodiesel, their production, properties, storage and performance as engine fuels.

TEXT BOOKS :

1. Bosch - Gavline fuel injection - Bosch Publications
2. Bosch - Diesel fuel injection - Bosch Publications

REFERENCES:

1. Automobiles and Pollution -PaulDegobert(SAE) .
2. Diesel engine operation manual- V.L Maleev, CBS Pub
3. I.C. Engines -E.F. Obert, Harper& Row
4. Engine emission -Springer and Patterson, Plenum Press
5. Heins Aeisth - Internal Combustion Engines - SAE Publications.

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IV Year B.Tech. AME I Semester

T	P	C
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**(07A72404) VEHICLE BODY ENGINEERING AND SAFETY
(ELECTIVE -I)**

UNIT-I

Structural materials : Aluminium alloy sheet, extrusion and casting, Austenitic and Ferritic stainless steels, alloy steels. Different types of composites, FRP & metal Matrix Composites. Structural timbers - properties designing in GRP and high strength composites different manufacturing techniques of composites. Thermo plastics, ABS and styrenes. Load bearing plastics, semirigid PUR foams and sandwich panel construction.

UNIT-II

Shaping and packaging : Product design and concepts, Aesthetics and industrial design, formal aesthetics and shape, computer aided drafting, surface development, interior ergonomics, ergonomics system design, dash- board instruments, advances in electronic display, CV legal dimension, CV-cab ergonomics, mechanical package layout.

UNIT-III

Aerodynamics : Basics, aerofoils, aerodynamics drag lift, pitching, yawing and rolling moments, determination of aerodynamic coefficients (wind tunnel testing), racing car aerodynamics, bluff body aerodynamics, local air flows.

Unit-IV

Load Distribution : Types of load carrying structures -closed, integral, open, flat types. Calculation of loading cases- static, asymmetric, vertical loads. Load distribution, stress analysis of structure, body shell analysis.

Unit-V

Body Fitting and Controls : Driver's seat, window winding mechanism, Door lock mechanism, other interior mechanisms, driver's visibility and tests for, visibility, minimum space, requirements and methods of improving space in cars, electric wiring and electronic control systems, advanced body electronics, networking or body systems controls.

UNIT-VI

Noise, Vibration, Harshness : Noise and vibration basics, body structural vibrations, noise, chassis bearing vibration, designing against fatigue, rubber as an isolator, CV body automatic enclosures, sandwich panels, structure dynamics applied, safety under impact, Impact protection basics, design for crash worthiness, occupant and cargo restraints, Passive restraint systems, slide impact analysis, bumper system, energy absorbant foams, laws of mechanisms applied to safety.

Unit-VII

Vans, trucks and buses : Types of mini coach with trailers, single and double deckers, design criteria based on passenger capacity, goods to be transported and distance to be covered, constructional details: weights and dimensions, conventional and integral type.

2007-2008

UNIT-VIII

Vehicle stability : Steering geometry vehicle and a curvilinear path, and lateral stability, effects of tyre factors, mass distribution and engine location on stability.

TEXT BOOKS:

1. Body Engineering -Sydney F Page
2. Vehicle body engineering -Gilcs J Pawlowski,

REFERENCES:

1. Automotive chassis -P.M. Heldt. chilton & Co
2. Handbook on vehicle body design -SAE Publications.

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T	P	C
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**(07A72405) AUTO AIR CONDITIONING
(ELECTIVE - I)**

UNIT - I

Fundamentals of Refrigeration, vapour compressors refrigeration - working principle, cycle COP - refrigeration cycle in T-s and P-h coordinates, Effect of sub cooling & super heating and cycle analysis and problems using P-h charts.

UNIT - II

Introduction to Air Conditioning - Psychrometric properties and processes, sensible and latent heat loads, characterization and SHF load for ventilation and filtration, concepts of RSHF& SHF ESHF and ADP, concepts of human comfort and effective temperature.

UNIT - III

Components of Air conditioners: Air-conditioning Components: Compressor-Evaporator- Condenser- Expansion valve-Receiver Drier- Filters-Mufflers -special features- compressor protection Anti freezing relay.

UNIT - IV

Vehicle cooling, load estimation, capacity requirements of Air Conditioning System, refrigerants used in Automobiles - properties.

UNIT - V

Operation of an Air-conditioning System: Type of Air conditioners. Heaters-Vehicle ventilation-combination heater and air conditioner-manually controlled air conditioner and heater system- automatically controlled air conditioner and heater systems.

