

2007-2008

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS**

**Mechanical Engineering
(Mechatronics)**

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 1 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

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

3. Courses of study

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

Branch Code	Branch
I.	Aeronautical Engineering.
II.	Automobile Engineering.
III.	Bio-Medical Engineering.
IV.	Biotechnology.
V.	Chemical Engineering.
VI.	Civil Engineering.
VII.	Computer Science and Engineering.
VIII.	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.

- 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

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.



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)

V

2007-2008

8. **Course pattern:**

- 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.
- A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the supplementary examination.
- When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester / year is offered after fulfilment of academic regulations. Whereas the academic regulations hold good with the regulations he/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.

- There shall be no branch transfers after the completion of admission process.
- There shall be no place transfer within the Constituent Colleges and Units of Jawaharlal Nehru Technological University.

13. **General:**

- Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
- The academic regulation should be read as a whole for the purpose of any interpretation.
- In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
- 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.

- 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:**

- A student shall be eligible to appear for University examinations if acquires a minimum of 75% of attendance in aggregate of all the subjects.
- 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.
- 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.
- Shortage of Attendance below 65% in aggregate shall in NO case be condoned.
- 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.
- 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

- 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.
- 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.
- 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.
 - Two regular and two supplementary examinations of I year.
 - Two regular and one supplementary examinations of II year I semester.
 - One regular and one supplementary examinations of II year II semester.
 - One regular examination of III year I semester.
- 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.
- 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.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

B.TECH. MECHANICAL (MECHATRONICS) 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
07A11491	Engineering Graphics	0	6 8
07A11492	Engineering Physics and Fuels and Lubricants Lab	0	3 4
07A11493	English Language Communication Skills Lab	0	3 4
07A11494	Computer Programming Lab	0	3 4
07A11495	Engineering Work Shop Practice	0	3 4
Total		24	18 56

II YEAR

COURSE STRUCTURE

I SEMESTER

COURSE STRUCTURE		T	P	C
CODE	SUBJECT			
07A3EC05	Production Technology	4+1*	0	4
07A3EC06	Object Oriented Programming	4+1*	0	4
07A3EC07	Mechanics of Solids	4+1*	0	4
07A3EC01	Electrical and Electronics Engineering	4+1*	0	4
07A3EC21	Thermal Science	4+1*	0	4
07A3EC09	Metallurgy and Material Science	4+1*	0	4
07A31491	Object Oriented Programming Lab	0	3	2
07A31492	Electrical and Electronic Engineering Lab	0	3	2
Total		30	6	28

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

II YEAR

COURSE STRUCTURE

SEMESTER II

COURSE STRUCTURE				
CODE	SUBJECT	T	P	C
07A4BS01	Probability and Statistics	4+1*	0	4
07A4EC01	Environmental Studies	4+1*	0	4
07A4HS01	Managerial Economics and Financial Analysis	4+1*	0	4
07A40403	Semi Conductor Devices and Circuits	4+1*	0	4
07A4EC06	Machine Drawing	-	6	4
07A40302	Fluid Mechanics and Heat Transfer	4+1*	0	4
07A41491	Semi Conductor Devices and Circuits Lab	0	3	2
07A41492	Metallurgy and Thermal Engineering Lab	0	3	2
Total		30	12	28

III YEAR

COURSE STRUCTURE

I SEMESTER

COURSE STRUCTURE				
CODE	SUBJECT	T	P	C
07A5HS03	Industrial Management	4+1*	0	4
07A50302	Finite Element Methods	4+1*	0	4
07A50206	Switching Theory and Logic Design	4+1*	0	4
07A5EC04	Machine Tools	4+1*	0	4
07A50303	Kinematics of Machinery	4+1*	0	4
07A5EC15	Data Base Management System	4+1*	0	4
07A51491	Machine Tools Lab	0	3	2
07A51492	Heat Transfer and Production Technology Lab	0	3	2
Total		30	6	28

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

B.TECH. MECHANICAL (MECHATRONICS) ENGINEERING

III YEAR		SEMESTER II		
COURSE STRUCTURE				
CODE	SUBJECT	T	P	C
07A6EC04	CAD/CAM	4+1*	0	4
07A60204	Instrumentation and Control Systems	4+1*	0	4
07A60304	Dynamics of Machinery	4+1*	0	4
07A60305	Principles of Machine Design	4+1*	0	4
07A60403	Linear and Digital I.C. Applications	4+1*	0	4
07A6EC14	Computer Organization	4+1*	0	4
07A61491	Instrumentation and I.C Applications Lab	0	3	2
07A61492	Advanced English Communication Skills Lab	0	3	2
Total		30	6	28

IV Year		I Semester		
COURSE STRUCTURE				
CODE	SUBJECT	T	P	C
07A7EC03	Operations Research	4+1*	0	4
07A7EC43	Microprocessors and Micro Controllers	4+1*	0	4
07A7EC07	Robotics	4+1*	0	4
07A71401	Motion Control Design	4+1*	0	4
	Elective-I	4+1*	0	4
07A71402	Product Design and Assembly Automation			
07A7EC02	Non Conventional Sources of Energy			
07A7EC08	Computational Fluid Dynamics			
07A7EC10	Advanced Data Structures and Algorithms	4+1*	0	4
	Elective-II			
07A7EC11	Power Plant Engineering			
07A7EC45	Automobile Engineering			
07A70302	Advanced Kinematics and Dynamics of Machinery			
07A7EC12	Unix and Shell programming			
07A71491	Microprocessors and Micro Controllers Lab	0	3	2
07A71492	Motion Control and Robotics Lab	0	3	2
Total		30	6	28

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B.TECH. MECHANICAL (MECHATRONICS) ENGINEERING

IV Year		II Semester		
COURSE STRUCTURE				
CODE	SUBJECT	T	P	C
07A82001	Flexible Manufacturing System	4+1*	0	4
	Elective-III	3+1*	0	3
07A8EC04	Automation in manufacturing			
07A8EC01	Production Planning and Control			
07A81401	Concurrent Engineering			
07A80512	Computer Networks	3+1*	0	3
	Elective-IV			
07A8EC02	Neural Networks and Fuzzy Logic Systems			
07A80513	Mathematical Modeling and Simulation			
07A8HS01	Principles of Entrepreneurship			
07A8EC06	Operating System concepts	0	3	2
07A81491	CAD/CAM Lab	0	0	2
07A81494	Industry Oriented Mini Project	0	0	2
07A81493	Seminar	0	0	2
07A81492	Project Work	0	0	10
07A81495	Comprehensive Viva	0	0	2
Total		13	3	28

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

* - Tutorial

T - Theory

P - Practical

C - Credits

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

1 Year B.Tech. MC

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. MC

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 , $e^{V(x)}$, $xV(x)$, 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. Raman, 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 – Diagonalization 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. Vijayalaxmi, Himalaya Publishers.
4. A text book of Mathematical Methods, Shahnaz Bathul, Right Publisshers.