UNIT - VI

Air Heating equipment, Ducts, Registers and Grills, blowers, filters

UNIT - VII

Trouble Shooting and Services: Servicing of heating Systems, Causes of air conditioner Failure, leak testing guide, Discharging the system- Evacuating the system-charging the System-trouble shooting air conditioner heater Systems.

UNIT - VIII

Servicing of Air Conditioners- Heating Systems: Air conditioner maintenance and service. Compressor trouble shooting and service, clutch service- shaft seal leakage compressor. Seal removal checking oil level-oil addition, repairs on compressors.

TEXT BOOK:

1. Automotive Air-conditioning- By William H .Grouse & Donald L.Angtin. MH

REFERENCES:

1. Automotive Air-conditioning- By Leslie F.Gomgs.. McGrawHill
2. Automotive Air-conditioning- By Boyce H.Dwiggins. Reston Pub.
3. Refrigeration & Air Conditioning by Manohar Prasad
4. Refrigeration & Air Conditioning by CP Arora

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T	P	C
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**(07A7EC10) ADVANCED DATA STRUCTURES AND ALGORITHMS
(ELECTIVE - I)**

Unit I:-

C++ Class Overview- Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete), exception handling.

Unit II:-

Function Overloading, Operator Overloading, Generic Programming- Function and class templates, Inheritance basics; base and derived classes, inheritance types, base class access control, runtime polymorphism using virtual functions, abstract classes, streams I/O.

Unit III:-

Algorithms, performance analysis-time complexity and space complexity,O-notation, Omega notation and Theta notation, Review of basic data structures - the list ADT, stack ADT, queue ADT, implementation using template classes in C++, sparse matrix representation.

Unit IV:-

Dictionaries, linear list representation, skip list representation, operations- insertion, deletion and searching, hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing,extendible hashing, comparison of hashing and skip lists.

Unit V:-

Priority Queues - Definition, ADT, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion, Application-Heap Sort, External Sorting- Model for external sorting, Multiway merge, Polyphase merge.

Unit VI:-

Search trees (part I) : Binary search trees, definition, ADT, implementation, operations-searching, insertion and deletion, Balanced search trees- AVL trees, definition, height of an AVL tree, representation, operations-insertion, deletion and searching.

Search trees (part II) : Introduction to Red-Black trees and Splay Trees, B-Trees-B-Tree of order m, height of a B-Tree, insertion, deletion and searching, Comparison of Search Trees.

Unit VII:-

Divide and Conquer- General method, applications - Binary search, merge sort, quick sort, Strassen's matrix multiplication
Efficient non recursive tree traversals algorithms, Biconnected components. Disjoint set operations, union and find algorithms.

Unit VIII:-

Greedy method and Dynamic programming : General method (Greedy), Minimum cost spanning trees, Job sequencing with deadlines, General method (Dynamic

UNIT-I

8086 ARCHITECTURE : Functional Diagram, Register Organization, Addressing modes, Instructions, Functional schematic, Minimum and Maximum mode operations of 8086, 8086 Control signal interfacing, Timing Diagrams.

UNIT-II

ASSEMBLY LANGUAGE PROGRAMMING OF 8086 : Assembly Directives, Macro's, Simple Programs using Assembler, Implementation of FOR Loop, WHILE, REPEAT and IF-THEN-ELSE Features, String Manipulation, Procedures.

UNIT-III

I/O INTERFACE : Parallel data transfer stream, Programmed I/O, Interrupt Driven I/O, 8255 PPI, Various modes of operations and interface of I/O devices to 8086, A/D, D/A Converter Interfacing, Stepper Motor Interfacing.

UNIT-IV

INTERFACING WITH ADVANCED DEVICES : 8086 System bus structure, Memory and I/O Interfacing with 8086, Interfacing through various IC Peripheral Chips, 8257 (DMA Controller), 8259 (Interrupt Priority Control), Memory Interface using RAMS, EPROMS and EEPROMS.

UNIT-V

COMMUNICATION INTERFACE : Serial Communication Standards, USART Interfacing RS-232, IEEE-488, 20mA Current Loop, Prototyping and Trouble shooting, Software Debugging tools, MDS.

UNIT-VI

INTRODUCTION TO MICRO CONTROLLERS : Overview of 8051 Micro Controller, Architecture, I/O ports and Memory Organization, Addressing modes and Instruction set of 8051, Simple Programs using Stack Pointer, Assembly language programming.

UNIT-VII

8051 INTERRUPTS COMMUNICATION : Interrupts, Timer/Counter and Serial Communication, Programming Timer Interrupts, Programming External H/W interrupts, Programming the serial communication interrupts, Interrupt Priority in the 8051, Programming 8051 Timers, Counters and Programming.