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, Aitkinson & Han, Wiely 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 - CO_2 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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T	P	C
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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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I Year B.Tech. MC

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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. Lamis Theorem, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.

UNIT – III

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

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

UNIT – IV

Area 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. Bhargava & J.G. Rajasekhara

REFERENCES :

1. Engineering Mechanics / Ferdinand . L. Singer / Harper – Collins.
2. Engg. Mechanics / Timoshenko & Yound.
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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I Year B.Tech. MC

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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 and sizes, 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 Educaion.
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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I Year B.Tech. MC

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(07A11491) 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 PORJECTIONS : 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 / Sciotech publishers.

REFERENCES :

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

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

I Year B.Tech. MC

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(07A11492) 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.

Sl.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 : Saybolts viscometer, Redwood Viscometer, Engler Viscometer.
4. Determination of Calorific Value: Solid/Liquid/Gaseous Fuels : Bomb Calorimeter.
5. Grease Penetration Test. : Junker Calorimeter.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

I Year B.Tech. MC

T	P	C
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(07A11493) 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

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

I Year B.Tech. MC

T	P	C
0	3	4

(07A11494) 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:

- a) Write a C program to find the sum of individual digits of a positive integer.
- b) A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

UNIT- II:

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

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

UNIT- III:

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

UNIT- IV:

- a) 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'.

- b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)

UNIT- V:

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

UNIT- VI:

- a) Write a C program that uses functions to perform the following operations:
 - i) To insert a sub-string in to given main string from a given position.
 - ii) To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

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 of 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.

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I Year B.Tech. MC

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(07A11495) ENGINEERING WORKSHOP PRACTICE

1. TRADES FOR EXERCISES :

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring
6. Foundry
7. 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.

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II Year B.Tech. MC I-Sem

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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 modeling)

TEXT BOOKS :

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

REFERENCES :

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

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II Year B.Tech. MC I-Sem

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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 grib 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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II Year B.Tech. MC I-Sem

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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, pinjoined, 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 Bhaikathi; Lakshmi publications.
2. Strength of Materials -By Jindal, Umesh Publications.

REFERENCES :

1. Solid Mechanics, by Popov
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 Ferdinond L. Singer Longman.

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II Year B.Tech. MC I-Sem

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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 Nagarath, TMH Publications, 2nd Edition.

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II Year B.Tech. MC I-Sem

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(07A3EC21) THERMAL SCIENCE

UNIT – I

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

UNIT II

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

UNIT – III

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

UNIT- IV

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

UNIT V

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

Refrigeration Cycles:

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

UNIT- VI

I.C. ENGINES:

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

Fuel system: Fuels used , Modes of fuel Admission to engine cylinder, Induction

and injection , chemically correct fuel- air ratios. Fuel carburetor, Fuel Injection System, Ignition, Cooling and Lubrication.

UNIT – VII

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

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

UNIT VIII

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

TEXT BOOKS :

1. Thermal Engineering / Rajput / Lakshmi Publications

REFERENCE BOOKS:

1. Thermal Engineering – R.S. Khurmi & J.S.Gupta / S.Chand Pub.
2. Fundamentals of Classical Thermodynamics – G. Van Wylen & R.E. Sonntag – John Wiley Pub.
3. Engineering Thermodynamics – Jones & Dugan
4. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles / TMH
5. Thermodynamics – J.P.Holman / McGrawHill
6. An introduction to Thermodynamics / YVC Rao / New Age

Pre-Requisite: Physics

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

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

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

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II Year B.Tech. MC I-Sem

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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, Cus-Sn and Fe-Fe₃C.

UNIT -IV

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

UNIT - V

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

UNIT - VI

Non-ferrous Metals and Alloys : Structure and properties of copper and its alloys, Aluminium and its alloys, Titanium and its alloys.

UNIT - VII

Ceramic materials : Crystalline ceramics, glasses, cermaets, abrasive aterials, 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. Avenier.
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 materials science / W.g.vinas & HL Mancini
6. Material science & material / C.D.Yesudian & harris Samuel
7. Engineering Materials and Their Applications – R. A Flinn and P K Trojan / Jaico Books.
8. Engineering materials and metallurgy/R.K.Rajput/ S.Chand.

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II Year B.Tech. MC I-Sem

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(07A31491) 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

Week1

- 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 first 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. MC I-Sem

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(07A31492) 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

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II Year B.Tech. MC II-Sem

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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, 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, Mendan Hall, Beaver Thomson Publishers.
4. Probability & Statistics, D. K. Murugeson & P. Guru Swamy, Anuradha Publishers.

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II Year B.Tech. MC II-Sem

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(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 Ex-situ 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) Act -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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. MC II-Sem

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(07A4HS01) 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. Donnck 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.

Prerequisites: Nil

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

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

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

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(07A40403) SEMI CONDUCTOR DEVICES AND CIRCUITS

UNIT I**Electron Dynamics and CRO**

Motion of charged particles in electric and magnetic fields, CRT, CRO.

UNIT II**Junction Diodes**

p-type, n-type semiconductors, p-n junction diode characteristics – breakdown mechanisms – Zener diode.

UNIT III**Rectifiers and Filters**

Half wave Rectifier and Full wave rectifier with and without filters.

UNIT IV**Transistor characteristics**

Bipolar Junction Transistor V-I Characteristics – CE, CB and CC configurations, JFET and MOSFET characteristics, SCR, Photo diode, Photo Transistor, LEDs.

UNIT V**Amplifiers – I**

Significance of biasing, self bias circuits, transistor as an amplifier, CE, CB, CC amplifier circuits.

UNIT VI**Amplifiers – II**

RC coupled amplifier, JFET amplifier circuits Frequency response.

UNIT VII**Feedback amplifiers**

Concept of feedback, advantages of negative feedback, block schematics, circuits.

UNIT VIII**Oscillators**

Principle of oscillator currents – RC, LC type oscillator circuits, RC phase shift, Wein Bridge and Crystal oscillators.

TEXTBOOKS

1. Electronic Devices and Circuits – J. Millman & C.C. Halkias, TMH, 1998.
2. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/ PHI, 9th Ed., 2006.
3. Electronic Devices and Circuits – K. Lal Kishore, B.S. Publications, 2nd edition, 2005.

REFERENCES

1. Electronic Devices and Circuits – T.F. Bogart Jr., J.S. Beasley and G.Rico, Pearson Education, 6th Edn., 2004.
2. Principles of Electronic Circuits – S.G. Burns and P.R. Bond, Galgotia Publications, 2nd Edn., 1998.
3. Electronic Devices - K. Satya Prasad
4. Electronic Devices and Circuits –B. Visweswara Rao et al, Pearson Ed.

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II Year B.Tech. MC II-Sem

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(07A4EC06) MACHINE DRAWING

I. 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 and their liberal usage
- Types of Drawings – working drawings for machine parts.

II. Drawing of Machine Elements and simple parts

Selection of Views, additional views for the following machine elements and parts with every drawing proportions.

- Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
- Keys, cottered joints and knuckle joint.
- Riveted joints for plates
- Shaft coupling, spigot and socket pipe joint.
- Journal, pivot and collar and foot step bearings.

III. Assembly Drawings:

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

- 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 BOOK :

- 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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II Year B.Tech. MC II-Sem

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(07A40302) FLUID MECHANICS AND HEAT TRANSFER

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

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

Unit-V

Introduction : Modes of heat transfer, Mechanism of heat transfer, Basic laws of heat transfer.

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

Unit-VI

Convection: Dimensional analysis, Rayleigh and Buckingham methods applied to heat transfer, Non-dimensional members in heat transfer.

Boundary layer concept, concept of stagnant film, Reference temperature for evaluation of fluid properties. Forced convection of laminar flow inside ducts and over bodies. Local and average heat transfer coefficients.

Unit-VII

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

Unit-VIII**Heat Exchangers:**

Classification of heat exchangers – overall heat transfer Coefficient and fouling factor – Concepts of LMTD and NTU methods - Problems using LMTD and NTU methods

Text Books

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

Reference Text Books:

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

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

Code/Date books:

1. Heat Transfer Databook/CP Kodandaraman Pub
2. Stream Terly

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II Year B.Tech. MC II-Sem

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(07A41491) SEMI CONDUCTOR DEVICES AND CIRCUITS LAB

- 1 Identification, Specifications and Testing of R, L, C Components (colour codes), Potentiometers, Switches (SPDT, DPDT and DIP), Coils, Gang Condensers, Relays, Bread Boards. Identification and Specifications of Diodes, BJTs, FETs, SCRs.
- 2 PN Junction Diode Characteristics (Forward bias, Reverse bias)
- 3 Zener Diode Characteristics
- 4 Transistor CE Characteristics (Input and Output)
- 5 Rectifier without Filters (Full wave & Half wave)
- 6 Rectifier with Filters (Full wave & Half wave)
- 7 FET Characteristics
- 8 SCR Characteristics
- 9 CE and CC Amplifiers.
- 10 Feedback Amplifier (Voltage Series/Current series)
- 11 RC Phase Shift Oscillator
- 12 Hartely/Colpitts Oscillator

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II Year B.Tech. MC II-Sem

T	P	C
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(07A41492) METALLURGY AND THERMAL ENGINEERING LAB

(A) METALLURGY LAB

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

Pre-Requisite: Metallurgy and Material Science**Objective:****Tables/Codes****(B) THERMAL ENGG LAB**

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

Pre-Requisite: Thermodynamics & Thermal Engineering I**Objective:** To understand the working principles of IC Engines, Compressors, Refrigeration and Air Conditioning Systems.**Tables/Codes:** Refrigeration Tables, Psychrometric Chart**Question Paper Pattern:**

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III Year B.Tech. MC I-Sem

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(07A5HS03) 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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III Year B.Tech. MC I-Sem

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(07A50302) FINITE ELEMENT METHODS

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. Dewhirst, Douglas E. Smith and Ted G. Byrom / John Wiley & sons (ASIA) Pte Ltd.
4. Finite Element Analysis/ C.S.Krishna Murthy

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III Year B.Tech. MC I-Sem

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(07A50206) SWITCHING THEORY AND LOGIC DESIGN

UNIT I**NUMBER SYSTEMS & CODES**

Philosophy of number systems – complement representation of negative numbers- binary arithmetic – binary codes – error detecting and error correcting codes – hamming codes.

UNIT - II**BOOLEAN ALGEBRA AND SWITCHING FUNCTIONS**

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

UNIT III**MINIMIZATION OF SWITCHING FUNCTIONS**

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

UNIT IV**COMBINATIONAL LOGIC DESIGN**

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

UNIT V**PROGRAMMABLE LOGIC DEVICES, THRESHOLD LOGIC**

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

UNIT VI**SEQUENTIAL CIRCUITS - I**

Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples) Basic flip-flops-Triggering and excitation tables. Steps in synchronous sequential circuit design. Design of modulo-N Ring and Shift counters, Serial binary adder, sequence detector.

UNIT VII SEQUENTIAL CIRCUITS - II

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

UNIT VIII ALGROTHIMIC STATE MACHINES

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

TEXTBOOKS

1. Switching and Logic design – CVS Rao, Pearson, 2005.
2. Switching & Finite Automata theory – Zvi Kohavi, TMH, 2nd Edition.
3. Fundamentals of Logic Design – Charles H. Roth, Thomson Publications, 5th Edition, 2004.

REFERENCES

1. Introduction to Switching Theory and Logic Design - F.J.Hill, G.R.Petrerson, John Wiley, 2nd edition.
2. Switching Theory and Logic Design – R.P.Jain, TMH Editon, 2003.
3. Digital Design - Morris Mano, PHI, 2nd edition.
4. An Engineering Approach To Digital Design – Fletcher, PHI.
5. Digital Logic – Application and Design – John M. Yarbrough, Thomson Publications, 1997.