UNIT- VIII

INTERFACING AND INDUSTRIAL APPLICATIONS : Applications of Micro Controllers, Interfacing 8051 to LED's, Push button, Relay's and Latch Connections, Keyboard Interfacing, Interfacing Seven Segment Display, ADC and DAC Interfacing.

TEXT BOOKS :

1. Kenneth J Ayala, " The 8051 Micro Controller Architecture, Programming and Applications", Thomson Publishers, 2nd Edition.
2. Kenneth J Ayala, " The 8086 Micro Processors Architecture, Programming and Applications", Thomson Publishers, 2005.

REFERENCES :

1. Ajay V. Deshmukh, "Microcontrollers - theory applications", Tata McGraw-Hill Companies - 2005.
2. D.V.Hall, "Micro Processor and Interfacing ", Tata McGraw-Hill.
3. Ray and BulChandi, " Advanced Micro Processors", Tata McGraw-Hill.

2007-2008
Programming), Optimal binary search trees, 0/1 knapsack problem, Ordering Matrix Multiplications

TEXT BOOKS :

1. Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education, second edition.
2. Data structures, Algorithms and Applications in C++, S.Sahni, University press (India) pvt Ltd, 2nd edition, Orient Longman pvt.ltd.

REFERENCE:

1. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and D.Mount, Seventh Edition Wiley student edition, John Wiley and Sons.
2. Data Structures and Algorithms In C++, Third Edition, Adam Drozdek, Thomson
3. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.
4. C++, The Complete Reference, 4th Edition, Herbert Schildt, TMH.
5. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI/Pearson Education.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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IV Year B.Tech. AME I Semester

T	P	C
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(07A7EC08) COMPUTATIONAL FLUID DYNAMICS
(ELECTIVE - II)

UNIT-I

Elementary details in numerical Techniques: Number system and errors, Representation of integers, Fractions, Floating point Arithmetic, loss of significance and error propagation, condition and instability, computational methods for error estimation, Convergence of Sequences.

UNIT - II

Applied Numerical Methods: Solution of a system of simultaneous Linear Algebraic Equations, iterative schemes of Matrix Inversion, Direct Methods for Matrix inversion, Direct Methods for banded matrices.

UNIT - III

Finite Difference Applications in Heat conduction and Convection - Heat conduction, steady heat conduction in a rectangular geometry, transient heat conduction, finite difference application in convective heat transfer, closure.

UNIT - IV

Finite Differences, discretization, consistency, stability, and Fundamentals of fluid flow modeling: Introduction, elementary finite difference quotients, implementation aspects of finite-difference equations, consistency, explicit and implicit methods.

UNIT - V

Introduction to first order wave equation, stability of hyperbolic and elliptic equations, fundamentals of fluid flow modeling, conservative property, the upwind scheme.

UNIT - VI

Review of Equations Governing Fluid Flow and Heat Tran. er: Introduction, conservation of mass, Newton's second law of motion, expanded forms of Navier-Stokes equations, conservation of energy principle, special forms of the Navier-Stokes equations.

UNIT - VII

Steady flow, dimensionless form of Momentum and Energy equations, Stokes equation, conservative body force fields, stream function - Vorticity formulation.

UNIT - VIII

Finite Volume Method: Approximation of surface integrals, volume integrals, interpolation and differentiation practices, Upwind interpolation, Linear interpolation and Quadratic interpolation.

TEXT BOOK :

1. Numerical heat transfer and fluid flow / Suhar V. Patankar- Butter-worth Publishers
2. Computational fluid dynamics - Basics with applications - John. D. Anderson / Mc Graw Hill.

REFERENCES :

1. Computational Fluid Flow and Heat Transfer/ Niyogi, Pearson Publications
2. Fundamentals of Computational Fluid Dynamics - Tapan K. Sengupta / Universities Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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IV Year B.Tech. AME I Semester

T	P	C
4+1*	0	4

(07A7EC05) FINITE ELEMENT METHOD
(ELECTIVE - II)

UNIT - I

Introduction to Finite Element Method for solving field problems. Stress and Equilibrium. Strain - Displacement relations. Stress - strain relations.

UNIT - II

One Dimensional problems : Finite element modeling coordinates and shape functions. Potential Energy

approach : Assembly of Global stiffness matrix and load vector. Finite element equations, Treatment of boundary conditions, Quadratic shape functions.

UNIT - III

Analysis of Beams : Element stiffness matrix for two node, two degrees of freedom per node beam element.

UNIT - IV

Finite element modelling of two dimensional stress analysis with constant strain triangles and treatment of boundary conditions.