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III Year B.Tech. MC I-Sem

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(07A5EC04) MACHINE TOOLS

UNIT – I

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

UNIT – II

Engine lathe – Principle of working, specification of lathe – types of lathe – work holders tool holders – Box tools Taper turning thread turning – for Lathes and attachments. Turret and capstan lathes – collet chucks – other work holders – tool holding devices – box and tool layout. Principal features of automatic lathes – classification – Single spindle and multi-spindle automatic lathes – tool layout and cam design.

UNIT – III

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

UNIT – IV

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

UNIT – V

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

UNIT –VI

Grinding machine – Fundamentals – Theory of grinding – classification of grinding machine – cylindrical and surface grinding machine – Tool and cutter grinding machine – special types of grinding machines – Different types of abrasives –

bonds specification of a grinding wheel and selection of a grinding wheel
Kinematic scheme of grinding machines.

UNIT - VII

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

UNIT - VIII

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

TEXT BOOKS :

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

REFERENCES:

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

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III Year B.Tech. MC I-Sem

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(07A50303) 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 Pearsons 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. MC I-Sem

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(07A5EC15) DATABASE MANAGEMENT SYSTEMS

UNIT I :

Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor

UNIT II :

History of Data base Systems. Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT III :

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views. Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT IV :

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT V :

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

UNIT VI :

Transaction Concept- Transaction State- Implementation of Atomicity and Durability

– Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

UNIT VII :

Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage- Advance Recovery systems- Remote Backup systems.

UNIT VIII :

Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

TEXT BOOKS :

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES :

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

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HYDERABAD**

III Year B.Tech. MC I-Sem

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(07A51491) MACHINE TOOLS LAB

1. Introduction of general purpose machines – Lathe, Drilling machine, Milling machine, Shaper, Planning machine, slotting machine, Cyl. Grinder, surface grinder. And tool and cutter grinder.
2. Step turning and taper turning on lathe machine
3. Thread cutting and knurling on – lathe machine
4. Drilling and Tapping
5. Shaping and Planning
6. Slotting
7. Milling
8. Cylindrical / Surface Grinding
9. Grinding of Tool angles.
10. Electro Discharge Machining / Ultrasonic Machining.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

III Year B.Tech. MC I-Sem

T	P	C
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(07A51492) HEAT TRANSFER AND PRODUCTION TECHNOLOGY LAB

(A) HEAT TRANSFER LAB

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

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. Question Paper Pattern:

(B) PRODUCTION TECHNOLOGY LAB**I. METAL CASTING LAB**

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

II WELDING LAB

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

III MECHANICAL PRESS WORKING

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

IV PROCESSING OF PLASTICS

1. Injection Moulding
2. Blow Moulding

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HYDERABAD**

III Year B.Tech. MC II-Sem

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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 BOOK :

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/Alavala/ PHI
5. Computer Numerical Control Concepts and programming / Warren S Seames / Thomson.

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III Year B.Tech. MC II-Sem

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(07A60204) 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 - capacitive, ultrasonic, magnetic, cryogenic fuel level indicators - Bubbler 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

Tables/Codes:

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

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

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

III Year B.Tech. MC II-Sem

T	P	C
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(07A60304) 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

FRICTION : 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

VIBRATIONS: 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 Dukkupati / New Age
2. Theory of Machines / Shiegly / MGH
3. Theory of Machines / Thomas Bevan / CBS Publishers
4. Theory of machines / Khurmi/S.Chand.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

III Year B.Tech. MC II-Sem

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(07A60305) PRINCIPLES OF MACHINE DESIGN

UNIT – I

INTRODUCTION : General considerations in the design of Engineering Materials and their properties – selection – Manufacturing consideration in design. Tolerances and fits – BIS codes of steels.

STRESSES IN MACHINE MEMBERS : Simple stresses – 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

Rivited 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

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

UNIT – VIII

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

TEXT BOOKS :

1. Dr P. Kanniah Scitech Publishers
2. Machine Design / Soundararaja Murthy and shanmugam
3. Machine design – Pandya & shah.

REFERENCE BOOKS :

1. Design of Machine Elements / V.M. Faies
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:

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

III Year B.Tech. MC II-Sem

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(07A60403) LINEAR AND DIGITAL IC APPLICATIONS

UNIT I**INTEGRATED CIRCUITS**

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

UNIT II**OP-AMP APPLICATIONS**

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

UNIT III**ACTIVE FILTERS & OSCILLATORS**

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

UNIT IV**TIMERS & PHASE LOCKED LOOPS**

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

UNIT V**D-A AND A- D CONVERTERS**

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

UNIT VI

Classification of Integrated circuits, comparison of various logic families, standard TTL NAND Gate- Analysis & characteristics, TTL open collector O/Ps, Tristate TTL,

MOS & CMOS open drain and tristate outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS & CMOS driving TTL.

UNIT VII

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

UNIT VIII

SEQUENTIAL CIRCUITS

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

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

TEXT BOOKS

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Ed., 2003.
2. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 1987.
3. Digital Fundamentals – Floyd and Jain, Pearson Education, 8th Edition, 2005.

REFERENCES:

1. Operational Amplifiers and Linear Integrated Circuits – R.F. Coughlin and Fredrick F. Driscoll, PHI, 1977.
2. Operational Amplifiers and Linear Integrated Circuits: Theory and Applications –Denton J. Daibey, TMH.
3. Design with Operational Amplifiers and Analog Integrated Circuits - Sergio Franco, McGraw Hill, 3rd Ed., 2002.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. MC II-Sem

T	P	C
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(07A6EC14) COMPUTER ORGANIZATION

UNIT-I

BASIC STRUCTURE OF COMPUTERS : Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers. Data Representation. Fixed Point Representation. Floating – Point Representation. Error Detection codes.

UNIT-II

REGISTER TRANSFER LANGUAGE AND 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.

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

UNIT-III

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

UNIT-IV

COMPUTER ARITHMETIC : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit Decimal Arithmetic operations.

UNIT-V

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

UNIT-VI

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

UNIT-VII

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

UNIT-VIII

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

TEXT BOOKS :

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, IIIrd 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, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Organization, Anjaneyulu, Himalaya. Pub house.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

III Year B.Tech. MC II-Sem

T	P	C
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(07A61491) INSTRUMENTATION AND I.C.APPLICATIONS LAB

Any five experiments from Each Lab

(A) INSTRUMENTATION LAB

1. Calibration of Pressure Gauges
2. Calibration of transducer for temperature measurement.
3. Study and calibration of LVDT transducer for displacement measurement.
4. Calibration of strain gauge for temperature measurement.
5. Calibration of thermocouple for temperature measurement.
6. Calibration of capacitive transducer for angular displacement.
7. Study and calibration of photo and magnetic speed pickups for the measurement of speed.
8. Calibration of resistance temperature detector for temperature measurement.
9. Study and calibration of a rotometer for flow measurement.
10. Study and use of a Seismic pickup for the measurement of vibration amplitude of an engine bed at various loads.
11. Study and calibration of Mcleod gauge for low pressure.

REFERENCE BOOK :

Metallography Laboratory Practice / George / KEHL

(B) IC APPLICATIONS LAB

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

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

III Year B.Tech. MC II-Sem

T	P	C
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(07A61492) 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, Rontledge 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.

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. MC I-Sem

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(07A7EC03) OPERATIONS RESEARCH

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.

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, Arhur Yasan & Lawrence Friedman
3. Operations Research / R.Pannerseivam, 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

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IV Year B.Tech. MC I-Sem

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(07A7EC43) MICROPROCESSORS AND MICRO CONTROLLERS

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 scheme, 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.

REFERENCE BOOKS:

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.

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IV Year B.Tech. MC I-Sem

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(07A7EC07) 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 Slow time / 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.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

IV Year B.Tech. MC I-Sem

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(07A71401) MOTION CONTROL DESIGN**UNIT - I**

Introduction to motion control, Electric motors, Pneumatics, Hydraulics

Unit - II

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

Unit - III

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

Unit - IV

Electric drives – various drive modes – position, velocity, torque, bipolar, MOSFET, IGBT drives – Over current protection – electronic commutation with hall effect sensor feedback vector drives.

Unit - V

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

Unit - VI

Interpolation techniques / functionalities in multiaxis motion control :
Creation mechanism : Point to point, linear, circular, _____, Jointed mechanism : Forward kinematics, Inverse kinematics, programmability and functionality of a servo motion controller.

UNIT - VII INDUSTRIAL HYDRAULICS

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

UNIT - VIII INDUSTRIAL PNEUMATICS :

Symbolic representations of Pneumatic elements – Compressor and air installation – Pneumatic circuits using Pneumatic cylinders and other elements – Applications to fluidics – Biselectors.

REFERENCE BOOKS :

Designing of Intelligent Machines, Open University, London 1995.
Introduction to Mechatronics and Measurement Systems.

TEXT BOOKS :

Principles of Machine Tools – Sen & Bhattacharya
Manuals on Mechatronics – CITD, Hyderabad.
Mechatronics – W. Bolton, Addison Wesley Longmont Ltd. 1999.
Control Sensors and Actuators – C.W.Desukva Prentice Hall, 1989.

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HYDERABAD (A.P.)**

IV Year B.Tech. MC I-Sem

T	P	C
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**(07A71402) PRODUCT DESIGN AND ASSEMBLY AUTOMATION
(Elective – I)**

UNIT – I

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

UNIT – II

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

UNIT-III

ASSEMBLE ADVANTAGES: Development of the assemble process, choice of assemble method assemble advantages social effects of automation.

UNIT-IV

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

UNIT-V

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

UNIT-VI:

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

UNIT-VII

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

UNIT-VIII:

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

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

TEXTBOOK:

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

REFERENCE BOOKS:

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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IV Year B.Tech. MC I-Sem

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**(07A7EC02) NONCONVENTIONAL SOURCES OF ENERGY
(ELECTIVE - I)**

UNIT - I

PRINCIPLES OF SOLAR RADIATION : Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

SOLAR ENERGY COLLECTION : Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT-III

SOLAR ENERGY STORAGE AND APPLICATIONS : Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-IV

WIND ENERGY : Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

UNIT-V

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

UNIT-VI

GEOTHERMAL ENERGY : Resources, types of wells, methods of harnessing the energy, potential in India.

UNIT-VII

OCEAN ENERGY : OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT-VIII

DIRECT ENERGY CONVERSION : Need for DEC, Carnot cycle, limitations, principles of DEC.

Thermo-electric generators, seebeck, peltier and joul Thomson effects, Figure of merit, materials, applications,

MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD

Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:

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

REFERENCES:

1. Renewable Energy Sources /Twidell & Weir
2. Solar Energy /Sukhame
3. Solar Power Engineering / B.S Magal Frank Kreith & J.F Kreith.
4. Principles of Solar Energy / Frank Krieth & John F Kreider.
5. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
6. Non-Conventional Energy Systems / K Mittal /Wheeler
7. Renewable Energy Technologies /Ramesh & Kumar /Narosa

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. MC I-Sem

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**(07A7EC08) COMPUTATIONAL FLUID DYNAMICS
(ELECTIVE – I)**

UNIT-I

Elementary details in numerical Techniques: Number system and errors, Representation of integers, Fractions, Floating point Arithmetic, loss of significance and error propagation, condition 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 Transfer: Introduction, conservation of mass, Newton's second law of motion, expanded forms of Navier-stokes equations, conservation of energy principle, special forms of the Navier-stokes equations.

UNIT - VII

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

UNIT -VIII

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

TEXT BOOK :

1. Numerical heat transfer and fluid flow / Suhas 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.

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HYDERABAD**

IV Year B.Tech. MC I-Sem

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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 traversal 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 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: HYDERABAD (A.P.)

IV Year B.Tech. MC I-Sem

T	P	C
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(07A7EC11) POWER PLANT ENGINEERING (ELECTIVE – II)

UNIT – I:

Introduction to the Sources of Energy – Resources and Development of Power in India.

STEAM POWER PLANT: Plant Layout, Working of different Circuits, Fuel and handling equipments, types of coals, coal handling, choice of handling equipment, coal storage, Ash handling systems.