UNIT - V

Finite element modelling of Axisymmetric solids subjected to Axisymmetric loading with triangular elements.

UNIT-VI

Two dimensional four noded isoparametric elements and numerical integration.

UNIT - VII

Steady state heat transfer analysis : one dimensional analysis of a fin and two dimensional analysis of thin plate. Analysis of a uniform shaft subjected to torsion.

UNIT-VIII

Dynamic Analysis : Formulation of finite element model, element matrices, evaluation of Eigen values and Eigen vectors for a stepped bar and a beam.

TEXT BOOK :

1. Introduction to Finite Elements in Engineering / Chandraputla, Ashok and Belegundu / Prentice - Hall.
2. The Finite Element Methods in Engineering / SS Rao / Pergamon.

REFERENCES :

1. An introduction to Finite Element Method / JN Reddy / Me Graw Hill
2. Finite Element Methods/ Alavala/TMH
3. The Finite Element Method for Engineers - Kenneth H. Huebner, Donald L. Dewhurst, Douglas E. Smith and Ted G. Byrom / John Wiley & sons (ASIA) Pte Ltd.
4. Finite Element Analysis/ C.S.Krishna Murthy

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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T	P	C
4+1*	0	4

**(07A7EC12) UNIX AND SHELL PROGRAMMING
(ELECTIVE - II)**

Unit I :

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands - PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.

Unit II :

Unix Utilities:- Introduction to unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text processing utilities and backup utilities , detailed commands to be covered are tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio

Unit III :

Introduction to Shells : Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.

Filters : Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files.

Unit IV :

Grep : Operation, grep Family, Searching for File Content.

Sed : Scripts, Operation, Addresses, commands, Applications, grep and sed.

Unit V :

awk: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, Mathematical Functions, User - Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

Unit VI :

Interactive Korn Shell : Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process.

Korn Shell Programming : Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

Unit VII :

Interactive C Shell : C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts.

C Shell Programming : Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

Unit VIII :

File Management :

File Structures, System Calls for File Management - create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API - opendir, readdir, closedir, mkdir, rmdir, umask.

TEXT BOOKS :

1. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg.Thomson
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition.

REFERENCES :

1. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson Education.
2. Unix programming environment, Kernighan and Pike, PHI / Pearson Education
3. The Complete Reference Unix, Rosen, Host, Klee, Farber, Rosinski, Second Edition, TMH.

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(07A72491) HYDRAULIC MACHINES LAB AND PRODUCTION TECHNOLOGY
LAB

(A) HYDRAULIC MACHINERY LAB.

1. Impact of jet on vanes
 2. Performance test on single stage centrifugal pump
 3. Performance test on reciprocating pump
 4. Performance and Specific speed test on Pelton wheel (or Turbo Wheel)
 5. Performance and specific speed test on Francis Turbine
 6. Performance and specific speed test on Kaplan Turbine
 7. Performance test on multi stage pump
 8. Suitability test on centrifugal pump
 9. Drag and Lift Coefficients of an Aerofoil model.
- Any five of the above experiments are to be covered.

(B) PRODUCTION TECHNOLOGY LAB

I. METAL CASTING LAB

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

II WELDING LAB

1. ARC Welding 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)

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(07A72492) AUTO SCANNING AND VEHICLE TESTING LAB

1. Computerised engine analyzer study and practice.
2. Computerised wheel balancing machine study and practice.
3. Computerised wheel alignment machine study and practice.
4. Exhaust emission test of petrol and diesel engine
5. Two wheeler chassis dynamometer study and practice
6. Study of wind tunnel -determining of coeff of drag for a given aerofoil
7. Road worthiness test a) Acceleration b) Gradability c) Maximum speed d) Constant speed fuel consumption (High way drive) e) city drive fuel consumption tests.
8. Head light focussing test.
9. Visibility test .
10. Braking distance test.
11. Drawings of automobile bodies -light and heavy vehicles for different seating capacities
12. Dimensional drawings of bus depots and service station workshop layouts.

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(07A82402) VEHICLE TRANSPORT MANAGEMENT

UNIT - I

Historical Back ground : Introduction, the growth of a network, trams, trolley buses, private car's subsidies.

The Infrastructure : Road- Approach Road. Highways National, State, District, traffic condition, relief of congestion, pedestrians, zebra lines, margins, shopping centres. Bus-stops, shelters, Bus stations. Garages layout of premises, equipment, use of machinery, conveyance of staff, facilities for passengers. Maintenance - preventive, breakdown, overhauling -major, minor.

UNIT - II

Organisation and Management : Forms of ownership, principle of transport, management -internal organisation, centralised condition, decentralised condition (Engineering, traffic and administration), staff administration: industrial relation, administration, recruitment and training, welfare, health and safety.

UNIT - III

Public relations divisions: Dissemination of information, maintaining goodwill-handling complaints, traffic advisory committees- local contractors co-operation with the press news and articles- facilities for visitors- forms of publicity importance of quality -inter departmental liaison advertisements, signs, notice and directions general appearance of premises, specialized publicity.

UNIT - IV

Prevention of accidents : Emphasis of safe driving-annual awards bonus encouragement vehicle design platform, layout, location of steps, scheduled route hazards records elimination of accident prone devices.

Route planning : Source of traffic, town planning, turning points, stopping places, shelters survey of route preliminary schedule test runs elimination of hazards factors affecting. Frequency direction of traffic flow estimated traffic possibility single verses double deck.

UNIT - V

Timing, bus working and schedules : Time table layout uses of flat graph method of presentation preparation of vehicle and crew schedule preparation of the duty roster, co-operation with employers use of the vehicle running numbering determination of vehicle efficiency, checking efficiency of crew, duty arrangements.

UNIT - VI

Fare collections systems : Principles of collection the way bill, bell punch system reduced ticket stocks w k brew system T.I.M and straight /M/C/S. The verometer lenson parson coach tic etc exchanges, box system personal and common stock flat fare platform control.

UNIT - VII

The fare structure : Basis of fares historical background effects of competition and control calculating average zone system straight and tapered scale elastic and inelastic demand coordination of fares concessions fares changes for workman. Anomalies double booking inter availability through booking and summation private hire charges.

UNIT -VIII

Operating cost and types of vehicles: Classification costs, average speed running costs supplementary costs depreciation obsolescence, life of vehicles sinking fund factor affecting post per vehicles mile incidence of wages and overheads 100 seats miles basis, average seating capacity vehicles size and spread overs, types of vehicle economic considerations authorization of trolley, bus services, statutory procedure taxes and hire cars.

TEXT BOOKS:

1. BUS OPERATION -L.D.KITCHEN, ILIFFE & Sons
2. BUS & COACH OPERATION -REX W. FAULKS, Butterworth Version of 1987

REFERENCES:

1. COMPENDIUM OF TRANSPORT TERMS CIRT,PUNE
2. M.V. ACT 1988 CENTRAL LAW AGENCY, ALLAHABAD
3. THE ELEMENTS OF TRANSPORTATION-R.J. EATON
4. GOODS VEHICLE OPERATION -By C.S. DUBBAR
5. ROAD TRANSPORT LAW- L.D. KITCHEN
6. COMPENDIUM OF TRANSPORT TERMS CIRT,PUNE(Report)
7. M.V.ACT 1988, PUB Central Law Agency, Allahabad.

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(07A82401) TRIBOLOGY
(ELECTIVE - III)

UNIT - I

Study of various parameters: Viscosity, flow of fluids, viscosity and its variation - absolute and kinematic viscosity, temperature variation, viscosity index determination of viscosity, different viscometers used.

UNIT - II

Hydrostatic lubrication: Hydrostatic step bearing, application to pivoted pad thrust bearing and other applications, hydrostatic lifts, hydrostatic squeeze films and its application to journal bearing.

UNIT - III

Hydrodynamic theory of lubrication: Various theories of lubrication, petroffs equation, Reynold's equation in two dimensions -Effects of side leakage - Reynolds equation in three dimensions, Friction in sliding bearing, hydro dynamic theory applied to journal bearing, minimum oil film thickness, oil whip and whirl anti -friction bearing.

UNIT - IV

Friction and power losses in journal bearings :Calibration of friction loss friction in concentric bearings, bearing modulus, Sommerfield number, heat balance, practical consideration of journal bearing design considerations.

UNIT - V

Air lubricated bearing: Advantages and disadvantages application to Hydrodynamic journal bearings, hydrodynamic thrust bearings. Hydrostatic thrust bearings. Hydrostatic bearing Analysis including compressibility effect.

UNIT - VI

Study of current concepts of boundary friction and dry friction.

UNIT - VII

Types of bearing oil pads: Hydrostatic bearing wick oiled bearings, oil rings, pressure feed bearing, partial bearings -externally pressurized bearings.

UNIT - VIII

Bearing materials : General requirements of bearing materials, types of bearing materials.

TEXT BOOKS:

1. Fundamentals of Tribology, Basu, SenGupta and Ahuja/PHI
2. Tribology in Industry : Sushil Kumar Srivatsava, S. Chand & Co.