UNIT II:

STEAM POWER PLANT:

COMBUSTION PROCESS: Properties of coal – overfeed and underfeed fuel beds, traveling grate stokers, spreader stokers, retort stokers, pulverized fuel burning system and its components, combustion needs and draught system, cyclone furnace, design and construction, Dust collectors, cooling towers and heat rejection. Corrosion and feed water treatment.

UNIT – III

INTERNAL COMBUSTION ENGINE PLANT:

DIESEL POWER PLANT: Introduction – IC Engines, types, construction – Plant layout with auxiliaries – fuel supply system, air starting equipment, lubrication and cooling system – super charging.

UNIT IV:

GAS TURBINE PLANT: Introduction – classification – construction – Layout with auxiliaries – Principles of working of closed and open cycle gas turbines. Combined Cycle Power Plants and comparison.

UNIT – V

HYDRO ELECTRIC POWER PLANT: Water power – Hydrological cycle / flow measurement – drainage area characteristics – Hydrographs – storage and Pondage – classification of dams and spill ways.

HYDRO PROJECTS AND PLANT: Classification – Typical layouts – plant auxiliaries – plant operation pumped storage plants.

UNIT VI:

POWER FROM NON-CONVENTIONAL SOURCES: Utilization of Solar-Collectors- Principle of Working, Wind Energy – types – HAWT, VAWT -Tidal Energy

DIRECT ENERGY CONVERSION: Solar energy Fuel cells, Thermo electric and Thermo ionic, MHD generation.

UNIT – VII

NUCLEAR POWER STATION: Nuclear fuel – breeding and fertile materials – Nuclear reactor – reactor operation.

TYPES OF REACTORS: Pressurized water reactor, Boiling water reactor, sodium-graphite reactor, fast Breeder Reactor, Homogeneous Reactor, Gas cooled Reactor, Radiation hazards and shielding – radioactive waste disposal.

UNIT – VIII

POWER PLANT ECONOMICS AND ENVIRONMENTAL CONSIDERATIONS: Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution, Load curves, load duration curve.

Definitions of connected load, Maximum demand, demand factor, average load, load factor, diversity factor – related exercises.

Effluents from power plants and Impact on environment – pollutants and pollution standards – Methods of Pollution control.

TEXT BOOKS:

1. A Text Book of Power Plant Engineering / Rajput / Laxmi Publications

REFERENCE BOOKS:

1. Power Plant Engineering: P.K.Nag/ II Edition /TMH.
2. Power Plant Engineering – P.C.Sharma / S.K.Kataria Pub
3. A Course in Power Plant Engineering: / Arora and S. Domkundwar.
4. Power station Engineering – ElWakil / McHill.
5. An Introduction to Power Plant Technology / G.D. Rai.
6. Power Plant Engineering – K.K Ramalingam / Scitech Publications (India) Pvt Ltd.

Pre-Requisite: 1. Thermodynamics

2. Thermal Engineering - I

3. Thermal Engineering - II

Objective: To identify different sources of energy and different means of using these resources to produce power and to understand the layout of different power plants.

Tables/Codes: NIL

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. MC I-Sem

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(07A7EC45) AUTOMOBILE ENGINEERING

UNIT – I

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

UNIT – II

Fuel System : S.I. Engine : Fuel supply systems, Mechanical and electrical fuel pump – filters – carburettor – types – air filters – petrol injection.

C.I. Engines : Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, spray formation, injection timing, testing of fuel pumps.

UNIT – III

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

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

Unit – IV

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

UNIT – V

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

UNIT – VI

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

UNIT – VII

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

UNIT – VIII

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

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

TEXT BOOKS :

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

REFERENCES :

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

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

IV Year B.Tech. MC I-Sem

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**(07A70302) ADVANCED KINEMATICS AND DYNAMICS OF MACHINERY
(Elective – II)**

UNIT-I:

Geometry of motion-Grublers Criterion for plain and spatial mechanisms-Grashoff's law for planar and spatial mechanisms, Kutn Batch criterion for planar and spatial mechanisms

UNIT – II

Velocity and acceleration analysis, use of computers in analysis. Velocity and accelerations analysis of complex mechanisms. Auxiliary point method, Goodman's analysis.

UNIT-III:

Coupler curves, Robert's Chebychev spacing method. Cognate linkages. Path curvature- Polodes- Euler Savary equation -Bobiller and Hartman's Construction-Equivalent mechanisms.

UNIT-IV:

Space mechanisms and mobility equations: Positional problems. Vector analysis of velocity and accelerations.

UNIT-V:

Theorem of angular velocities and accelerations –computer aided analysis.

UNIT-VI:

Static force analysis of plane and spatial mechanisms: Inertia forces and torques. Dynamic force analysis, application of computer animation and simulation of motion studies.

UNIT-VII:

Dynamic Motion Analysis: Quinn's energy distribution method, the equivalent mass and force method. The rate of change of energy method, dynamic motion simulation.

UNIT-VIII:

Synthesis of linkages: Two position synthesis. Properties of rotapole, Chebychev spacing. Optimization of the transmission angles. The overlay method; Three-position synthesis; point position reduction; synthesis of dwell mechanisms; synthesis using complex numbers and matrices, Freudenstain equation. Computer aided kinematic synthesis.

Codes / Tables: No table/code books required for examination

Objective: To understand the formation of different mechanisms, different motions possible by modifications in the mechanisms, construction of velocity and acceleration diagram to understand analysis of various mechanisms w.r.t. motion. To enable student to draw free body diagram and to enable to conduct force analysis.

TEXTBOOKS:

1. Kinematics and Dynamics and design of machinery, Waldron, Wiley Publishers.
2. Shigley : J.E. Kinematic Analysis of mechanism, McGraw '11.

Reference for Books

1. Hirschcom : J.K.. KinciBcs and Dynamics of Plane Mechanisms Mc.Graw Hill.
2. Holewenko, A.R. Dynamics of machinery, John Wiley & Sons.

**JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. MC I-Sem

T	P	C
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**(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, 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.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

IV Year B.Tech. MC I-Sem

T	P	C
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(07A71491) MICROPROCESSORS AND MICROCONTROLLERS LAB

I. Microprocessor 8086:

Introduction to MASM/TASM.

Arithmetic operation – Multi byte addition and subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.

Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.

By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.

Modular Program: Procedure, Near and Far implementation, Recursion.

Dos/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.

II. Interfacing

8259 – Interrupt Controller.