REFERENCE:

1. Tribology - B.C. Majumdar

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(07A81403) PRODUCT DESIGN AND ASSEMBLY AUTOMATION
(ELECTIVE - III)

UNIT - I

AUTOMATIC FEEDING AND ORIENTING DEVICES : Vibrator feeders : Mechanics of vibratory conveying, estimating the mean conveying velocity, load sensitivity, solutions to load sensitivity, spiral elevators, balanced feeders.

UNIT - II

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

UNIT - III

Assembly Automation : Development of the assembly process, choice of assembly method, automation advantages, social effects of automation.

UNIT-IV

AUTOMATIC ASSEMBLY TRANSFER SYSTEMS : Continuous transfer, intermittent transfer, indexing mechanisms, and operator - paced free - transfer machine.

UNIT-V

PRODUCT DESIGN FOR HIGHSPEED AUTOMATIC ASSEMBLY AND ROBOT ASSEMBLY : Introduction, design of parts for: high speed, feeding and orienting, example, additional feeding difficulties, high speed automatic insertion, example, analysis of an assembly, general rules for product design for automation, design of parts for feeding and orienting, summary of design rules for high speed automatic assembly, product for robot assembly.

UNIT-VI

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

UNIT-VII

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

UNIT-VIII

PERFORMANCE AND ECONOMICS OF ASSEMBLY SYSTEMS : Indexing machines, free transfer machines, basis for economic comparisons of automation equipment, comparison of indexing and free - transfer machines' economics of robot assembly.

FEASIBILITY STUDY FOR ASSEMBLY AUTOMATION : Machine design factors to reduce machine downtime due to defective parts. Feasibility study.

TEXT BOOK :

1. Geoffrey Boothroyd, "Assembly Automation and Product Design", Marcel Dekker Inc., NY, 1992.

REFERENCES:

1. Geoffrey Boothroyd, "Hand Book of Product Design" Marcel and Dekken, N.Y. 1990.
2. A Delbainbre "Computer Aided Assembly London, 1992.

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**(07A8EC04) AUTOMATION IN MANUFACTURING
(ELECTIVE - III)**

UNIT - I

Introduction Types and strategies of automation, pneumatic and hydraulic components circuit's. Automation in machine tools. Mechanical feeding and tool 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

Adaptive control systems : Introduction, adaptive control with optimization, Adaptive control with constraints, Application of A.C. in Machining operations. Use of various parameters such as cutting force, Temperatures, vibration and acoustic emission.

UNIT - VIII

Business process Re-engineering: Introduction to BPE logistics, ERP, Software configuration of BPE, concurrent Engineering, Techniques of Rapid Proto typing.

TEXT BOOK :

1. Automation, Production Systems and Computer Integrated Manufacturing : M.P. Groover/Pearson Edu.

REFERENCES :

1. Computer control of Manufacturing Systems by Yoram Koreom.
2. CAD / CAM/ CIM by Radhakrishnan.
3. Automation by W. Buekinsham.

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**(07A8EC03) COMPUTER ORGANIZATION AND ARCHITECTURE
(ELECTIVE - III)**

UNIT-I

BASIC STRUCTURE OF COMPUTERS : Computer Types, Functional unit, Basic Operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers. Data Representation, Fixed Point Representation, Floating - Point Representation. Error Detection codes. Addition, subtractions and multiplications and algorithms.

UNIT-II

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS : Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Microoperations, logic micro operations, shift micro operations, Arithmetic logic shift unit. Instruction codes. Computer Registers. Computer instructions - Instruction cycle.

UNIT-III

Memory - Reference Instructions. Input - Output and Interrupt. STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer.

UNIT-IV

MICRO PROGRAMMED CONTROL : Control memory, Address sequencing, microprogram example, design of control unit Hard wired control. Microprogrammed control

UNIT-V

THE MEMORY SYSTEM : Basic concepts semiconductor RAM memories. Read-only memories Cache memories performance considerations, Virtual memories secondary storage. Introduction to RAID.

UNIT-VI

INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt Direct memory Access, Input -Output Processor (IOP) Serial communication; Introduction to peripheral component, Interconnect (PCI) bus. Introduction to standard serial communication protocols like RS232, USB, IEEE1394.

UNIT-VII

PIPELINE AND VECTOR PROCESSING : Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

UNIT-VIII

MULTI PROCESSORS : Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration. InterProcessor Communication and Synchronization Cache Coherence. Shared Memory Multiprocessors.

TEXT BOOKS :

1. Computer Organization - Carl Hamacher, Zvonks Vranesic, SafaaZaky, 5th Edition, McGraw Hill.
2. Computer Systems Architecture - M.Moris Mano, 11rd Edition, Pearson/PHI

REFERENCES :

1. Computer Organization and Architecture - William Stallings Sixth Edition, Pearson/ PHI
2. Structured Computer Organization - Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals of Computer Organization and Design, - Sivarama Dandamudi Springer Int. Edition.
4. Computer Organization, Anjaneyulu, Himalaya Pub house.

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(07A8HS01) PRINCIPLES OF ENTREPRENEURSHIP
(Elective-IV)

Unit I : Introduction to Entrepreneurship

Definition of Entrepreneur, Entrepreneurial Traits, Entrepreneur vs. Manager, Entrepreneur vs Intrapreneur. The Entrepreneurial decision process. Role of Entrepreneurship in Economic Development, Ethics and Social responsibility of Entrepreneurs. Opportunities for Entrepreneurs in India and abroad. Woman as Entrepreneur.

Unit II : Creating and Starting the Venture

Sources of new Ideas, Methods of generating ideas, creating problem solving, product planning and development process.

Unit III : The Business Plan

Nature and scope of Business plan, Writing Business Plan, Evaluating Business plans; Using and implementing business plans. Marketing plan, financial plan and the organizational plan, Launching formalities.

Unit IV : Financing and Managing the new venture

Sources of capital, Record keeping, recruitment, motivating teams, financial controls . Marketing and sales controls. E-commerce and Internet advertising.

Unit V : New venture Expansion Strategies and Issues

Features and evaluation of joint ventures, acquisitions, merges, franchising. Public issues, rights issues, bonus issues and stock splits.

Unit VI : Institutional support to Entrepreneurship

Role of Directorate of Industries, District Industries Centres (DICs), Industrial Development Corporation (IDC), State Financial Corporation (SFCs), Small Scale Industries Development Corporations (SSIDs), Khadi and Village Industries Commission (KVIC), Technical consultancy Organisation (TCO), Small Industries Service Institute (SISI), National Small Industries Corporation (NSIC), Small Industries Development Bank of India (SIDBI).

Unit VII : Production and Marketing Management

Thrust of production management, Selection of production Techniques, plant utilization and maintenance, Designing the work place, Inventory control, material handling and quality control. Marketing functions, market segmentation, market research and channels of distribution, Sales promotion and product pricing.

Unit VIII

Labour legislation, Salient Provision under Indian Factories Act, Industrial Disputes Act, Employees State Insurance Act, Workmen's Compensation Act and payment of Bonus Act.

This course replaces the course offered in earlier years as 'Entrepreneurship & Management'

2007-2008

Text Books:

1. Robert Hisrich, & Michael Peters: Entrepreneurship, TMH, 5th Edition.
2. Dollinger: Entrepreneurship, 4/e, Pearson, 2004.

REFERENCES:

1. Vasant Desai: Dynamics of Entrepreneurial Development and management, Himalaya Publishing House, 2004.
2. Harvard Business Review on Entrepreneurship, HBR Paper Back, 1999.
3. Robert J. Calvin: Entrepreneurial Management, TMH, 2004.
4. Gurmeet Naroola: The Entrepreneurial Connection, TMH, 2001.
5. Bolton & Thompson : Entrepreneurs- Talent, Temperament, Technique, Butterworth Heinemann, 2001.
6. Agarwal : Indian Economy , Wishwa Prakashan 2005.
7. Dutt & Sundaram : Indian Economy, S. Chand, 2005.
8. Srivastava: Industrial Relations & Labour Laws, Vikas, 2005.
9. Aruna Kaulgud: Entrepreneurship Management by, Vikas publishing house, 2003.
10. Thomas W. Zimmerer & Norman M. Scarborough: Essential of Entrepreneurship and small business management, PHI, 4/e, 2005.
11. Mary Coulter: Entrepreneurship in Action, PHI, 2/e, 2005.
12. Kaplan: Patterns of Entrepreneurship, Wiley, 2005.
13. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2005.

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(07A8EC02) NEURAL NETWORKS AND FUZZY LOGIC SYSTEMS

Objective :

This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multilayer Feed Forward Networks. Also deals with Associate Memories and introduces Fuzzy sets and Fuzzy Logic system components. The Neural Network and Fuzzy Logic application to Systems Engineering is also presented. This subject is very important and useful for doing Project Work.

Unit - I: Introduction to Neural Networks

Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

Unit- II: Essentials of Artificial Neural Networks

Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN -- Connectivity, Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules.

Unit-III: Single Layer Feed Forward Neural Networks

Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Limitations of the Perceptron Model.

Unit- IV: Multilayer Feed forward Neural Networks

Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

Unit V: Associative Memories

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function.

Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis.

Unit - VI: Classical & Fuzzy Sets

Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

UNIT VII: Fuzzy Logic System Components

Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

UNIT VIII: Applications

Neural network applications: Process identification, control, fault diagnosis.

Fuzzy logic applications: Fuzzy logic control and Fuzzy classification.

TEXT BOOKS:

1. S. Rajasekharan and G. A. Vijayalakshmi Pai, "Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications", PHI Publication, 2004.
2. John Yen and Reza Langari, "Fuzzy Logic: Intelligence, Control and Information", Pearson Education, 2004.

REFERENCE BOOKS:

1. Simon Haykin, "Neural Networks- A comprehensive foundation", Pearson Education, 2001.
2. S.N.Sivanandam, S.Sumathi,S. N. Deepa "Introduction to Neural Networks using MATLAB 6.0", TMH, 2006.
3. James A Freeman and Davis Skapura, Neural Networks Pearson Education, 2002.
4. Timothy J. Ross, " Fuzzy Logic With Engineering Applications", McGraw-Hill Inc. 1997

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(07A8EC05) INTERACTIVE COMPUTER GRAPHICS
(ELECTIVE - IV)

Unit-1

Introduction, Application area of Computer graphics, overview of graphic system, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

Unit-II

Output primitives: Points and lines, line drawing algorithms, mid-point circle algorithm, Filled area primitives: scan-line polygon fill algorithm, boundary-fill and flood-fill algorithm

Unit-III

2-D geometrical transformations: Translation, scaling, rotation, reflection and shear transformation matrix representations and homogeneous co-ordinates, composite transformations, transformations between coordinates

Unit - IV

2-D viewing : The viewing pipe-line, viewing coordinate reference frame, window to view-port co-ordinate transformations, viewing function, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland-Hodgeman polygon clipping algorithm

Unit - V

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curve, Bezier and B-spline surfaces, Basic illumination models, shading algorithms

Unit - VI

3-D geometric transformations: Translation, rotation, scaling, reflection and shear transformation and composite transformations

Unit - VII

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting

Unit - VIII

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation language, key frame system, motion specification

TEXT BOOKS:

1. "Computer Graphics C version" Donald Hearn and M. Pauline Baker, Pearson/ PHI
2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education

REFERENCES:

1. "Computer Graphics Second edition", Zhigang Xiang, Roy Plastock, Schaum's outlines, Tata Mc-Graw hill edition.
2. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
5. Computer Graphics, Steven Harrington, TMH

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(07A8EC06) OPERATING SYSTEM CONCEPTS
(ELECTIVE - IV)

UNIT I :

Computer System and Operating System Overview: Overview of computer operating systems operating systems functions protection and security distributed systems special purpose systems operating systems structures and systems calls operating systems generation

UNIT II :

Process Management - Process concepts threads, scheduling-criteria algorithms, their evaluation, Thread scheduling, case study of Windows

UNIT III :

Concurrency : Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case study of , Windows

UNIT IV :

Memory Management : Swapping, contiguous memory allocation, paging, structure of the page table , segmentation, virtual memory, demand paging, page-Replacement, algorithms, case study of Windows

UNIT V :

Principles of deadlock - system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock,

I/O systems, Hardware, application interface, kernel I/O subsystem, Transforming I/O requests Hardware operation, STREAMS, performance.

UNIT VI :

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, file system implementation, directory implementation, directory implementation, allocation methods, free-space management, efficiency and performance, case study of Windows

UNIT VII :

Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

UNIT VIII :

Protection and Security: Protection, Goals of Protection, Principles of Protection, Access control The Security problem, program threats, system and network threats cryptography as a security tool,

TEXT BOOKS :

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH

REFERENCES :

1. Operating Systems' - Internal and Design Principles Stallings, Fifth Edition-2005, Pearson education/PHI
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI.

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(07A82491) HEAT TRANSFER AND INSTRUMENTATION LAB

(A) HEAT TRANSFER LAB :

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

Pre-Requisite: Heat Transfer

Objective: To understand physically different aspects of modes of heat transfer and the effect of different parameters like geometry, mass flow rate, heat flux & wall temperatures etc., on the heat transfer rates by different modes.

Tables/Codes: Heat and Mass Transfer data book/ C.P. Kothandaraman, Subramanian/ New Age Pub.

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.

REFERENCE BOOK:

Metallography Laboratory Practice / George / KEHL

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(07A81094) INDUSTRY ORIENTED MINI PROJECT

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(07A81093) SEMINAR

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(07A81092) PROJECT WORK

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0	0	2

(07A81095) COMPREHENSIVE VIVA