8279 – Keyboard Display.

8255 – PPI.

8251 – USART.

III. Micro controller 8051:

1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.
4. Understanding three memory areas of 00 – FF (Programs using above areas).
5. Using external interrupts
6. Programs using special instructions like swap, bit/byte, set/reset etc.
7. Programs based on short, page, absolute addressing.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

IV Year B.Tech. MC I-Sem

T	P	C
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(07A71492) MOTION CONTROL AND ROBOTICS LAB

MOTION CONTROL ROBOTICS LAB

1. Study of the following equipment :
 - a. Study of different types of drives
 - b. Relief Valve
 - c. Flow Control Valves
 - d. Directional Control Valves
2. Circuits for reciprocating motion of a single acting and double acting pneumatic cylinders.
3. Circuits for rotary & reciprocating motion of hydraulic cylinder.
4. Circuits for speed control of a (a) double acting pneumatic cylinder. (b) Double acting hydraulic Cylinder.
5. Circuits for semi automatic and automatic operation of a double acting cylinder.
6. Circuits for sequencing motion of two pneumatic cylinder (a) by cascading (b) by using a sequence valve (c) by using a microprocessor
7. Circuits for deceleration motion of hydraulic cylinder.
8. Circuits for Measurement of pressure of air/oil in fluid power system.
9. Circuits for Measurement of flow rate in a fluid power system.

Pre-requisite:

Objective: *The objective of this subject is to provide the basic concepts about Computer aided design and manufacturing. Also it covers advance topics in computer applications in design and manufacturing.*

Codes / Tables: Nil

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

IV Year B.Tech. MC II-Sem

T	P	C
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(07A82001) FLEXIBLE MANUFACTURING SYSTEM

UNIT - I

Introduction: Types of production, characteristics, applications, Flexibility in Machining systems, need for FMS, Flexible Automation, where to apply FMS technology.

UNIT - II

Flexible Manufacturing Cell: Characteristics, Flexible Machining systems, achieving flexibility in machining systems, Machine cell design, quantitative techniques.

UNIT - III

Group Technology (GT) - Part classification and coding systems: Part families, Parts classification and coding, Optiz system, structure, MULTICODE, differences between Optiz and MULTICODE systems, relative benefits.

UNIT - IV

GT- production flow analysis: Composite part concept, numerical problems for parts clustering, advantages of GT in manufacturing and design.

UNIT - V

Components of FMS: FMS layout configurations, Planning the FMS, FMS's Workstations, Material Handling systems, Automatic Guided vehicle systems, Automated storage and retrieval systems, and Computer control systems.

Unit - VI

Implementing FMS: FMS Layout configurations, Quantitative Analysis methods for FMS, Applications and benefits of FMS, problems in implementing FMS.

Unit - VII

Computer Aided Process planning: Importance, generative and retrieval systems, advantages and disadvantages, Generation of route sheets, selection of optimal machining parameters, methods.

Computer aided quality control and testing: Coordinate measuring machines, over view, contact and non contact inspection principles, Part programming coordinate measuring machines, In-cycle gauging.

Unit - VIII

NETWORKING FOR MANUFACTURING SYSTEMS: Hierarchy of computers in manufacturing, benefits of hierarchical structure, types of networks, characteristics, methods of communication, local area networks, network topologies, access methods and Manufacturing Automation Protocol (MAP).

Text Books:

1. Automation, Production systems and Computer Integrated Manufacturing System - Mikell P. Groover
2. The design and operation of FMS - Dr. Paul Ranky Nort - Holland Publishers

References:

1. Flexible Manufacturing systems in practice by Joseph talvage and roger G. Hannam, Marcel Dekker Inc., Newyork
2. Hand book of FMS - Nand Jha .K.
3. FMS and control of machine tools - V. Ratmirov, MIR publications
4. Flexible Manufacturing - David J. Parrish

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. MC II-Sem

T	P	C
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**(07A8EC04) AUTOMATION IN MANUFACTURING
(ELECTIVE - III)**

UNIT - I

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

UNIT - II

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

UNIT - III

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

UNIT - IV

Assembly system and line balancing : Assembly process and systems assembly line, line balancing methods, ways of improving line balance, flexible assembly lines.

UNIT - V

Automated material handling : Types of equipment, functions, analysis and design of material handling systems conveyor systems, automated guided vehicle systems.

UNIT - VI

Automated storage systems, Automated storage and retrieval systems; work in process storage, interfacing handling and storage with manufacturing.

UNIT - VII

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./ PE/PHI

REFERENCES :

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

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

IV Year B.Tech. MC II-Sem

T	P	C
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**(07A8EC01) PRODUCTION PLANNING AND CONTROL
(Elective – III)**

UNIT – I

Introduction : Definition – Objectives of production Planning and Control – Functions of production planning and control – Elements of production control – Types of production – Organization of production planning and control department – Internal organization of department.

UNIT – II

Forecasting – Importance of forecasting – Types of forecasting, their uses – General principles of forecasting – Forecasting techniques – qualitative methods and quantitative methods.

UNIT – III

Inventory management – Functions of inventories – relevant inventory costs – ABC analysis – VED analysis – EOQ model – Inventory control systems – P-Systems and Q-Systems –

UNIT – IV

Introduction to MRP & ERP, LOB (Line of Balance), JIT inventory, and Japanese concepts.

UNIT – V

Routing – Definition – Routing procedure – Route sheets – Bill of material – Factors affecting routing procedure. Schedule – definition – Difference with loading

UNIT – VI

Scheduling Policies – Techniques, Standard scheduling methods,

UNIT – VII

Line Balancing, Aggregate planning, Chase planning, Expediting, controlling aspects.

UNIT – VIII

Dispatching – Activities of dispatcher – Dispatching procedure – followup – definition – Reason for existence of functions – types of followup, applications of computer in production planning and control.

TEXT BOOKS:

1. Elements of Production Planning and Control / Samuel Eilon.
2. Modern Production / Operations Management / Baffa & Rakesh Sarin.
3. Operations Management / Joseph Monks.

REFERENCE BOOKS :

1. Operations Management – S.N. Chary.
2. Inventory Control Theory and Practice / Martin K. Starr and David W. Miller.
3. Reliability Engineering & Quality Engineering by Dr. C. Nadha Muni Reddy and Dr. K. Vijaya Kumar Reddy, Galgotia Publications, Pvt., Limited.
4. Production Control A Quantitative Approach / John E. Biegel.
5. Production Control / Moore.

Pre-requisite:**Objective:****Codes / Tables:****Question Paper Pattern:**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

IV Year B.Tech. MC II-Sem

T	P	C
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**(07A81401) CONCURRENT ENGINEERING
(ELECTIVE – II)**

UNIT – I

Introduction : Development of Concurrent Engineering. The mean and activity concepts and principles. Examples.

UNIT – II :

Concurrent Engineering Tools and Technologies : Changes in to Technologies, Tasks, Talents and times into well managed resources product developments.

UNIT – III :

Research in Engineering design and manufacturing : Theory applications using the concurrent Engineering concepts and Principles.

UNIT-IV

Simultaneous design and all related processes of a product.

UNIT – V :

The mission and vision of C.E. : Computer optimized manufacturing (COM). The next generation of computer integrated manufacturing (CIM).

UNIT-VI

Global competitiveness and development of high quality product. Offline reliability

UNIT – VII

Managing the concurrent Engineering: Contemporary Issues a modern Tools and methods. Use of Computers and decision making. Reengineering concepts

UNIT-VIII

Automated Quality Control Application of CMM, Basic concepts, Zero defect, 6 sigma concept, Tolerancing, Examples, DFMA, Rapid Prototyping

TEXT BOOK:

1. Concurrent Engineering: Tools and Technologies for Mechanic Systems Design – Edward, J. Haug.

REFERENCES :

1. Research in Engineering Design : Theory, applications, and concurrent engineering : Vol. 7, No. 1, 1995.
2. Managing Concurrent Engineering. – Jon Turino.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. MC II-Sem

T	P	C
3+1*	0	3

(07A80512) COMPUTER NETWORKS

UNIT - I

Introduction : OSI, TCP/IP and other networks models, Examples of Networks: Novell Networks, Arpanet, Internet, Network Topologies WAN, LAN, MAN.

UNIT - II

Physical Layer : Transmission media copper, twisted pair wireless, switching and encoding asynchronous communications; Narrow band, broad band ISDN and ATM.

UNIT - III

Data link layer : Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Slip, Data link layer in HDLC, Internet, ATM.

UNIT - IV

Medium Access sub layer : ALOHA, MAC addresses, Carrier sense multiple access, IEEE 802.X Standard Ethernet, wireless LANS, Bridges

UNIT - V

Network Layer : Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing.

UNIT - VI

Dynamic routing - Broadcast routing. Rotary for mobility. Congestion, Control Algorithms - General Principles - of Congestion prevention policies. Internet working: The Network layer in the internet and in the ATM Networks.

UNIT - VII

Transport Layer: Transport Services, Connection management, TCP and UDP protocols; ATM AAL Layer Protocol.

UNIT - VIII

Application Layer - Network Security, Domain name system, SNMP, Electronic Mail; the World WEB, Multi Media.

TEXT BOOKS :

1. Computer Networks — Andrew S Tanenbaum, 4th Edition, Pearson Education/PHI
2. Data Communications and Networking — Behrouz A. Forouzan, Third Edition TMH.

REFERENCES :

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. MC II-Sem

T	P	C
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**(07A8EC02) NEURAL NETWORKS AND FUZZY LOGIC SYSTEMS
(Elective - IV)**

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 BOOK:

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 Langan, "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

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

IV Year B.Tech. MC II-Sem

T	P	C
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**(07A80513) MATHEMATICAL MODELING AND SIMULATION
(Elective – IV)**

Unit – I:

Art of Modeling, Types of models, mathematical models – solution methods – analytical, Numerical and Heuristic. L.P.P. – Formulation – Graphical Method, simplex method, dual simplex method and application.

Unit – II:

Transportation models – Assignment models, Integer programming, Non-linear programming.

Unit – III:

Deterministic Inventory models – General Inventory model, Static E.O.Q. Models, Dynamic Inventory model, Probabilistic Inventory models, continuous Review models, single period model and multiple period model.

Unit – IV:

Selective Inventory control – ABC, VED, FSN Analysis. Inventory systems – Fixed order quantity system, two bin system, periodic review systems, Optional Replenishment system and M R P.

Unit – V:

Queuing Theory – Basic Structure of Queuing Models, Role of Exponential Distribution, Birth-and-Death Process, Queuing Models Based on the Birth-and-Death Process, Queuing Models involving Non-exponential Distributions, Priority-Discipline Queuing Models and Queuing Networks. Applications of Queuing Theory – Decision Making, Formulation of Waiting – Cost Function and Decision Models.

Unit – VI:

CPM and PERT – Network Representation, Critical path calculation, construction of Time schedule.

Unit – VII:

Simulation – Introduction, General principles, Random-Number Generation, Random-Variate Generation, Simulation Software.

Unit – VIII:

Input modeling, verification and validation of simulation models, Output Analysis for a single model, Comparison and Evaluation of Alternative System Designs, Simulation of Computer Systems.

Text Books:

- 1) Introduction to Operations Research, Frederick S Hiller and Gerald J Lieberman, 7th Edition, Tata McGrawHill, 2001 (Chapters 17 and 18 for Unit-III).
- 2) Discrete-Event System Simulation, Jerry Banks, John S Carson II, Barry L. Nelson and David M. Nicol, 3rd edition, PHI/Pearson Education (Chapters 1,3,4,7 and 8 for Unit-IV; Chapters 9,10,11,12 and 14 for Unit-V).
- 3) Operations Research – An Introduction, 7th edition, Prentice-Hall of India, 1999 (Chapter 1 to 5 for Unit-I and Chapters 11 and 16 for Unit II, Section 6.7 for Unit-IV).

Reference Books:

- 1) Operation Research – S.K.Jain and D. M. Mehta, Galgotia.
- 2) Introductory Operations Research: Theory & Applications, Kasana, Springer.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. MC II-Sem

T	P	C
3+1*	0	3

**(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 and leading teams, financial controls. Marketing and sales controls. E-commerce and Entrepreneurship, 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 (SSIDCs), 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'

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, Willey, 2005.
13. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2005.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. MC II-Sem

T	P	C
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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.